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# **PILLAI COLLEGE OF ENGINEERING**



## Journal of Computer Engineering

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# Editorial

It takes immense pleasure in launching this issue of the Journal of the Computer Engineering Department, PCE. This journal is a forum for the students and faculty of the department to showcase their work in various eminent fields related to computer engineering and its applications.

This issue has 25 papers comprising the outcome of research work done by the students and the faculty of the computer department, exploring the various domains such as Augmented reality, Machine Learning, Internet of Things, Natural Language Processing, Image Processing, Security, Mobile & Web technologies, E-Commerce and others.

I hope that this journal of Computer Engineering will be helpful for the future aspiring computer engineers and the research students. I thank the editorial team for their efforts put in for the launching of this issue.

**Dr. Sharvari Govilkar**

*Editor-in –Chief*

# Cross Lingual Plagiarism Detection

Sanjeet Bodkhe, Radhika Dhopeswarkar, Simrandeep Kaur Sandhu, Ankush Bhat, and Prof. Sagar Kulkarni

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**Abstract**— *Cross-lingual plagiarism occurs when the source (or original) text(s) is in one language and the plagiarized text is in another language. In recent years, cross-lingual plagiarism detection has attracted the attention of the research community because a large amount of digital text is easily accessible in many languages through online digital repositories and machine translation systems are readily available, making it easier to perform cross-lingual plagiarism and harder to detect it. To develop and evaluate cross-lingual plagiarism detection systems, standard evaluation resources are needed. This detection can be done using Natural Language Processing (NLP). NLP is broadly defined as the automatic manipulation of natural language, like speech and text, by software. In our project, recognizing semantically similar sentences or paragraphs across languages is beneficial for many tasks, ranging from cross-lingual information retrieval and plagiarism detection to machine translation. Cross-lingual semantic textual similarity systems estimate the degree of the meaning similarity between two sentences, each in a different language. A straightforward approach based on machine translation is to use translated text so as to make the problem monolingual. Back-translation is translating target language to source language and comparing both original source sentence and back-translated sentence to find the semantic similarities. Semantic Textual Similarity (STS) assesses the degree to which two sentences are semantically equivalent to each other. In general, the objective is to locate the fragments of a document that are derived from another text.*

**Keywords**—Plagiarism, Semantic Analysis, Multivariate Pattern Detection, Translation, Corpus.

## 1. Introduction

Plagiarism can be defined as the reuse of someone else's ideas, results, or words without acknowledging the original source. Cross-Language Plagiarism Detection (CLPD) consists in discriminating semantically similar texts independent of the languages they are written in, when no reference to the original source is given. CLPD issue has acquired pronounced importance lately since semantic contents of a document can be easily and discreetly plagiarized through the use of translation (human or machine-based). Semantic similarity is often confused with semantic relatedness, where the second one includes any relation between two terms. For example, "car" and "bus" are similar in that they are connected via a relation with "vehicle", but are only related to "road" and "driving". Natural language utterances are, in general, highly ambiguous, because of the multiple possible meaning or senses that words may have (polysemous) or

malapropism which is the confounding of an intended word with another word of similar sound or similar spelling that has a quite different and malapropos meaning, and interpretation can generally be determined only by taking into account the context in which the utterance occurred. Thus Cross-language plagiarism detection deals with the automatic identification and extraction of plagiarism in a multilingual setting. In this setting, a suspicious document is given, and the task is to retrieve all sections from the document that originate from a large corpus of cross-lingual cases of plagiarism for a language pair developed.

## 2. Literature Survey

**A. Corpus for Urdu-English Language Pair:** The main goal of this study was to develop a large benchmark corpus of cross-lingual cases of plagiarism for Urdu-English language pair at four levels of rewrite including automatic translation, artificial paraphrasing, manual paraphrasing, and non-plagiarized. Wikipedia articles are used as source texts and categorized into small, medium, and large documents. (a) Automatic Translation. (b) Artificially Paraphrasing. (c) Manually Paraphrased Copy. (d) Non-plagiarized.[1]

**B. Multivariate pattern detection for recognition of text similarities:** Plagiarism detection has been transformed into a big data analytics problem since the number of digital sources is extravagant and a new document needs to be compared with millions of other existing documents. In this paper, a text mining methodology is proposed that can detect all common patterns between a document and the documents in a reference database. The technique is based on a pattern detection algorithm and the corresponding data structure that enables the algorithm to detect all common patterns. The methodology has been applied in a well-defined dataset providing very promising results identifying difficult cases of plagiarism such as technical disguise.[2]

**C. Cross Language Plagiarism Detection:** Here the basic retrieval strategy for the task, includes two important subtasks which require special attention: the heuristic multilingual retrieval of potential source

candidates for plagiarism from the Web, and the detailed comparison of two documents across languages. With respect to the former, well-known and less well-known state-of-the-art research is reviewed. With respect to the latter, the survey of existing retrieval models describes three of them in detail, namely the cross-language character n-gram model (CL-CNG), the cross-language explicit semantic analysis (CL-ESA) and the cross-language alignment-based similarity analysis (CL-ASA). [3]

### 3. Proposed Work

Cross-lingual semantic textual similarity systems estimate the degree of the meaning similarity between two sentences, each in a different language. A straightforward approach based on machine translation is to use translated text so as to make the problem monolingual. Back-translation is translating target language to source language and comparing both original source sentence and back-translated sentence to find the semantic similarities. Semantic Textual Similarity (STS) assesses the degree to which two sentences are semantically equivalent to each other. The objective is to locate the fragments of a document that are derived from another text.

#### 3.1 System Architecture

The system architecture is given in Figure 1.

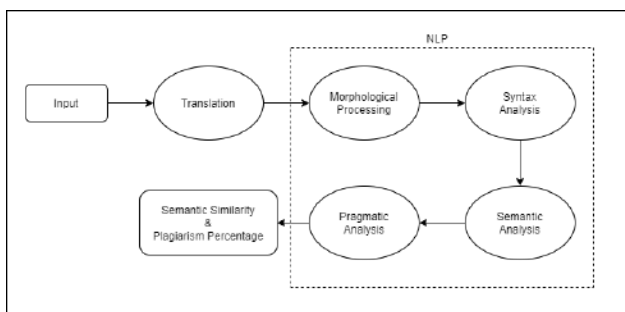


Fig. 1 Proposed system architecture

**A)Input:** It can be any suspicious text or a document that needs to undergo plagiarism detection.

**B)Translation:** The source document will be translated into target language which is ENGLISH using Google Translator.

**C)Morphological Processing:** It is the first phase of NLP. The purpose of this phase is to break chunks of language

input into sets of tokens corresponding to paragraphs, sentences and words. For example, a word like “uneasy” can be broken into two sub-word tokens as “un-easy”.

**D)Syntax Analysis:** It is the second phase of NLP. The purpose of this phase is two folds: to check that a sentence is well formed or not and to break it up into a structure that shows the syntactic relationships between the different words. For example, the sentence like “The school goes to the boy” would be rejected by a syntax analyzer or parser.

**E)Semantic Analysis:** It is the third phase of NLP. The purpose of this phase is to draw exact meaning, or you can say dictionary meaning from the text. The text is checked for meaningfulness. For example, a semantic analyzer would reject a sentence like “Hot ice-cream”.

**F)Pragmatic Analysis:** It is the fourth phase of NLP. Pragmatic analysis simply fits the actual objects/events, which exist in a given context with object references obtained during the last phase (semantic analysis). For example, the sentence “Put the banana in the basket on the shelf” can have two semantic interpretations and pragmatic analyzer will choose between these two possibilities.

**G)Semantic Similarity & Plagiarism Percentage:** Semantic Textual Similarity (STS) assesses the degree to which two documents are semantically equivalent to each other and gives the plagiarism percentage as the output.

**H)N-Grams Model:** A contiguous sequence of N items from a given sample of text or speech. Here an item can be a character, a word or a sentence and N can be any integer. An n-gram is a set of N consecutive words and we use them as the building blocks of our model. We can use the n-gram model for the specific case of n equals one (N=1) which is also called unigrams (for N=2 they are called bigrams, for N=3 trigrams, four-grams and so on...). When dealing with N-grams, special tokens to denote the beginning and end of a sentence are sometimes used. In other words, a model that simply relies on how often a word occurs without looking at previous words is called unigram. If a model considers only the previous word to predict the current word, then it's called bigram. If two previous words are considered, then it's a trigram model.

**Combining n-grams:** We can combine multiple n-grams models, which is called backoff: for a given document we may use trigrams when found in the training table. Otherwise, if a trigram is not found, we then try to use the bigrams or directly fallback to use unigrams.

**I)Character N-Gram Model:** The number N of characters considered (N-grams) is defined beforehand and constant.



In general, the character N-grams considered are bigrams or trigrams (4-grams or 5-grams). Character n-grams are found in text documents by representing the document as a sequence of characters. These n-grams are then extracted from this sequence and a model is trained. There are a number of different models for this, but a standard one is very similar to the bag-of-words model we have used earlier. For each distinct n-gram in the training corpus, we create a feature for it. An example of an n-gram is  $\langle e \ t \rangle$ , which is the letter e, space, and then the letter t (the angle brackets are used to denote the start and end of the n-gram).

#### 4. Requirement Analysis

The implementation detail is given in this section.

##### 4.1 Software

Operating System	Windows XP Professional With Service pack 2
Programming Language	Python 3.8

Table 4.1 Software details

##### 4.2 Hardware

Processor	2 GHz Intel
HDD	180 GB
RAM	2 GB

Table 4.2 Hardware details

##### 4.3 Dataset and Parameters

Hindi is an under-resourced language as large repositories of digital texts in this language are not readily available for the research purposes. Hindi newspapers in India mostly publish news stories in an image format which is not suitable for text processing. Therefore, to collect realistic, high-quality, and diversified source articles for generating Corpus, we selected Wikipedia as a source. Wikipedia is a free and publicly available, multitopic, and multilingual resource. Initially, Wikipedia contains an

article in multiple languages which makes it possible to be considered as a comparable corpus.

#### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof. Sagar Kulkarni for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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# A Survey of Techniques for Fitness Products Recommendation using Chatbot

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**Abstract**— *A sedentary lifestyle and a lack of proper nutrition can take a toll on a person's body. An active body plus proper nutrition is necessary to keep a healthy mind and sustain in this growing competitive environment. E-commerce websites are a way of getting fitness related products at one click away. Nowadays companies make huge investments in e-commerce applications so as to reach out to a wider audience. So to increase the utility of the e-commerce application and to make it more friendly, a chatbot technology is required. To bridge this gap we propose a project where customers can have one to one conversation with a chatbot and get the most suitable fitness related products for them. Our chatbot will suggest the user to buy products on our website as per users need. Chatbot will filter out which food products (whey supplements, nutrition bars & many more) that are best suitable for the user by calculating their BMI (Body Mass Index) based on the age, height and weight predefined in the dataset. Also functionalities like showing nutrition chart of product, calorie intake for a person, will also be answered by chatbot after taking necessary information from the user.*

**Keywords**—Chatbot, E-commerce, Nutrition, Supplements, BMI.

## 1 Introduction

E-commerce is the activity of electronically buying or selling products on online services or over the Internet. It is supported by electronic business for retail sales direct to consumers via Websites and mobile apps, and conversational commerce via live chat, chatbots, and voice assistants. Chatbot is an Artificial Intelligence software that takes an input from the users in the form of conversations and replies them in the form of conversations or by making some actions. Here, In smart chatbot we will be making conversation with the users who need opinions about buying a product from our E-commerce website.

## 2. Literature Survey

**A. Design of E-Commerce Chat Robot for Automatically Answering Customer Question [1]:** This chatbot uses a

telegram question-answer corpora. When a user asks a question the bot goes to question-answer corpora and it tries to find the related answer within less than 5 seconds. Advantages: This chatbot uses a telegram question-answer corpora. Disadvantages: It is not user friendly.

**B. SuperAgent: A Customer Service Chatbot for E-commerce Websites [2]:** When a user asks a question

to the SuperAgent bot, it surfs the the data in-page product descriptions and then provides the user with an answer (reply). This superagent frees up the work of a human staff and only lets them answer higher level questions.

Advantages: When a user asks a question to the SuperAgent bot, it surfs the data in-page product descriptions and then provides the user with an answer.

Disadvantages: This superagent frees up the work of a human staff and only lets them answer higher level questions.

**C. An E-Commerce Website based Chatbot [3]:** This chatbot can make conversations with the users in simpler language. It helps the user to make the decision of the desired product. It acts as an online automated assistant.

Advantages: This chatbot can make conversations with the users in simpler language.

Disadvantages: This chatbot cannot respond to complicated syntax only plain text.

**D. Design and implementation of a chatbot for e-commerce [4]:** It works as an Order taking and Recommender bot. The main goal of this proposed design is to make conversion faster.

Advantages: It works as an Order taking and Recommender bot.

Disadvantages: It has a limitation for only to be used by a few applications like telegram, Instagram and chatbot is very tangled and confusing for a newcomer.

## 2.1 Summary of Related Work

The summary of methods used in literature is given in Table 1.

Table 1 Summary of literature survey

Literature	Asking Questions	Complex	User Friendly
AM. Ali Fauzi, Eko Sakti Pramukantoro et al. 2017 [1]	Yes	No	No
LeiCui*,Shaohan Huang*,Furu Wei,Chuanqi Tan,Chaoqun Duan, andMing Zhou et al. 2017 [2]	No	Yes	No
Siddharth Gupta, Deep Borkar,Chevelyn De Mello, Saurabh Patil et al. 2015 [3]	Yes	Yes	Yes
Amir-reza Asadi and Reza Hemadi et al. 2018 [4]	Yes	Yes	Yes

The overview of comparison of different parameters are given in Table 2

Table 2 Summary of literature survey

Literature	Use of Data Source	Simple language	Limitation
AM. Ali Fauzi, Eko Sakti Pramukantoro et al. 2017 [1]	Yes	No	No
LeiCui*,Shaohan Huang*,Furu Wei,Chuanqi Tan,Chaoqun Duan, andMing Zhou et al. 2017 [2]	Yes	No	Yes
Siddharth Gupta, Deep Borkar,Chevelyn De Mello, Saurabh Patil et al. 2015 [3]	Yes	Yes	Yes
Amir-reza Asadi and Reza Hemadi et al. 2018 [4]	Yes	Yes	Yes

## 2.2 Literature Review

**Buddy Nutrition** [6]: Buddy Nutrition sells protein powder using chatbot with highly personalized vitamin “shots” that take into account age, weight, level of activity, the goal you want to achieve as well as what flavors you like.

**Healthkart** [7]: Healthkart offers various Professional weight management and fitness services. Services like expert consultations, product recommendations, health tips,etc.

### 3 Proposed Work

Smart chatbot for a fitness product is gonna be a fairly simple program for the user to understand because when a user launches the website then first he can either search for the products or the user can directly start chatting with the chatbot. The chatbot will first ask the name of the user and then it will ask for its height and weight which is prominently used for calculating the BMI that is body mass index. Once the user gets to know about its body mass index the chatbot will store the result into its datasheet. Then the chatbot will ask the user a question that what does the user want to buy today so the user will answer it and the chatbot will search for the listen to relative answer using the datasheet and comparing it with the users body mass index and then only it will reply to the user.

#### 3.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.

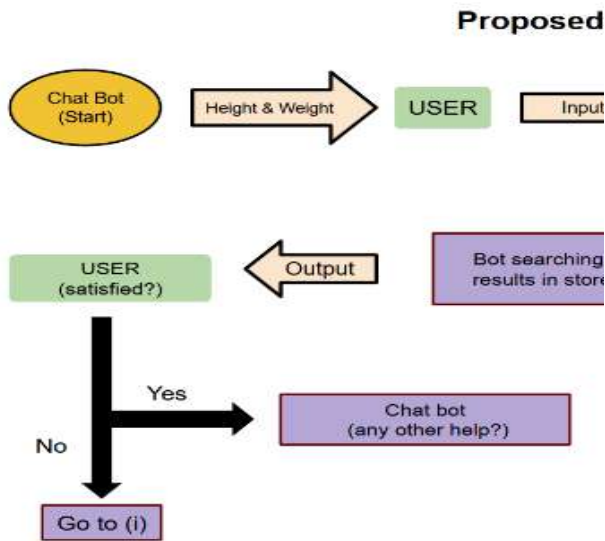


Fig. 1 Proposed system architecture

*A/* In the first block, the customer visits the website. Where we have built a website by using HTML5, CSS3, and different frameworks. The user goes to the chatbot for a fitness-related suggestion and starts the conversation. We have used some datasets for this conversation which will help to detect the desired product. The dataset can consist of age, weight, gender, etc. We have built the chatbot by using a python programming language with some libraries. The libraries used for this chatbot are

NLTK, chatterbot, Tkinter. Tkinter helps with the GUI of chatbots and NLTK is a natural language toolkit for symbolic and statistical natural language processing. A chatbot is a python library that makes it easy to generate an automated response to a user's input. Chatterbot uses a selection of machine learning algorithms to produce different types of responses.

*B/* The second part receives a message from the user for example "hello" chatbot will respond to this message with the help of NLTK. The description of NLTK in the previous step. Then the user will ask for their query. The chatbot will ask the age, name, weight, gender and calculate the BMI. The basic formula for calculating a BMI is  $BMI = kg/m^2$ . Then the chatbot will suggest a product or nutrients suitable to their body type and health.

*C/* After the suggestion the user has to say that they want to go with the suggested product or not. If the user says yes then the product will be added to the cart and the process repeats asking what the user wants to buy either the conversation will stop. Users get automatically checked out from the conversation.

*D/* After the user says yes to the suggested product, the chatbot will ask that the user want more help related to their fitness. Then again the user will ask the query and the chatbot will give proper suggestions.

### 3 Requirement Analysis

The implementation detail is given in this section.

#### 3.1 Software

Operating System	Windows 7 and Above
Programming Language	Javascript, Python, HTML5, CSS
Framework	Microsoft Bot Framework
Database	MySQL

### 3.2 Hardware

Processor	2 GHz Intel
HDD	180 GB
RAM	2 GB

### 3.3 Dataset and Parameters

Datasets of different types of food and products along with their respective amount of fats, proteins, calories and carbohydrates is referred to deduce a specialised parameter and suggest different products to the users.

#### ACKNOWLEDGMENT

We would like to express our special thanks to Principal Dr. Sandeep Joshi, H.O.D. Dr. Sharvari Govilkar and Guide Prof. Blessy. V. who gave us the opportunity to do this project in the topic Smart Chatbot For Fitness Product Hub, which helped us in applying the knowledge that we have acquired during the semester and learn new concepts. We take this opportunity to thank all other subject teachers who have directly or indirectly helped our project. We pay our respects and love to our parents and all other family members and friends for their love and encouragement throughout our career. Last but not the least we express our thanks to our friends for their cooperation and support. We are immensely grateful to all of them for sharing their pearls of wisdom with us during this course of final year major project.

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# ASK IMAGE:

## A chatbot which answers questions on image captions.

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**Abstract**— *Caption generation is a challenging artificial intelligence problem where a textual description must be generated for a given photograph. It requires both methods from computer vision to understand the content of the image and a language model from the field of natural language processing to turn the understanding of the image into words in the right order. A single end-to-end model can be defined to predict a caption, given a photo, instead of requiring sophisticated data preparation or a pipeline of specifically designed models. Conversational AI use cases are diverse. They include customer support, e-commerce, controlling IoT devices, enterprise, productivity and much more. In very simplistic terms, these use cases involve a user asking a specific question (intent) and the conversational experience (or the chatbot) responding to the question by making calls to a backend system like a CRM, Database or an API. It turns out that some of these use cases can be enriched by allowing a user to upload an image. In such cases, you would want the conversation experience to take an action based on what exactly is in that image. In this project we will develop a photo captioning deep learning model and integrate Flickr 8k dataset, SQuAD dataset to provide rich and dynamic ML based responses to user provided image inputs.*

**Keywords**— Natural Language Processing, Caption Generation, Convolutional Neural Networks, Recurrent Neural Networks, Question Processing.

### 1. Introduction

Ask Image whose main objective is to generate captions by processing the input image and integrating a chatbot with it for better conversational experience. Caption generation is a challenging artificial intelligence problem where a textual description must be generated for the given image. It requires both methods from computer vision to understand the content of the image and a language model from the field of natural language processing to turn the understanding of the image into words in the right order. When humans read an article or a short passage from book, the best way for checking a quality of comprehensive reading is trying to make a summary or answering the questions in the context of the part that you read. Therefore in order to mimic this reading process most of the QA systems are aimed to extract important information from a provided article or a short passage to answer the given questions.

### 2. Literature Survey

**A. Enriching Conversation Context in Retrieval-based Chatbots:** This technique is demonstrated by Amir Vakili and Azadeh Shakery from the University of Tehran. This project works on retrieval-based chatbots, like most sequence pair matching tasks, can be divided into Cross-encoders that perform word matching over the pair, and Bi-encoders that encode the pair separately. Development of a sequence matching architecture that utilizes the entire training set as a makeshift knowledge-base during inference is expanded upon. Retrieval-based systems, which select a response from candidates retrieved from chat logs according to how well they match the current conversation context as opposed to generative systems which synthesise new sentences based on the context are studied. Detailed experiments demonstrating that this architecture can be used to further improve Bi-encoders performance while still maintaining a relatively high inference speed are performed. [1]

**B. Survey on Automatic Image Caption Generation:** This survey is executed by Shuang Bai and Shan An for image caption generation. The survey explains in detail about connecting both research communities of computer vision and natural language processing. In this paper, a survey on advances in image captioning research based on the technique adopted and classification of image captioning approaches into different categories is presented. Representative methods in each category are summarized, and their strengths and limitations are talked about. The initial methods discussed are mainly retrieval and template based. Neural network based methods are also discussed, which give state of the art results. Neural network based methods are further divided into subcategories based on the specific framework they use. Each subcategory of neural network based methods are discussed in detail. After that, state of the art methods are compared on benchmark datasets.[2]

**C. An Intelligent Behaviour Shown by Chatbot System:** The Authors Vibhor Sharma, Monika Goyal, Drishti Malik discuss about how chatbots are software agents used to interact between a computer and a human in

natural language, just as people use language for human communication, chatbots use natural language to communicate with human users. In this paper, analysis of some existing chatbot systems namely ELIZA and ALICE is observed. Arrival at a conclusion that it is easier to build bots using ALICE because of its simple pattern matching techniques that building one for ELIZA since it is based on rules is observed. Finally, discussion of the proposed system in which the implementation of ALICE chatbot system as a domain specific chatterbox which is a student information system that helps users in various queries related to students and universities is observed.[3]

**D. Connecting Images and Natural Language:** The Author Andrej Karpathy discussed about the model which is based on a novel combination of a Convolutional Neural Network to process the image and a Recurrent Neural Network Language Model that is conditioned on the image information.

### 3. Proposed Work

Since the input consists of two parts, an image vector and a partial caption, we cannot use the Sequential API provided by the Keras library. For this reason, we use the Functional API which allows us to create Merge Models. First, let's look at the brief architecture which contains the high level sub-modules:

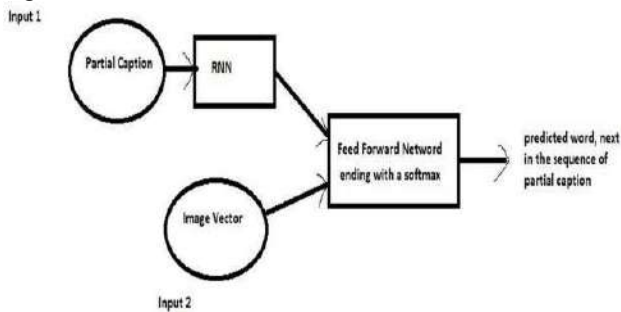


Fig 1: High Level Architecture

The LSTM (Long Short Term Memory) layer is nothing but a specialized Recurrent Neural Network to process the sequence input (partial captions in our case).

### 3.1 System Architecture

The system architecture is given in Figure 2. Each block is described in this Section.

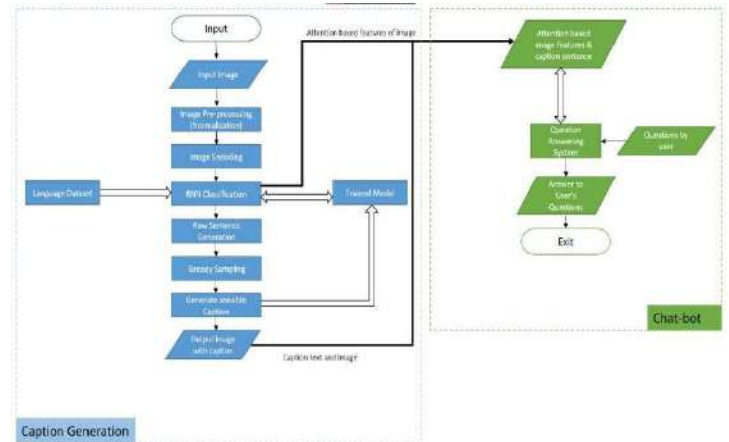


Fig. 2 Proposed system architecture

**A. Image Pre-processing:** Pre-processing is a common name for operations with images at the lowest level of abstraction - both input and output are intensity images. The aim of preprocessing is an improvement of the image data that suppresses unwanted distortions or enhances some image features important for further processing.

**B. Image Encoding:** It is also known as “encoding method”. Image encoding is used to prepare photos to be displayed in a way that most computers and software, as well as browsers, can support. This is often necessary because not all image viewing software is able to open certain image files.

**C. RNN Classification:** Recurrent Neural Networks (RNN) are a type of Neural Network where the output from the previous step is fed as input to the current step.

**D. Language Dataset:** Here we have used SQuAD dataset. Stanford Question Answering Dataset (SQuAD) is a reading comprehension dataset, consisting of questions posed by crowdworkers on a set of Wikipedia articles, where the answer to every question is a segment of text, or span, from the corresponding reading passage, or the question might be unanswerable.

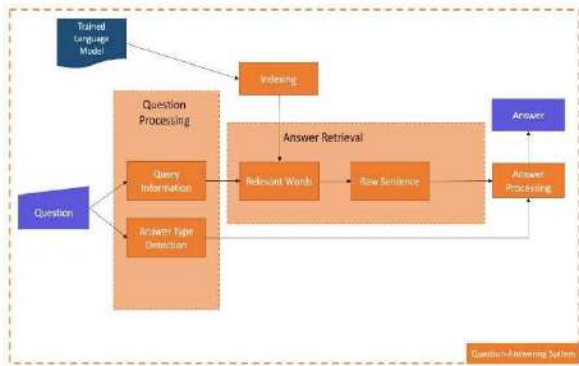


Fig 3: Chatbot Architecture

**E. Information Retrieval-based QA:** IR-based QA systems are sometimes called text-based and relies on unstructured corpus - huge amount of paragraphs on web sites such as news sites or Wikipedia. As can be seen from its name IR methods are used in order to extract passages that can contain an answer to given question. The key phrases or keywords from a question which determine answer type make search query for search engine. The search engine returns the documents which are splitted into many passages. The final possible answer strings are chosen from those passages and most fitted answer is selected as a result. Most of modern open-domain QA systems are IR-based.

**F. Question Processing:** After question processing, some important datais extracted from a question. Based on this information our task is to determine type of answer. It is called answer type recognition, or just question classification and rely on name entity recognition in most of the cases.

**G. Document Processing:** The next step is formulation of queries. For that we use query reformulation rules. The construted query is sent to information retrieval engine running based on a number of indexed documents. As a result, we get a set of documents which are ranked by relevance. The next step is retrieving units – passages, sentences or sections from a large set of documents. First we filter documents which do not contain the entities we got from answer type recognition phase. Secondly, we filter and rank other documents with using simple machine learning.

**H. Answer Processing:** The last step is an extraction of answer for a question from the selected passage or sentence. The main part of this work will focus on an answer processing. I will analyze different advanced sequential models based on embeddings of the given question and the selected passage.

### 3 Requirement Analysis

The implementation detail is given in this section.

#### 3.1 Software

Operating System	Windows 10
Programming Language	Python 3.6+ With following dependencies Pytorch ,Pandas, Keras, Tensorflow 2.1+, Numpy, Opencv2, Transformers

Table 1: Software Details

#### 3.2 Hardware

CPU	Intel Core i5 or higher/AMD Ryzen 5 or higher 8GB DDR4 Memory
GPU	GTX 1050 or higher with min 4GB VRAM

Table 2: Hardware Details(Recommended)

CPU	Intel Core i7/i9 /AMD RYZEN 7/9 with 32GB DDR4 RAM
GPU	GTX1080/ RTX 3090

Table 3: Hardware Details(Ideal)

#### 3.3 Dataset and Parameters

We have used SQuAD dataset. The Stanford Question Answering Dataset (SQuAD) is a set of question and answer pairs that present a strong challenge for NLP models. It tests a model’s ability to read a passage of text and then answer questions about it.

```

model.summary()
-----
Layer (type)                Output Shape              Param #   Connected to
-----
input_0 (InputLayer)        (None, 34)                0         0
input_3 (InputLayer)        (None, 2048)              0         0
embedding_2 (Embedding)     (None, 34, 200)          330400    input_0[0][0]
dropout_3 (Dropout)         (None, 2048)              0         input_3[0][0]
dropout_4 (Dropout)         (None, 34, 200)           0         embedding_2[0][0]
dense_2 (Dense)              (None, 256)              524544    dropout_3[0][0]
lstm_2 (LSTM)                (None, 256)              467968    dropout_4[0][0]
add_2 (Add)                  (None, 256)              0         dense_2[0][0]
                                                                    lstm_2[0][0]
dense_3 (Dense)              (None, 256)              65792     add_2[0][0]
dense_4 (Dense)              (None, 1652)             424564    dense_3[0][0]
-----
Total params: 1,813,268
Trainable params: 1,813,268
Non-trainable params: 0
    
```

Fig 3: Summary of the parameters in the model



#### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof. Dhiraj Amin for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We are thankful to Project coordinators Prof. Rupali Nikhare and Prof. Charumathi K. S. We deeply express our sincere thanks our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to presenting this work.

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# Automatic Grading For Short Answer Script (AGSAS)

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**Abstract**— During checking of answers, teachers usually go through the same lengthy process. This repetitive and monotonous process can cause errors in grading. The same problem can be solved by automatic grading techniques which use Natural Language Processing to grade short answers on basis of its correctness. This is applicable to technical courses, such automated grading techniques will make grading papers not only easy and quick but ethical as well. The grader takes the short answers possibly up to one page and divides it into parts or points and checks for its correctness individually and then makes sense of all of them as a whole answer to then finally come to its conclusion where it assigns the marks to the respective answer. Some of the factors which the grader takes into account are any technical or important terms in the answer as well as the overall depth and meaning of it. Techniques used in this domain can be broadly classified into two types based on their requirement of reference or model answers, Our work focuses on both of these types, i.e questions having a model answer and questions without a model answer. Limitation of these existing techniques is that they either rely on the answers written by students too much or require a well labelled dataset with a variety of scores. So combining the two techniques and using weighted combinations of scores produced by them is the proposed technique used in this work.

**Keywords**—Natural Language Processing, Automatic Grading, Weighted Combination

## 1. Introduction

Automatic short answer grading (ASAG), also known as short answer scoring (SAS), is the task of grading students' short responses, constructed in natural language, with respect to instructor-provided reference answer(s) and/or scoring schemes.

Length: The word short in “short answer” has lacked precise definition in the literature. We find following versions in various text:

- a) “from about one phrase (several words) up to one paragraph”.
- b) “phrases to three to four sentences”.
- c) “a few words to approximately 100 words”.

While the above definitions are imprecise, it is typically not difficult to decide whether an answer can be considered as short. Intuitively, they are not as long as essays but long enough for students to express the answers. The Automatic Grading for Short Answer Script (AGSAS), aims to grade the answers of the students more optimally than the previous techniques. It does so by

combining the existing methods/techniques.

The objectives of this work are as follows:

- a) To study the ASAG techniques and identify their limitations that may help to suggest an optimal approach which may overcome the drawbacks of existing methods.
- b) To understand methods of grading for grading systems and combining the methods that may help the system to give the proper and more accurate grades to the answer.
- c) To identify evaluation metrics used for performance analysis of the grading system.

## 2. Literature Survey

### **A. Wisdom of Students: A Consistent Automatic Short Answer Grading Technique[4]:**

This work proposes an unsupervised technique of grading answers without requiring a model answer.. It consists of 2 steps:

Step 1] : Sequential pattern mining problem - for matching the answers by finding the pattern. This basically means that it tries to create its own answer model answer based on the answers written by the students

Step 2] : Intuition Driven hypothesis - used for grading i.e. it matches the sequential pattern found in the previous step with all the answers and grades them accordingly

Many ASAG techniques have fluctuations in the grading of answers, this Intuition Driven technique shows no such fluctuation. This work provides significantly better correlation than all word similarity based ASAG techniques. This technique would perform the best when all answers are correct in the same manner and worst if in an unlikely case all are wrong in the same manner.

### **B. Distributed Vector Representations for Unsupervised Automatic Short Answer Grading[1]:**

This paper proposes an unsupervised technique of grading answers The technique consists of 2 steps:

Step 1] : Providing model answer and student answer as datasets in which some datasets have presence of a weighted scoring scheme for each question, which demonstrates promise in improving unsupervised ASAG performance when used.

Step 2] : It is observed that for ASAG not all words in student and model answers are equally important. Rather, pairs of related words which appear in student and model answers are more important than some other words. Hence, for evaluation of answers Document and Word vector based approaches are used.

Student answers often contain information beyond the key concepts instructors are looking for, though those extra pieces of text typically do not affect their scores unless they are contradictory or wrong. These shortcomings are taken care by Vecalign and Vecalign-asm.

Vector Representation in ASAG uses techniques like LSA(Latent semantic analysis), Paragraph vectors, Averaging word vectors, Word mover’s distance. This approach increases the precision of ASAG as it uses not only some keywords but uses a string or combination(pairs) of keywords while evaluation which overcomes the problem of dissimilarity between the representation student and provided model answers.

**C. An Iterative Transfer Learning Based Ensemble Technique for Automatic Short Answer Grading[3]:**

This work proposes an iterative technique which consists of two modules.

Module one consists of an ensemble which is a combination of two classifiers.

The first classifier uses TFIDF vectorisation on bag of words representations of student answers and then converts them to vectors with corresponding grades as class labels.

The second classifier is based on real valued features capturing similarity of student answers with respect to the model answer.

Module two consists of transfer learning based on canonical correlation analysis of a common feature representation to build the classifier ensemble for questions having no labelled data.

Projection vectors are used to transform the real valued features from the source question and target question to have maximum correlation. The source question’s labels are projected onto a subspace to train a model which is then used to predict labels of target question in this subspace.

This technique outperforms all the winning supervised entries on the SCIENSBANK dataset from the “Student Response Analysis” task of SemEval 2013.

**D. Enhanced Bleu Method for Automatic Short Answer Grading[2]:**

This work proposes to assess an answer after calculating a score based on explicitly matching the

student’s answer and the teacher’s answer i.e. reference/model answer word by word. When the reference answers available are more than one the work will match them independently and the best scoring pair is taken as the final score.

Matching of unigrams are done based on the following modules:

A] Exact module: The module will match the surface level forms of unigrams.

B] Stemming module: The matching of two unigrams is done after stemming them down to their base form using Porter stemmer..

C] Heuristics Rule based module: The module matches unigrams based on their base form after applying the following heuristic rules:

Rule 1] WordNet synonym match: matches if the unigrams have the same parts of speech and are in the same synset of the WordNet.

Rule 2] Numeric value match: Matches the numeric value with the same written in text. (Eg. “2nd”is matches with “second”)

Rule 3] Acronym match: Matches the nodes with capitalised characters with the first characters of the corresponding multi word. (Eg. “NLP” is aligned with “Natural Language Processing”)

Rule 4] Derivational form match: The Rule matches words which have the same root form or have a synonym with the same root form and which have similar semantic meaning, but which may belong to different syntactic categories.

Rule 5] Country adjectival form / demonym match: It matches from an explicit list of place names, adjectival forms, and demonyms.( Eg. “Chennai” and “Madras”)

**2.1 Summary of Related Work**

A literature review is an objective, critical summary of published research literature relevant to a topic under consideration for research. The summary is presented here in Table 1.

Literature	BLEU	Intuitive	Hybrid
Shourya Roy, Sandipan Dandapat, Ajay Nagesh, and Y. Narahari. Wisdom of Students: A Consistent Automatic Short Answer Grading Technique. In	No	Yes	No

Proceedings of the Thirteenth International Conference on Natural Language Processing (ICON), 2016.[4].			
P.Selvi, Research Scholar, Dr.A.K.Banerjee, Professor, Department of Computer Science and Engineering, National Institute of Technology, Tiruchirappalli, Tamilnadu, India.[2]	Yes	No	No
Shourya Roy, Himanshu Sharad Bhatt, and Y. Narahari. arXiv preprint arXiv:1609.04909..[3]	No	No	No
Oliver Adams, Shourya Roy, and Raghuram Krishnapuram. Distributed Vector Representations for Automatic Short Answer Grading. (NLP-TEA-3) in conjunction with COLING 2016.[1]	No	No	No

Table 1 Summary of literature survey

### 3. Proposed Work

The systems take input as student answers and model answers and then perform intuitive technique and the enhanced BLEU technique independent of each other. We then take a weighted combination of grades given by both the techniques to provide a final score or grade to the student answer. Scoring System: It would give the final score to the students by taking the weighted combination of the scores.

$$\text{Score} = \text{IS} * \alpha + \text{ES} * (1 - \alpha) \quad \dots(3.1)$$

Where,

IS => Intuitive Score

Es => Enhanced BLEU Score

$\alpha$  => Weightage between (0,1)

### 3.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.

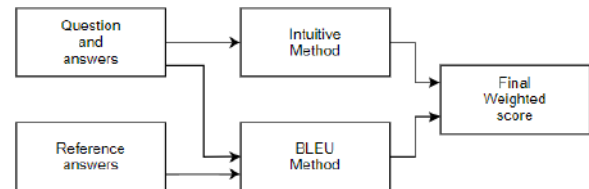


Fig. 1 Proposed system architecture

**Preprocessing Module:** This module performs all the preprocessing needed to be done on the input in order to perform NLP actions on them. This includes tokenization, word alignment, stop words removal etc.

**Enhanced BLEU Method:** This method assesses a text by computing a score based on explicit word-to-word match between the student’s answer and teacher’s answer (i.e. reference). If more than one reference is available, the matching similarity is scored against each reference independently and the best scoring pair is used to find the final score.

**Wisdom of Students- A Consistent Automatic Short Answer Grading Technique(Intuitive):** This technique makes two passes of the student answers. In the first pass it creates a skeleton of how the answers should be, based on the answers written by the students. Then it goes for a second pass in which it compares them with the created skeleton and scores them accordingly.

**Processing and Grading Module:** This module performs the main tasks of the algorithm that is heuristic rule matching and intuitive matching. It then computes the similarity between the model and the student answers and takes the weighted average between the two. After that scores are assigned based on the weighted average.

**Validation Module:** Validation module is required to compute the performance of the system. Correlation is calculated between the grades given by the teachers and grades given by the system to check real world performance of the system

### 3 Requirement Analysis

The implementation detail is given in this section.

### 3.1 Software

<b>Operating System</b>	Windows 8 or higher
<b>Programming Language</b>	Python

### 3.2 Hardware

<b>Processor</b>	2 GHz Intel
<b>HDD</b>	280 GB
<b>RAM</b>	4 GB

### 3.3 Dataset and Parameters

The AGSAS requires training of the model with an already given set of questions and answers to further grade the answers of unseen questions. The model is given the input of student answers for various questions, for example The CSD dataset consists of 21 questions with answers provided by a class of 31 students.

Dataset	Users	Items	Interactions	Type
CSD	831	621	1 651	Information
XCSD	331	180	2273	Information
RCD	758	114	812	Information

Table 3.3.1 Sample Dataset

An important aspect of AGSAS is to use appropriate evaluation measures for judging goodness of the automated techniques.

**Absolute error measure:** These measures judge the virtue of an automated technique based on the extent of element wise differences. Variations exist in terms of how differences are measured. Some of the popular examples are, Mean absolute error (MAE) and root mean square error (RMSE) which are shown to be superior measures than RMSE in assessing average model performance for classification tasks.  $MAE(u, v)$  is defined as the mean absolute differences between elements of  $u$  and  $v$  i.e.

$$\dots(3.2)$$

**Correlation coefficient:** A correlation coefficient is a number which is a quantification of some type of correlation and dependence. Pearson's  $r(u, v)$  is the most popular product-moment correlation coefficient between  $u$  and  $v$  where  $\bar{u}$  ( $\bar{v}$ ) denotes the mean of  $u$  ( $v$ ) and  $\sigma_u$  ( $\sigma_v$ ) denotes standard deviation of  $u$  ( $v$ ).

$$\dots(3.3)$$

**Confusion matrix based measure:** A confusion matrix is generally used to evaluate supervised learning algorithms. Each column of the matrix represents the instances in actual class while each row represents the instances in predicted class or vice versa. In the case of AGSAS, one can represent  $u$  and  $v$  along the rows and columns where principal diagonal elements indicate complete agreements, elements adjacent to the principal diagonal differ by 1 point and so on.

#### ACKNOWLEDGMENT

We would like to express our gratitude to Dr. Shourya Roy for sharing his PHD thesis, from which we were able to acquire more knowledge on this topic.

We would like to express our special thanks of gratitude to Prof. Sunil Shelke, our project guide, who guided us through the project and who helped us in applying the knowledge that we have acquired during the semester and learned new concepts.

We would like to express our special thanks to Dr. Sharvari Govilkar the H.O.D of our Computer Engineering department who gave us the opportunity to do this project because of which we learned new concepts and their application.

And finally we would like to express our special thanks of gratitude to Principal Dr. Sandeep Joshi who gave us the opportunity to do this project.

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arXiv:1609.04909.

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# EVENT E-BOOKING SYSTEM IN COLLEGE CAMPUS

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**Abstract**—*The Project Domain of our project is Web Engineering. Web engineering focuses on the methodologies, techniques, and tools that are the foundation of Web application development and which support their design, development, evolution, and evaluation.*

*The main focus of our project is to provide a facility to reserve the venues for the events in the college campus. It is a web based portal. The user can request for the specific venue by filling all the necessary details i.e. venue, event name, date, time etc. The request will get forwarded to the respective in-charge. The in-charge can approve or reject the request. It will work on the First Come First Serve (FCFS) and Priority basis. The portal will also show the event calendar with venue (directions) to avoid the clashes or overlapping. The portal will also show the event calendar with venue (directions) to avoid the clashes or overlapping. This project has a huge variety of practical applications. This system would particularly helpful in any college campus for event booking, corporate offices, event Management companies, tourism field etc*

**Keywords**—FCFS, Online Booking, PHP, Priority, Web based

## 1. Introduction

The front end of a website is the part that users interact with. Front-end is responsible for a website's user-facing code and the architecture of its immersive user experiences. In order to execute those objectives, we have created a website using HTML, CSS, and Javascript so that the project becomes user friendly. We have created separate dashboards for users, admins and incharges. In order to make the server, application, and database communicate with each other, our back-end uses server-side language, PHP, to build our application and MySQL to find, save, or change data and serve it back to the user in front-end code. For the backend, we have used php to connect to our database. Through this project, we aim to provide an efficient and user-friendly solution that is required to reserve the venue beforehand and make the information available to others to check the status of the venue before booking. The project allows registered users, admin and incharge login and new users can be added

only by the admin or incharge . It helps in the booking of events and the aspects related to them. This proposed to be a web application. The project provides most of the basic functionality required for an event type, the system then allows the user to select date and time of event, place and the event equipment. All the data is entered in the database. Only the in-charge can approve or reject the request and admin in case of emergency. The user needs to request for the booking two to three days prior to the requesting date. If two or more users request for the same venue for the same timing, then the request will get accepted in FCFS and Priority Basis.

## 2. Literature Survey

**A. Web Based Hall Booking Management System :** This paper proposes a web base hall booking management system that provides the searching facilities based on various factors. Web base hall booking management systems developed web portal for searching wedding halls. This web portal is used to check the availability of wedding halls , hence we do not need to visit the place.

**B. Conference Room Booking System Across Multiple Ministries/Departments in Different Buildings :** This paper proposes the conference web portal allows users to book conference rooms across multiple departments or ministries. It provides flexible repetitive bookings. It is an efficient and user-friendly system that reserves the hall beforehand and makes the information available to others to check the status of the hall before booking.

**C. Design and Implementation of an Online Booking System for a Cinema House:** This project introduces an e-commerce website that can promote a trendy way for people to perform booking/reservation of a cinema house. It helps in reducing the long queues at the cinema house. One can simply book/reserve a seat from the web or

mobile application sitting at home which is very convenient.

**D. Online Seminar Hall Booking System :** This project presents a review on the software program “Seminar Hall Booking System” as should be used in a Hall Booking system, a facility which is used to reserve Halls, cancellation of reservation and different types of route enquiries used on securing quick reservations.

## 2. Summary of Related Work

A literature review is an objective, critical summary of published research literature relevant to a topic under consideration for research. The summary is presented here.

SN	Paper	Advantages and Disadvantages
1.	“Web Based Hall Booking Management System” - 2017  Ms. Swati Dekate , Ms. Priti Bisen and Ms. Monali Dhanuskar.	Advantages: tracks all the booking details, customers & hall. Provides the searching facilities based on payment, booking,customers,hall.Mana ges the information of booking dates. Disadvantages: If the data of the hall is lost, it is unable to provide the details of the same.
2.	“Conference Room Booking System Across Multiple Ministries/Depart ments in Different Buildings” - 2017  Prof. Chetan Bulla, Priyanka Mane S, Pooja Kabade, Pooja Madiwal & Pooja Galatage.	Advantages: The system is web-based, so it is easy for all the users to communicate with the system. Disadvantages: Traffic on the Internet may be heavy which may delay the retrieval of data.

3.	“Design and Implementation of an Online Booking System for a Cinema House” - 2017  Raphael Akinyede , Temitayo Balogun & Gabriel Iwasokun.	Advantages: Time-saving and 24 hour working service. Disadvantage: Without availability of internet, unable to do the bookings.
4.	“Online Seminar Hall Booking System” - 2020  Gowtham K, Ranjith K & Mr. Udhaya Moorthi. M	Advantages: It replaces the traditional method of hall booking to web based seminar hall booking. It reduces the time of the user for searching a hall. Disadvantage: If the internet is down, it is unable to provide the hall details.

Table 1. Summary of literature survey

## 3. Proposed Work

An online booking system is an application that allows potential guests to self-book and pay through the website, and other channels, while giving you the best tools to run and scale your operation, all in one place. The system allows registered user login and new users are allowed to register on the application. The system helps in the booking of events and the aspects related to them. This proposed to be a web application.

An online reservation system can help you save time by tackling mundane tasks. The project provides most of the basic functionality required for an event type, the system then allows the user to select date and time of event, place and the event equipment. All the data is logged in the database and the user is given a receipt number for his booking. The data is then sent to the administrator (website owner) and they may interact with the client as per his requirement.

Our project Event e-booking system is to provide a facility to reserve the venues for the events in the college campus. It is a web based portal. The user can request for



the specific venue by filling all the necessary details i.e. venue, event name, date, time etc. The request will get forwarded to the respective in-charge. Only the in-charge can approve or reject the request and admin in case of emergency. The user needs to request for the booking two to three days prior to the requesting date. If two or more users request for the same venue for the same timing, the the request will get accepted in FCFS and Priority Basis. All the data is entered in the database.

### 3.1 System Architecture

This project proposes an Web based application E-booking system in College Campus that integrates with webpage. The system architecture is given in Figure 1.

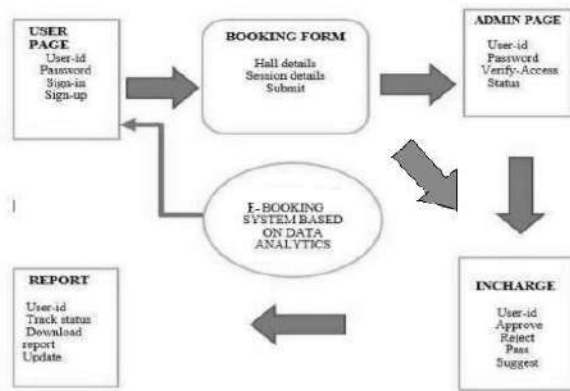


Fig. 1 Proposed system architecture

The E-booking system in College Campus is divided into five main modules. Each and every module performs a particular work.

Those 5 modules are,

**A. Maintenance of user and venue:** It consists of Login , Event venue booking, update details of venues and user . The project allows registered users, admin and incharge login and new users can be added only by the admin or incharge .

**B. Admin Module:** There is a specific Login credentials for admins. They are the Head of the Departments or Committee Heads. They can create users , active or inactive them. In exceptional emergency cases in absence of the Incharge they can accept or reject the booking request.

**C. Request for booking the Venue:** Each department user in college has given their specific username and password to book the seminar hall for their requirement. Through this they can view the available dates of particular venues and also the facilities in the hall like capacity.This provides a user-friendly environment while booking the seminar hall it gives suggestions regarding the selection of venue based on the capacity and availability. The concerned department incharge or admin can view the list of the request. The acceptance and rejection can be viewed by the user through that log in or even by the email id.

**D. Approval and Rejection by In-charge:** The role of in-charge is to check if the request came for the events. When in-charges login into their account the list of new requests are displayed in their page . The request can be either accepted or rejected based on the priority of the request. If more than one request is made for the same venue on the same date, after granting approval to a particular request by seminar hall in- charge, the remaining requests are automatically rejected and the email is sent to the user to reschedule by suggesting alternative venues.

**E. Event Calendar and details:** Our project has an event calendar module which shows the current date, upcoming event details, holidays etc. Admin can add other holidays in the event calendar.

### 4. Requirement Analysis

The implementation detail is given in this section. In designing and implementing this secured system, the design architecture are into three phases (i.e. The front-end, middle-tier and back-end). These also form the components that were used in designing the system and these design components include; Web browsers HTML, CSS and JavaScript for the front end design, PHP (A scripting language), Relational Database System (MySQL). The System is designed to run on all of operating systems that make use of this technology. The System is platform independent.

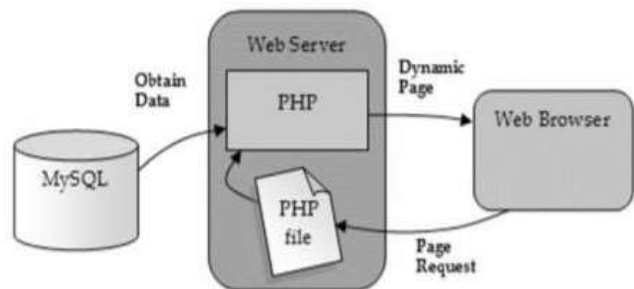


Fig. 2 Backbone of a Web page

5. Online Seminar Hall Booking System :  
Gowtham K ; Ranjith K; Mr. Udhaya Moorthi.  
M, 2020.

#### 4.1 Software and Hardware details

Operating System	Windows
Programming Language	Php,HTML,CSS, JavaScript
Database	MySQL

Table 2 Software details

#### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof. Aju Palleri for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We would also like to thank our project coordinators, Prof. Rupali Nikhare and Prof. K.S. Charumathi for giving us a challenging domain which helped us in learning new concepts while designing the solution to the given problem statement. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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# FACULTY PORTAL

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**Abstract—** Faculty Portal makes data manipulation of projects & employees easy and fast. It's less time consuming and provide efficient searching. In this web portal, we include a development presentation of an information system for managing the staff data within organization. The system as such as it has been developed is called Faculty Portal. This is the organization's portal where most of the internal collaboration and communication take place between the various departments. The authorized employees are allowed to share documents, calendar events, announcements, and useful Internet links. Our web portal accessible to only those of us who have employee portal login accessibility. For login into application he needs to enter first Mes email id and password. As well as he needs to pass three way authentication process which consist of QR code, Otp and Graphical password. All the data staff transfer to each other will be encrypted so no one can access that data. For encryption we will use Bcrypt hashing method as it is more secure compare to other encryption techniques. With this we are going to include Spring security framework which will enhance security of the application.

**Keywords** —Authentication, Graphical Password, Bcrypt Hashing, Spring.

## 1. Introduction

Any organization having any number of employees needs a communication system. A chat system, which could be intranet or internet based, can be used to share information, make inquiry, among others. Chat is to participate in a synchronous text, video, audio, or multicast exchange of remarks with one or more people over a computer network. There is the need to ensure confidentiality of communication to breed honest and frank chatting free from fear of eavesdropping and breach of privacy. Organizations should also keep possession of their chat messages. The capability to securely chat with a colleague in an organization is to a great advantage against competitors who do not have such facility. A Secure Chat System is a system which enhances communication between two or more people within an organization or over the internet in a way that seriously attempts to be free from risk of interception by or involvement of unauthorized persons.

## 2. Literature Survey

**A. Three Factor Authentication:** System proposed in this paper makes use of Authentication, security, and confidentiality which are some of the most important topics of cyber security and information security. This are the methods for strengthening the security of login password-based authentication methods. It includes two factor authentication (combination of single factor authentication mechanisms. The growing popularity and acceptance of two- factor methods are driven by the increasing need for privacy and security in this technological age).

**B. Creating of a Secure Chat System:** Secure chat system is essential for effective and efficient communication in succeeding organizations. Current 'free' chat systems make breach risk of confidentiality probable, and organizations lose possession of logged chat messages. There is therefore the need for the design and creation of a private chat system which this research addressed. Design and creation research strategy was adopted and data collection was through existing documents and structured interviews. The outcome provides secure private chat system that minimizes the breach risk of confidentiality through encryption and localization, and grants user organization possession of logged chat messages. The goal of this work is, therefore, to design and implement private chat application software that will enable effective and efficient text-based communication between users. The chat system will privatize and secure the transfer of information and communication. Security of this chat system would be limited to password and username for authentication.

**C. Design OF an Academic Web Portal Providing E-Facilities:** Pratibha S. Yalagi ,Chaitali S.Dangare in 2013, introduced a web portal, as a way of providing users (i.e. Students and Faculties) with information about their facilities and features. A web portal is not a single technology, but it brings together a wide range of technologies and enables them to work together for the benefit of the individual. Web portal is considered as a

type of information systems used to gather, manage, share, and utilize information that has been stored in database. In other words portals can be define as applications getting data from different data sources and displaying the stuff under a consistent look and feel umbrella.

**D. Employee Management System:** In an organization to simplify the process of record of maintenance it is designed a system of Employee management. For HR function it helps to manage the employee’s information. It can consider as a part of comprehensive Human Resource Management System to employee management system in general. For improving effectiveness of workplace management an employee management system is implemented. This employee management system manages the overall performance and different aspects of an employee in an organization.

**E. Factors Affecting Faculty Web Portal Usability:** As technology becomes a key tool for good teaching, academic institutions promote and encourage optimization of the Internet technology for information dissemination. The web is becoming an educational medium for universities. Higher education institutions have developed their own web portals called it educational web portal. This serves as a gateway to information and services of some learning or teaching relevance. In these, Teachers can view their academic profile, know their teaching load for the current semester, and download class lists to verify students’ inclusion in the class. They can research online through its e-journals and other scholarly works. They can post the grades of the students so that they will know their class standing.

**2.1 Summary of Related Work**

Table 1 Summary of literature survey

No	Author & Year of publications	Paper Title	Observations and remarks
1	William Kennedy, Aspen Olmsted, 2017	Three Factor Authentication	Secure web application through text password, OTP, Location.

2	Mweemba Simaanya, 2019	Employee Management System	1. Sent Application 2. Leave Management 3. Report Generation
3	Adewale debayo, Komolafe Oyindolapo, Ogu Chiemela, Omotosho Toluwalase, 2014	Creating of a Secure Chat	Secure and effective chat communication among certain people.
4	Pratibha S. Yalagi ,Chaitali S.Dangare, 2013	Design OF an Acadamic Web Portal Providing E-Facilities	It provides feature of: E-Alerts E-Records E-Notice
5	Rex P. Bringula and Roselle S. Basa, 2011	Factors Affecting Faculty Web Portal Usability	Higher Authority User get Higher Access.

**3. Proposed Work**

The system consists of three modules as admin module, student module and faculty module. Each module has an same login page that contain user id and password field, by entering value in that field the user should login to the system Each module is described below.

a. Login Module: The purpose of this module is to provide entry to the portal. Based on the type of login, the user is provided with various facilities and functionalities. The main function of this module is to allow the user to use the portal. This module provides two types of login - Admin login and Student login, faculty login.

b. Administration Module: In this module the administrator enters his/her user name and password, which enables access to the administrator page. This page consists of two following sub modules. • Student Addition/Updating/Deletion: Each Student is added, updated or deleted according to his/her department. • Notice/Updates/Result Generation: On the portal, information about notice, attendance and Internal result is generated.

c. Faculty Module: Faculty member can upload/download the study materials that are beneficial for students in solving their doubts. Faculty member can also enter the marks for each student and thus generate the overall term-work sheet for a particular semester.

d. Student Module: Initially the student has to log into portal by filling up the registration form. Once the student's request is approved by the administrator, the student becomes a part of the portal. Student can download the study material uploaded by the faculty members.

drawbacks of multifactor authentication is that user ID's and passwords are abundant, with many users stating that they have more user IDs and passwords than they can remember. This cost of convenience makes the proposed implementation of higher security measures and added authentication factors worrisome to many users and providers.

- Apply For Leave: In this module students can apply their leave application through the online. User should with their own username and password. A comparison is done for a user name and for a password if the correct user id and password are supplied then, main menu of online leave form will be displayed to the user.

### 3.1 System Architecture

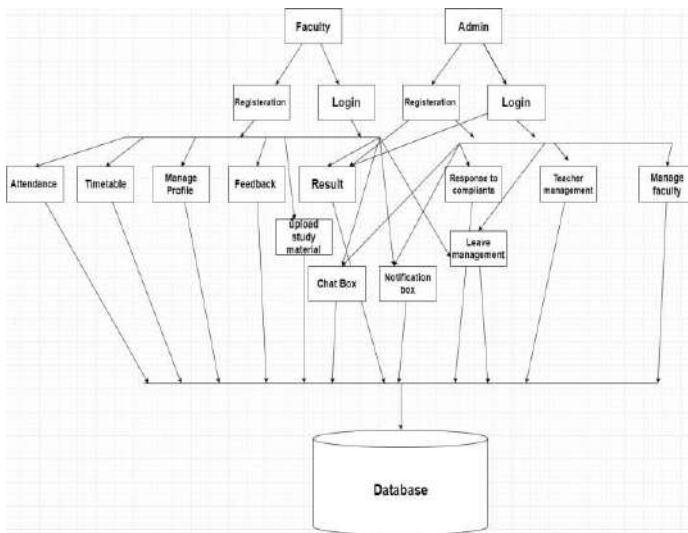


Fig. 1 System Architecture

The Following Modules have been proposed:

- Three Way Authentication process: User authentication is the main building block for any secure cooperative computing system. Security concerns are on the rise in all areas of industry such as banks, healthcare institutions, industry, etc. Due to the proliferation of mobile devices and the heightened interaction between mobile applications and web services, the authentication of users is more frequent for mobile devices than for desktop users. In many instances of multifactor authentication, both a mobile device and a desktop are necessary and go hand in hand for adequate authentication. One of the

- Alerts for urgent notices: Cellular text messaging services are become more popular now a day's. Whether to co-ordinate meetings, office reminders, and event, this type of communication is now offered by cellular networks. The voice based services are unavailable, SMS, messages are successfully received because the control channels are responsible for their delivery. Now a day's colleges are using Traditional Paper based Notice Board so here we are thinking more advanced system of Android Based Application. The users can get the notices through ENotice Board from anywhere in the college campus. This paper implement E-Notice Board program which can run on any computer system either by local area network or wired or wireless network. Notice board are mostly used in school to large organization to convey the message. Traditional notice board required lots of paper work and also wastage of papers

- Communication using Chat Box: The very crucial way to have contact is through chat. We have come up with this module as to make the part of communication easier. Teachers can communicate with the other teachers within the department or other through chat, without actually meeting them.

- Study material upload: This module is crucial for teachers as well as students. In this module the teachers can upload the study material and student can download it. It helps to keep things in one place, and access them whenever needed.

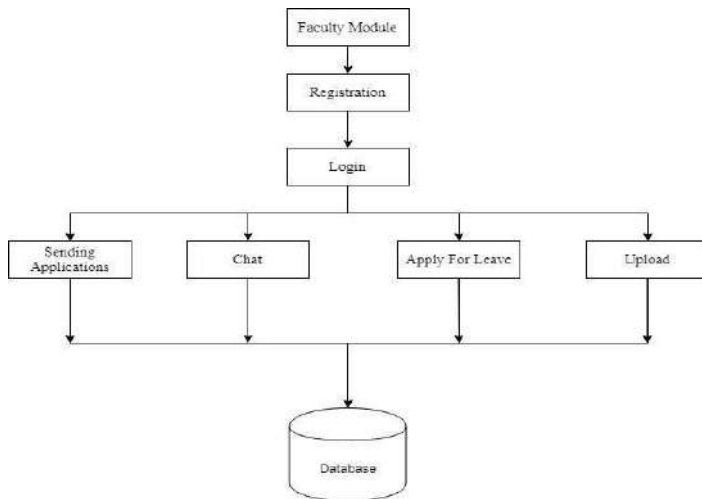


Fig. 2 Overview

#### 4. Summary

In the existing system, maximum work goes manually and is error prone system, takes time for any changes in the system. This big problem is the searching, and updating of the student data and interaction between faculty and student available for giving information to student except the notice board. Proposed system gets automated by use of portal resources to be provided online, communication between the users. This project aims in improving the manual data collection and reducing Malpractice and use it for productive purpose. It reduces manual work and provides accurate information, so it is better to have a web based system. This system is useful for colleges and universities. It allows student to interact with college faculty and get all information they needed. A student and makes the staff very prompt regarding students and college day to day work. This project aid in automating the existing manual system. This is a paperless work. It can be monitored and guarded remotely. It cut down the man power required and provides accurate information. Malpractice can be pare. For this reason the data stored in the repository helps in taking decision by management. So it is improved to have a Web Based system. All the stakeholders, faculty and authority can get the required information without delay. This system is crucial in the colleges and universities.

#### ACKNOWLEDGMENT

We have put in a lot of efforts and dedicatedly worked towards completing this synopsis. However, this would have not been possible were it not for the constant motivation and encouragement that we received from the teaching as well as non teaching faculty of our college.

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We would also like to thank our Project Coordinator Prof. K.S. Charumathi for the constant guidance and support.

We extend our thanks to our Supervisor Prof. K.S. Suresh Babu for the constant supervision, guidance and motivation during the development of our project without which our project would have not been at par.

We would also like to expand our deepest gratitude to all those who have directly and indirectly guided us in completing this synopsis.

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# Fake Currency Detection Application

## - Know Your Currency!

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*Abstract—Fake currency is the money produced without the approval of the government, creation of it is considered as a great Offence. The elevation of color printing technology has increased the rate of fake currency note printing on a very large scale. Years before, the printing could be done in a print house, but now anyone can print a currency note with maximum accuracy using a simple laser printer. This results in the issue of fake notes, instead of the genuine ones, has been increased very largely. It is the biggest problem faced by many countries including India. Though Banks and other large organizations have installed Automatic machines to detect fake currency notes, it is really difficult for an average person to distinguish between the two. Counterfeiting of money is as old as money itself, and is sufficiently prevalent throughout history that it has been called the world's second oldest profession. This has led to the increase of corruption in our country hindering the country's growth. Some of the methods to detect fake currency are watermarking, optically variable ink, security thread, latent image, techniques like counterfeit detection pen and using MATLAB version 13. Fake currency therefore causes major issues in our economic growth and also it will decrease the value of original money. There are various methods available to detect these types of fake currencies. We hereby propose an application system for detecting fake currency where image processing is used to detect fake notes. We are going to detect the variation in barcode among the real and fake one and also, we will find out dissimilarities between the image under consideration and the prototype. In order to obtain the dissimilarity between two images, the local key points on each image are detected and described. Based on the characteristics of the currency, the matched key points between the two images can be identified in an efficient manner. SVM classifier will be used to detect fake currency. The proposed app for fake currency detection will be simple, accurate and easy to use.*

*Keywords—Fake currency, Offense, Counterfeiting, hindering, watermarking, optically variable link, security thread, counterfeit detection pen, MATLAB, propose an application system, variation in barcode, local key points, SVM classifier, accurate, easy.*

### 1. Introduction

We are living in the era of information revolution, with a lot of devices such as computers and mobile devices sprouting everywhere thereby making it easy for information to be communicated, and the education

sector is not left out in this growing development. Computers and mobile phones have become an unavoidable part of our lives. There are a lot of things which we can do with these technologies. With the rapid development of mobile phones and technologies come several services like **application creation** - refers to the process of making application software for handheld and desktop devices such as mobile phones, personal computers and Personal Digital Assistants. Through the usage of apps, the user is provided with various features that will enable him to fulfill all his needs and much more. Apps should be interactive to the users, **Camera/webcam services** - includes use of camera services for processing various aspects of image. Fake currency Detection is a system that can be used to overcome the limitations most of the people and our institutions of higher learning face with respect to making difference between **counterfeit currencies-** (is imitation currency produced without the legal sanction of the state or government, usually in a deliberate attempt to imitate that currency and so as to deceive its recipient) and real currencies. The project involves making use of **Digit Image Processing Domain** - Digital image processing is the use of computer algorithms to perform image processing on digital images. As a subcategory or field of digital signal processing, digital image processing has many advantages over analog image processing. It allows a much wider range of algorithms to be applied to the input data and can avoid problems such as the build-up of noise and signal distortion during processing. Since images are defined over two dimensions (perhaps more) digital image processing may be modeled in the form of multidimensional systems. **Currency detection** - is the process related to image processing where an image is detected through camera services for further processing that includes template matching through a stored dataset.

## 2. Literature Survey

Counterfeit Notes have always been an issue for different countries since many years. As the technology advances year by year, the possibility of printing counterfeit notes, without the legal authority of the Government, has increased. India is one the country which faces this problem and as a result the economy of India degrades. After demonetization in India, new 500 and 2000 currency notes were introduced. But taking advantage of the technology, these high value notes were counterfeited by the common people. Detecting counterfeit notes manually becomes a tedious task hence to overcome that, many researchers have introduced different methods or automation techniques with which currency identification process can be efficiently done.

[1] *The paper titled as “Fake currency Detection using Basic Python Programming and Web Framework” (2020)* presented by Prof Chetan More, Monu Kumar, Rupesh Chandra, Raushan Singh. System proposed in this paper makes use of flask web framework (Flask is micro web framework of python and web programming) and is written in python programming language. It includes image processing which is done using brute force matcher (Brute force matcher is simple, it takes descriptor of one feature in first set and is matched with all other features in second set using some distance calculation and closest match is returned).

[2] *The paper titled as “Detection of Counterfeit Indian Currency Note Using Image Processing”* presented by Vivek Sharan and Amandeep Kaur in 2019 describes Detection of Counterfeit Indian Currency Notes using Image Processing. In this paper, three major features were taken into consideration; Latent image, Logo of RBI and denomination numeral with Rupee symbol with color part of the currency note. Using these three features they had applied an algorithm which detects the counterfeit Indian currency notes. This algorithm includes: Acquisition of image which involves capturing of image through digital camera. Pre-processing of image is done which resizes the image into standard format and noises, if any, is removed from the image. Grayscale conversion of image is done where the RGB colors of the note is converted to black and white image which gives more detailed information about the note. Edge detection of an image is performed which is a technique that finds the boundaries of the objects by changing the brightness in order to set curved lined segments. Segmentation of the image is performed which

basically changes the representation of the image to sub region which is more useful or easier to analyze. Extracting feature is the main part of the algorithm where the dimension of the data is reduced and information extraction of that very region or data is done so as to detect whether the note is counterfeit or not.

[3] *The paper titled as “Indian Paper currency detection presented by Aakash S Patil in 2019*, introduced a new technique to improve the Recognition ability and the transaction speed to classify Indian currency. It involved making use of Open Cv library of computer functions mainly aimed at real-time computer vision which covered functions such as note identification, segmentation and Recognition and NumPy module of Python used for numerical processing, argparse to parse command line arguments cv2 for the OpenCV bindings. Both of which were referred to as a new evaluation method for Recognition and image processing ability.

[4] *The paper titled as “Identification of fake notes and denomination recognition”* presented by Archana MR, Kalpitha C P, Prajwal S K, Pratiksha N proposed Identification of fake note and denomination recognition in 2018 to reduce human power. This system is mainly divided into two halves currency recognition & conversion system. They made use of software interface which could be utilized for different types of monetary standards. This system focuses on retrieving visible and hidden tags in currency notes. System flow comprises of Note Feature-extraction, preprocessing. Classification, Template matching. In note extraction they made use of (median)noise filter which is used to eliminate noise from image. It basically carries out middle shifting of picture. In feature extraction, In Spite of focusing on three color components (RGB), They focused on Grey scale as using GLCM (Grey level co-occurrence Matrix) to get several statistical measurements. In preprocessing, they removed noise using Linear filtering and adaptive filtering. In classification, they made use of Probabilistic Neural Networks to produce net output vectors of probabilities. They also made use of Template matching which acts as one of the most important key components of the system to detect Fake currency.

[5] *The paper titled as “Fake currency detection using Image processing”* presented by S. Atchaya, K. Harini, G. Kaviarasi, B. Swathi in 2017 gave the technique called Performance Matrix for the Fake currency detection using MATLAB image processing system. Neural networks and



model-based reasoning are the two methods behind this technique. Various methods like water marking, optically variable ink, fluorescence, etc. are used to detect fake currency in this paper. Image acquisition, gray scale conversion, edge detection, feature extraction, image segmentation and comparison of images are the methods used in this approach to detect the fake currency. Various security features of Indian currency are also used in this paper.

### 3. Proposed Work

The proposed system contains the advantages of the existing system and eliminates the disadvantages of it.

The project centers on the design and implementation of Fake Currency Detection Application for the Department of Computer Science, for Pillai College of Engineering. The scope of the project is to provide approaches and strategies, which have proved to be suitable when accessing the image of the desired currency note.

The scope of this project includes:

1. Study existing image detection schemes and concern on recognition base types.
2. Study the usability features of the existing fake currency detection methods from the general and ISO features.
3. Mapping between the recognition-based image detection system methods and the usability features and extract a collection of usability features to be built in the new system prototype.

The basic plan behind the working of the project includes:

- Applying one of the Machine Learning Algorithms recognized for Image Detection and Processing.
- Training the machine using an already prepared dataset of currency notes, which will contain sample images of fake and real currency notes.
- Analysing the content of the dataset, using the applied algorithm to extract required features which will help in recognizing other input images of similar format.
- Interpreting a given set of input images, to identify a proportion or distribution of features in it.

This basic outline can be used with various algorithms for Image Detection depending upon the requirements of the user. Users who require a simpler version of the application can make use of KNN algorithms although it has been proved to be less accurate and lazy learner on the other hand, users who require an appropriate or more exact count of distinguishing features in the data, may opt for complex machine learning algorithms with Support Vector Machines (SVMs) with higher accuracy rate of output.

### 3.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.

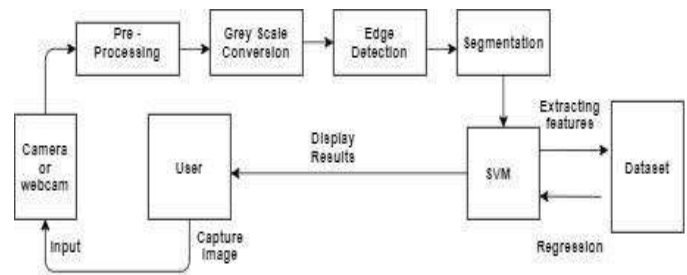


Fig. 1 Proposed system architecture

*The Above block diagram depicts the flow of our project.*

**User registration:** The flow begins with user registration, where the user fills the details about himself/herself into the system.

**Login:** Further when a user revisits the system, he/she has to login into the system. The system will then authenticate the user based on the details he/she had entered into the system during registration.

**Input:** A webcam or phone camera will then be used to take the input image by the user. The input image taken by the user will be used for preprocessing.

**Image Processing:** Various operations are performed on input image such as grayscale conversion, edge detection, image segmentation, feature extraction (S.V.M) and then finally towards template matching.

**Template matching:** The template matching will then be used to find the small parts of an image that is needed to be compared with a template/dataset image. It is basically used to assure quality control of image.

**Finally, we get output whether the currency is fake or real**

### 3 Requirement Analysis

The implementation requirement details are given in this section.

#### 3.1 Software and Hardware Specifications.

Requirement Analysis method is intended in such a way that it takes fewer resources to figure out work correctly. The minimum needs that we'd like to take care of: The system would require a minimum of two GB of RAM to run all the options sleek and unforeseen. It wants a minimum of 2 GHz processor to run the system smoothly. The system can be operated by common people as well as commercial people.

**Table 3.1.1 Hardware Requirements**

Processor	2 GHz Intel
Storage	512 GB
RAM	2 GB

**Table 3.1.2 Software Requirements**

Operating System	Windows 7, 8, 10
Programming Language	Python
Database	MySQL

#### 3.2 Dataset and Parameters

Correlation is a measure of the degree to which two variables agree, not necessary in actual value but in general behavior. The two variables are the corresponding pixel values in two images, template and source. Cross Correlation is used for template matching or pattern recognition. Template can be considered a sub-image from the reference image, and the image can be considered as a sensed image.

An experiment is conducted in order to identify the input/output behaviour of the dataset for the system. The sample dataset used in the experiment are identified and given in Table 3.3.1

**Table 3.3.1 Sample Dataset Used for Experiment**

Dataset	Source	Users	Items	Type
Indian Currency Notes	Kaggle	81,282	995 files	Image dataset



### 4. Summary

We commenced with a brief introduction to our system and discussed the scope and objectives of our project. During the literature survey we got an opportunity to look closely into the problem that people are facing in the current environment, we reviewed multiple research papers out of which we taper down to ten papers and selected five papers as our base research papers. We analyzed all existing architectures of our base papers and by understanding their working we have discovered some flaws in the currently existing system. We have kept all the prime features of existing systems as a primary focus with some of the additional features for our proposed system.

#### ACKNOWLEDGMENT

It is a privilege to express our sincerest regards to supervisor Prof Rupali Nikhare for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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# FAKE REVIEW MONITORING AND AUTOMATED CHATBOT

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*Abstract—E-commerce is the online buying and selling process that is extremely important in our daily life now. One of the important aspects of E-commerce is Reviews. Most of the time, customers place the order only by reading the reviews related to the particular product. In this situation, it might be possible that the reviews are fake, because of which the user might get the second thoughts of not buying the product. So, to remove this type of fake reviews and provide the users with the original reviews and ratings related to the products, We proposed a Fake Product Review Monitoring and Removal System by using different approaches including identification process, opinion mining, and machine-learning approach. The website will have also have a chatbot system that provides an automatic response to the incoming customer to-seller question. In general, the proposed. The system consists of two main agents: communication and the intelligent part. Since we rely greatly on online shopping, nowadays, providing customers with the best experience is the priority. The Chatbot will reply to the Customers product related Query. The objective of this project is to provide users with the best experience of products and website by removing fake reviews and having an automatic chatbot to easily solve their Queries.*

**Keywords**—Fake Reviews, chatbot

## 1. Introduction

There are different ways to shop like you can buy a specific thing of your need by going to a store or mall. In this style of shopping the seller gives you the feedback of the product, you do not know whether he/she is giving a fake feedback or original. Because, it is upon seller honesty, how much the seller is true in his/her words and you have to carefully examine the product because you do not have any other option in examining the product . If you don't pay attention in buying that product then it may be proved a waste for you. On the other hand, nowadays source of shopping has been changed. You can

buy the products from the online stores of different brands. Here, you have to place the order without seeing and examining the original product. You read the reviews and buy the product. Therefore, you are dependent on the reviews about the product. These reviews may be original or fake. The customer wants to buy an original and reliable product, which is possible only when you get the original feedback related to that product.

## 2. Literature Survey

**A. Fake Review Monitoring using opinion mining(2018):** There have been several attempts for spam review detection till today. In this paper, we propose a general framework to detect spam reviews. Sentiment analysis or opinion mining is a field of study that analyzes people's sentiments, feelings, or emotions towards certain entities. The software will do analysis and then if any fake review is found from any IP address consistently then the admin user can block that IP address. It also sends mail. And user can be sure about the product's availability on that application and reviews too.

**B. Fake News Detection using Naïve Bayes Classifier(2017):** The research showed that even quite a simple Artificial Intelligence algorithm may show a good result on such an important problem as fake news classification. Therefore the results of this research suggest even more, that artificial intelligence techniques may be successfully used to tackle this important problem.

Success Ratio: 74%

Dataset: Collected by BuzzFeed news. It contains information about Facebook posts, each of which represents a news article, including political news pages.

**C. Spam Review Detection Using the Linguistic and Spammer Behavioural Methods (2020):** The applications of the study include spam review detection in product/services reviews on e-commerce websites, product/services websites e.g. Amazon, etc. Furthermore, additional attributes will be added to the dataset to improve the accuracy and reliability of the spam review detection models. These may include an IP address of the spammer, registered an email address and signed-in location.

**D. Eye movement based HCI:** Using eye movement for controlling the computer, Ramsha Fatima [5] improves the experience of working with the computer as it is faster and gives the illusion that the computer is complying with the users' thought. It can be used either exclusively or in combination with other input technologies such as eye movement can be used along with a button so that it confirms the users' intentions for performing critical tasks and reduce the chances of error. It does not require any training and can thus be used by a layman. It can act as a boon for a person with motor disability as it does not require any motion but simple eye movements. It can give them a greater controlled over their surrounding and help them in interacting with the world.

## 2.1 Summary of Related Work

The summary of methods used in literature is given in

There are many projects and research papers published on this topic that involves fake review monitoring, but all of them has either used opinion mining, IP tracking etc. Here we have listed some of the papers below with their datasets and success ratio.

### Advantages:

- The user gets genuine reviews about the product.
- User can post their own review about the product.
- Users can spend money on valuable products.

### Disadvantages:

- If the social media optimization team uses the different IP addresses to send the review, the system will fail to track the fake review.

## 3. Proposed Work

To solve the major problem faced by online websites due to opinion spamming, this project proposes to identify any such spammed fake reviews by classifying them into fake and genuine. The implementation of this project uses a supervised learning technique on the datasets and the fake and genuine labels help us to cross-validate the classification results of the data. Since this problem is a kind of text classification, implementing a Naïve Bayes Classifier will be best as this is standard for text-based processing. Fake reviews will be detected based on parameters Product The review is not related to the product, abusive words in the review and review is not written in language except English and last parameter is about usernames i.e. the reviews with proper user names will be considered like names with first name and last name or else the reviews having usernames like nicknames also usernames consisting of numbers only will not be considered as a genuine review.

### 3.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.

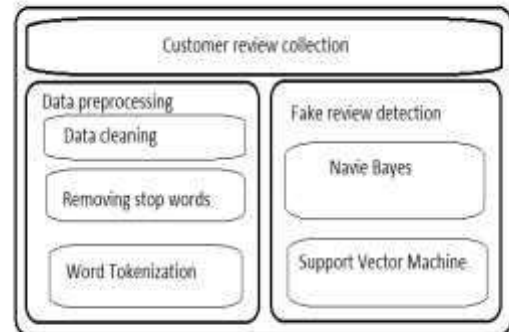


Fig. 1 Proposed system architecture for fake reviews

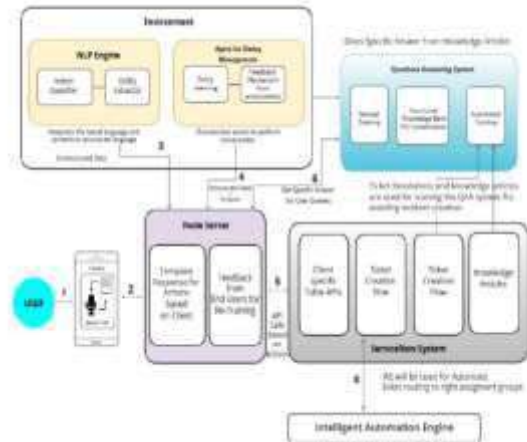


Fig 2 Proposed system for automated Chatbot

**A. Customer Review Collection:** The first part is Consumer review data collection in which raw review data was collected from sources, such as Amazon, Flipkart, etc. reviews. Doing so was to increase the diversity of the review data.

**B. Data Preprocessing:** Processing and refining the data by removal of irrelevant and redundant information as well as noisy and unreliable data from the review dataset.

- Step 1 Sentence tokenization

The entire review is given as input and it is tokenized into sentences using NLTK package.

- Step 2 Removal of punctuation marks

Punctuation marks used at the starting and ending of the reviews are removed along with additional white spaces.

- Step 3 Word Tokenization

Each individual review is tokenized into words and stored in a list for easier retrieval.

- Step 4 Removal of stop words

Affixes are removed from the stem. For example, the stem of "cooking" is "cook", and the stemming algorithm knows that the "ing" suffix can be removed.

**C. Fake Review Detection:** After cleaning the data and getting the vectors for the same, we will split the data generally in a ratio of 80:20. So, 80% of the data will be used for training the model and the remaining 20% will be used for validation of the model and eventually getting its accuracy. Now, we will be training our model with the training data which we have prepared. Since this problem is a text classification problem, we will be using the naive Bayes algorithm as it works best for text classification problems. After the model is trained, we will predict the target variable for the test set and compare it with the actual data to evaluate the model and find its accuracy.

**D. Naive Bayes Algorithm:** Naive Bayes is a simple technique for constructing classifiers: models that assign class labels to problem instances, represented as vectors of feature values, where the class labels are drawn from some finite set[14]. Abstractly Naive Bayes is a conditional probabilistic model: given a problem instance to be classified, represented by a vector  $x=(x_1,x_2,.., x_n)$  representing some  $n$  features (independent variables), it assigns to this

$$p(C_k | x_1, \dots, x_n)$$

Instance probabilities

$$p(C_k | x_1, \dots, x_n)$$

For each K possible outcomes or classes  $C_k$ .

The problem with the above formulation is that if the number of features  $n$  is large or if a feature can take on a large number of values, then basing such a model on probability tables is infeasible. We, therefore, reformulate the model to make it more tractable

**E. Support Vector Machine:** In machine learning, support vector machines[15] are supervised learning models with associated learning algorithms that analyze data used for classification and regression analysis. Given a set of training examples, each marked as belonging to one or the other of two categories, an SVM training algorithm builds a model that assigns new examples to one category or the other, making it a non-probabilistic binary linear classifier (although methods such as Platt scaling exist to use SVM in a probabilistic classification setting). An SVM model is a representation of the examples as points in space, mapped so that the examples of the separate categories are divided by a clear gap that is as wide as possible.

**E. Output Block Description:** After the fake reviews detected, we need to remove them so that user can spend his/her money on quality product.

## 4. Requirement Analysis

The implementation detail is given in this section.

### 4.1 Software

In operating system we will require windows 7 or higher version. Programming language will be HTML, CSS, PYTHON, ANGULAR, PHP, ETC. We will also need database so we will make use of MYSQL and server will be Xampp.

#### 4.2 Parameters

First the reviews other than English language will be considered as fake. Second if the review is not related to the product then also it will be considered as fake. Third will be use of abusive words will make the review fake.

#### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof. Krishnendu Nair for the valuable inputs, guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to

presenting this work.

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# FEATURE EXTRACTION FOR GENDER AND EMOTION RECOGNITION:A SURVEY

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**Abstract**— *Voice recognition plays a key role in spoken communication . Humans can identify gender and emotion easily by the speech of the speaker but it is not easy for a computer.This leads to huge scope to work on speech recognition. But going through feature analysis for speech recognition is a tedious and complex task. There are many solutions to overcome this problem. Feature extraction using Mel-Frequency Cepstral Coefficient(MFCC), feature reduction by Principal Component Analysis(PCA) and Support Vector Machine(SVM) classifier to identify the gender and emotion are few solutions. Hence the motto is to find an improved approach for voice feature extraction. As a base idea, here few feature extraction techniques are discussed based on data selection, preprocessing of voice signals, feature selection and classification.*

**Keywords**—*Voice feature extraction, data selection, preprocessing , feature selection and classification.*

## 1. Introduction

The rapid growth of technology and increasing human demand has made voice recognition systems one of the most desired software programs in various devices. Speech recognition technology converts spoken audio into text and lets users control digital devices by speaking instead of using conventional tools such as keystrokes, buttons, keyboards etc. Some examples of such softwares are Google voice, digital assistants, car bluetooth etc. Speech signals contain large amounts of information. Two such pieces of information are gender and emotion which can be distinguished relatively more easily by humans than by computers. At present, the research on voice recognition mainly focuses on the identification of single information, which is not enough to understand the true meaning of speech. Here we intend to use voice feature extraction to identify the gender and emotion of the person using SVM classifier, PCA and MFCC.

## 2. Literature Survey

**A. Data Selection:** The training of the proposed system will be done with the help of predefined datasets. The testing and validation of the proposed model will be done either by using predefined dataset or by taking live input

from the user. The RAVDESS dataset consisting 4904 files of emotional speech in eight basic emotional categories i.e. angry, disgust, fearful, happy, calm, sad, and neutral is used [2].

**B. Preprocessing voice signals:** The speech signals obtained from the predefined datasets or from the user cannot be given as input directly to the feature extraction module. The input signals need to be pre-processed using Voice Activity Detection (VAD). Wang et al. [1] used this technique to select active frames and filter out silence frames which did not contain any emotional information. VAD is also used to recognize age/gender from speech. The advantage of using VAD is that even if there is long silence in the beginning or in the end of an utterance, the behavior of the classifier would not be negatively influenced.

**C. Feature Extraction:** For the purpose of gender and emotion recognition from speech signals it is important to extract relevant features. Feature extraction transforms the processed speech signal to a concise but logical representation that is more distinct and reliable than the actual signal.

The short term power spectrum of sound is described by Mel-frequency cepstrum (MFC), on the basis of a linear cosine transform to log power spectrum with a non-linear Mel scale of frequency. MFCC takes into account human perception for sensitivity at appropriate frequencies by converting the conventional frequency to Mel Scale. Gumelar et al.[2] used this method to perform feature extraction since it is very easy to implement and hence has become a widely used method for speech recognition. The accuracy of the system decreases if the sound samples used have low emotional intensity. It is observed that accuracy value can be increased when more datasets are involved.

Linear Prediction Coding (LPC) approximates speech samples as a linear combination of past samples. Then, by minimizing the sum of the squared differences between the actual speech samples and the linearly predicted samples over a finite interval, a unique set of predictor coefficients can be determined. Paulraj, M. P., et al.[5] presented an automatic vowel classification system based on LPC and neural network. Where traditional linear



prediction suffers aliased autocorrelation coefficients LPC gives a very accurate estimate of speech parameters and is comparatively efficient for computation. At the same time, the performance of LPC degrades on the presence of noise in audio signals.

Linear Predictive Cepstral Coefficients (LPCC) gives a stable representation of the input speech signal in compressed form as compared to LPC. LPCC are derived from the fourier transform of the log magnitude spectrum of LPC. It analyses the input signal by estimating the enhanced frequency bands by removing their effects from the signal and estimates the intensity and frequency of the remaining signal[13].

With the help of Discrete Wavelet Transform (DWT), time domain and frequency domain information of the signal can be fetched. DWT decreases the quantity of signals required to recognize the emotions. Koduru et al.[3] used different feature extraction techniques like MFCC, pitch, energy, Zero Crossing Rate (ZCR) and DWT in order to extract maximum information of the speech signal and get better accuracy. It improves the speech emotion recognition rate with less processing time.

**D. Feature Selection:** There are many features in a speech signal but not all of them are needed for the proposed system. Feature selection is required to extract features from audio signals for selection of principal components, as well as to remove redundancy and unused information. Principal Component Analysis (PCA) is used to find the principal components out of all available features[7]. PCA is a statistical tool which is used to convert a set of observations of correlated variables to a set of values of linearly uncorrelated variables[14]. It also reduces the processing time since a large set of information requires more processing time.

#### E. Classification

Emotion and gender recognition is a supervised learning problem. Each pattern used for the training of the classifier carries the correct emotion/gender class label. There is a large number of classifiers for supervised learning. The most popular approaches are Bayesian learning, the linear discriminant analysis (LDA), the support vector machine (SVM) as an extension of LDA with a high-dimensional feature space, the multi-layer neural network (NN), and the hidden Markov model (HMM) to capture temporal state transitions. SVM is the most widely used classifier due to its efficiency in classifying high dimensional data where the number of features is greater than number of observations. A significant advantage of SVMs is that while ANNs can suffer from multiple local minima, the solution to an SVM is global and unique. SVM has a simple geometric interpretation and gives a sparse solution.

## 2.1 Summary of Related Work

A literature review is done with respect to the associated system. The summary is given in Table 1

Table 1 Summary of literature survey

Literature	Advantages and Constraints
Sharma, Gyanendra, and Shuchi Mala [7]	Advantages: Higher accuracy is achieved by using a hybrid model consisting of PCA and SVM classifier. Constraints: Small dataset is used for training and testing the model.
Aggarwal, Gaurav, and Rekha Vig[8]	Advantages: With reduced speech features, recognition rate increased compared to existing systems. SVM achieved more accuracy than Naive Bayes. Constraints: Less no. of features were considered for classification.
Jiang, Wei, et al [11].	Advantages: Refined and unified features are fed into the fusion network module for recognition. Constraints: SVM classifier was not capable of detecting Neutral emotions correctly from audio signals.
Hossain et al. [12]	Advantages: F-1 Cepstral Coefficient method provides better performance. Constraints: Experimental dataset is not large enough and noise in audio signals is not considered here.
Pahwa, Anjali, and Gaurav Aggarwal[10]	Advantages: The proposed system removes long silence/pauses and unwanted noise for greater precision. Constraints: It considers only stored signal files for input and does not take real time input.
S. Sengupta, G. Yasmin and A. Ghosal[14]	Advantages: Functional and perceptual characteristics are used for classification. Quadratic kernel improved accuracy of SVM by 4%. Constraints: k-NN did not perform well since the value of k chosen is undecidable and there is no way to decide which value would provide best results.

Ka, Sundar, et al.[15]	Advantages: High computational processing and independent of ethnicity. Constraints: Accuracy is low when compared to newer techniques. It also requires some computational devices. Implementation cost is high.
Gumelar, Agustinus Bimo, et al.[2]	Advantages: The training process is repeated multiple times which increases the overall accuracy. Constraints: The results of this study will have a much more decreased accuracy if the sound samples used have low emotional intensity.
Kerkeni, Leila, et al.[16]	Advantages: 90.05% recognition rate was achieved by integrating MFCC and Modulation Spectral Features(MSF). Constraints: The RNN model has too many parameters(155 coefficients in total) and poor training data.
Manas Jain et al.[13]	Advantages: The MFCC extraction features have achieved higher accuracy compared to that of LPCC. Constraints: Accuracy of UGA dataset was low as compared to LDC dataset.

### 3. Existing architecture

In the existing systems, various acoustic features are extracted with the help of MFCC, LPCC, etc. The values are stored as CSV (comma-separated values) files which store tabular data in plain text and every line of the file is considered as a data record. Various models such as Random Forest, CART model, Neural networks, etc. are trained to categorise the input speech sample. For testing and validation, either predefined datasets are used or live input is taken from the user. With the help of knowledge gained after training and integrated algorithms, the gender and emotion of the speaker is classified and given as output. It is observed that deep learning neural networks or convoluted neural networks have high accuracy but are resource hungry, requiring large dataset for training and high processing time and the accuracy obtained with the help of other classification models is much less as compared to SVM classifier.

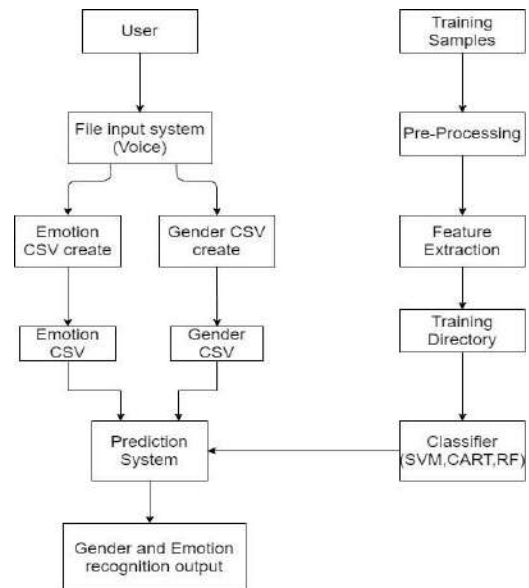


Fig 3.1: Existing system architecture

### 4. Proposed model

Detecting a user's emotion and gender accurately, from his/her voice input, requires complex algorithms and intricate deep learning models. To overcome this, we pre-processed the input data meticulously, followed by classification with the help of SVM, which resulted in precise identification of emotion and gender without the need of complicated Neural networks.

#### 4.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.

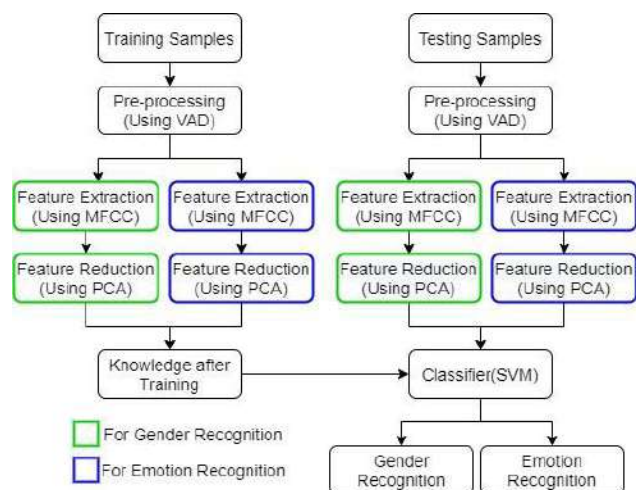


Fig. 1 Proposed system architecture

The proposed model follows the steps such as data extraction( database and real time), preprocessing signals using Voice Activity Detector(VAD). VAD helps in determining whether a particular signal contains speech or not. Mel-frequency cepstral coefficient (MFCC) can be used for feature extraction which determines unique coefficients to a particular sample after processing. Principal Component Analysis (PCA) extracts features from audio signals for selection of principal components. A binary and multiclass SVM classifier will be efficient in classifying gender and emotion from the speech signals. The proposed combination of techniques are expected to produce better results as per survey.

### 5. Dataset and Parameters

The sample dataset that would be used in the experiment is RAVDESS (Ryerson Audio-Visual Database of Emotional Speech and Song) Dataset. The database contains a total of 7356 files (total size: 24.8 GB) which consists of voice samples of 24 professional actors (12 female, 12 male) vocalizing 2 lexically-matched statements. These are in a neutral North American accent. Speech consists of happy, sad, angry, surprise, calm, disgust and fearful expressions. With additional neutral expression ,every expression is even produced at 2 levels of emotional intensity- normal and strong.

### Conclusion

The study of voice feature extraction for gender and emotion recognition is presented in the aforementioned sections and previous works related to the same are studied thoroughly and analyzed for further improvements. The existing architecture is explained along with some shortcomings. The proposed model will be capable of recognizing the gender and current emotional state of a person through his/her voice input in real time. It focuses working more on the pre-processing of the input, unlike the complex Neural Network and SVM approaches in existing systems, which gives more assurance of the classification accuracy. Both Gender Recognition (GR) and Emotion recognition (ER) can be implemented using Support Vector Machine (SVM), fed with relevant audio features. Since SVM is the core in this model, it is capable of training faster with high accuracy.

### ACKNOWLEDGEMENT

It is our privilege to express our sincerest regards to our supervisor Dr. Madhu M. Nashipudimath for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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# Health monitoring system based on IOT

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***Abstract**— Internet has become an inseparable part of our lives and can integrate health care seamlessly in everyday life. Patients can continuously check their wellbeing by just staying at home rather than going to clinic in this pandemic situation. This project aims at developing a system which will monitor the patient's body temperature, heart rate, pulse rate and BP through the sensors which are interfaced with a controller and the data will be sent to a website it will be also recorded and stored in cloud. Patient's health status will be notified according to the parameters measured, project is designed in such a way that it can be easily modified or more sensors can be added. It can be very useful in current situation as this is directly related to the patient's immunity. IOT is the new revolution of internet. The objective of this project is to track and maintain the health profile of the patient. With the help of the data set of patients, recommendation about the specific doctor is made.*

**Keywords**— Detection of pulse rate, Blood pressure, temperature, Heart rate, IoT, Data Mining

## 1. Introduction

In recent years there are many devices which are used to capture health parameter they include starting from wearable devices to big machines which are used in hospital for collecting data, the project will be useful in the current situation where we are restricted from leaving the house. As technology is advancing in day-to-day life and the smart devices related to health has given the seasoning effect on healthcare. IoT is one of the growing fields in this era. IoT simply refers to connect internet to things such as sensors and can be used to collect and shared data over internet.

## 2. Literature Survey

This Literature survey consists of research papers that is relevant to the domain Internet of things. Basic ideas and fundamentals of implementation come under some of the reference paper presented below.

### A. A systematic review. SN Applied Sciences. [3]:

This article involves internet of things (IoT) based on healthcare system is enormously used in healthcare system such as health monitoring, fitness programs etc. Numerous researches have been carried out in the IoT based healthcare system to improve monitoring efficiency. Cloud integrated systems are used in the IoT architecture. Factors such as accuracy and power consumption are important concern of IoT. Most research works are efficient in detecting several symptoms and can accurately predict the diseases. The IoT based healthcare system designed especially for elders is an efficient solution in monitoring their healthcare issues.

### B. Heart rate monitoring using IoT wearable for ambulatory patient. [4]:

This System acts as assistant in health care and medical observing services. Health specialists and technicians have developed a great system with low-cost healthcare monitoring for people suffering from many diseases using common techniques such as wearable devices, wireless channels, and other remote devices. Network-related sensors, either worn on the body or in living environments, collect rich information to assess the physical and mental state of the patient. This work focuses on scanning the existing e-health (electronic healthcare) monitoring system using integrated systems. The results of the study refer to the application of IoT in the health institutions, it will help to obtain accurate diagnoses for patients, which will reflect on the quality of service.

**C. E-Healthcare Monitoring System using IoT with Machine Learning Approaches. [1]:**

IoT Health wearable devices are taking new challenges by upgrading with innovative technology and resources. Using health wearable devices, in/out patient's health status can be monitored periodically and regularly. This paper introduces an IoT application framework E-Healthcare Monitoring System (EHMS) integrated with Machine learning (ML) techniques to design an advanced automation system. Using this system, it will connect, monitor and decisions making for proper diagnosis.

**D. A Smart System Connecting e-Health Sensors and the Cloud. [2]:**

The architecture for this system is based on medical sensors which measure patients' physical parameters by using wireless sensor networks (WSNs). These sensors transfer data from patients' bodies over the wireless network to the cloud environment. Therefore, patients will have a high-quality service because the e-health smart system supports medical staff by providing real-time data gathering, eliminating manual data collection, enabling the monitoring of huge numbers of patients. This paper presents the design and implementation of an e-health smart networked system.

**2.1 Summary of Related Work**

The summary of methods used in literature is given in

Table 1.

SN	Paper	Advantages and Disadvantages
1.	Selvaraj,S& Sundaravaradhan <b>Reference number- [4]</b>	Advantages: Better accuracy and efficient solution in monitoring their healthcare issues. Disadvantages: 1)More power consumption and security issues due to utilisation of more resources. 2)Less availability of resources.
2.	Irawan, H. C., & Juhana <b>Reference number- [5]</b>	Advantages: Low cost and affordable technique. Disadvantages: Consume lot of time and slow.
3.	Brahmaji Godi, Sangeeta Viswanadham, Appala <b>Reference number- [1]</b>	Advantages: Integrated with machine learning techniques to design an advanced automation system. Disadvantages: 1)Leak of sensitive information about the patient's health and location. 2)This is only an application framework.
4.	Mohammad S. Jassas, Abdullah A. Qasem and Qasay.Mahmoud <b>Reference number- [2]</b>	Advantages:1)System is based on medical sensors which measure patients physical parameters by using wireless sensor networks. Disadvantage: 1) Financially implementation of hospitals and staff training is quite high 2)Real Challenge to implement.

Table 1 Summary of literature survey

**3. Proposed Work**

Health care system reform covers a disparate and controversial array of issues. Healthcare system needs some hardware devices such as Wi-Fi module and various types of sensors the following systems based on Internet of Things (IoT) and Data mining. The system consists of temperature sensor, heartbeat sensor, pulse sensor etc. to put forth the various results of the tested patient. The system shows the parameter's and then user can share the data to the respective doctors. Data of patient is recorded by the system. The previous all records of the patient are stored for doctor to take reference.

**3.1 System Architecture**

The system architecture is given in Figure 1. Each block is described in this Section.

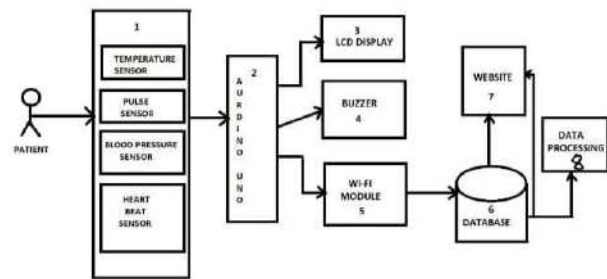


Fig. 1 Proposed system architecture

**A. Block 1 Description:** Temperature, pulse, blood pressure, heartbeat is taken from the patients using temperature sensor, pulse sensor, blood pressure sensor, heartbeat sensor.

The LM35 is a temperature measuring tool capable of analog output equal to the temperature. Provides output power at Centigrade (Celsius). It does not require any external measurement cycles. The sensitivity of the LM35 is 10 mV / degree Celsius. As the temperature rises, so does the output.

Heartbeat sensor is an electronic device used to measure heart rate which means faster heartbeat. ... You can get the Principle of Heartbeat Sensor, the performance of the Heartbeat Sensor and the Arduino based Heart Rate Monitoring System using the Heartbeat Sensor.

Blood pressure monitoring measures the intensity of arterial pressure (MAP) and is approximation to systolic and diastolic pressure. Requires the use of a pressure

transducer, Arduino Uno, and coding to control the valve and air pump. The circuit design is made up of three basic components: a low ground filter, a high ground filter, and a non-responsive amplifier. This sensor is used to take patient readings and will be sent to Arduino.

**B. Block 2 Description:** Arduino is a microcontroller board based on ATmega328. It has 20 digital input / output pins (of which 6 can be used as PWM output and 6 can be used as analog input), 16 MHz resonator, USB connection, jack, in-circuit system programming (ICSP) header, and reset button. It is the brain of the project

**C. Block 3 Description:** LCDs have the same interface, which means the microcontroller has to control multiple interface pins at the same time to control the display. This is a 16-character character with 2-line Alphanumeric displays. Black text on green background. It uses the most advanced visual chipset of HD44780. Interface code is freely available. You will need Minimum 6 standard I / O pins to connect to this LCD screen. Includes LED background light. Works in 4bit and 8-bit mode. The LCD will be one of the things where the output of the entire sensor will be displayed in an orderly fashion

**D. Block 4 Description:** Arduino buzzer is also called piezo buzzer. Basically, a small speaker that you can connect directly to Arduino. You can set the tone to the frequency you set. The buzzer produces sound based on the reversal of the piezoelectric effect. The buzzer produces the same sound quality regardless of the variation in power applied to it. Depending on the patient parameters the buzzer will buzz if the parameters are higher than normal or below normal values.

**E. Block 5 Description:** ESP8266 includes antenna switch, RF balun, power amplifier, low noise receiving amplifier, filters and power management modules. The integrated design reduces the size of the PCB and requires the L106 Diamond series 32-bit processor and on-chip SRAM external. The wifi module is used to send the data collected from patients using different sensors directly to the internet when the sensors are on.

**F. Block 6 Description:** Patient's information will be stored in a database so that the doctor or respective guardian can view the data any were anytime without issue.

**H. Block 7 Description:** ThingSpeak enables sensors, devices to send data to the cloud where it is stored on a private or public channel. ThingSpeak automatically stores data on private channels, but public channels can be used to share data with others. Once the data is in ThingSpeak channel, you can analyze and visualize it, calculate new data, or interact with social media, web resources, and other devices. The data collected from the patients is then securely transferred to a website so that the doctors or respective guardian can overlook the data anywhere and anytime conveniently.

**G. Block 8 Description:** Data processing will be done by Excel with its Data mining add-on using it we can find future pattern of the patient health parameters with the help of historical data of the patient. It will be used to find the co-relation between the health parameters of the patient the data will be plotted on a graphical manner depending on the historical data and the patient parameters.

### 3 Requirement Analysis

#### 3.1 Software

- 1)ThingSpeak
- 2)Arduino Software
- 3)C++/C

#### 3.2 Hardware

- 1)Arduino UNO board.
- 2)ESP8266 Wi-fi Module.
- 3)16\*2 LCD Display.
- 4)10k Potentiometer.
- 5)Pulse Sensor.
- 6)LM35 Analog Temperature Sensor.
- 7) Resistor 2k & 1k.
- 8)5mm LED.
- 9)Piezo Buzzer.
- 10)Breadboard.
- 11)M-M Jumper Wires & M-F Jumper Wires.

### 3.3 Dataset and Parameters

As the project is directly related to medical field, information about real-time patient's dataset is very confidential and is difficult to be obtained for experimental purposes. The parameters taken from the patients are blood pressure, heartrate and temperature which are displayed on a website.

### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof. Sunil Shelke for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to presenting this work.

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# Laptop Tracking System

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*Abstract— Around the world everywhere, everyday many laptops are stolen by strangers. It is a very critical issue as the confidentiality of personal data, files and information is compromised. Letting this information in hands of the unknown will lead to unexpected and unwanted events. In the computing world tracing the laptop and locating the thief's position is a difficult process. Various solutions are provided by vendors to tackle the problem through GPS, GSM monitoring and cloud services. But there are various pitfalls of tracking laptops through above mentioned services. Our project aims at providing a Laptop Tracking System that would help the legal authorities, administrators to trace the stolen/misplaced laptop with the help of current IP address and MAC address.*

**Keywords—**GPS, GSM, IP Address, MAC Address.

## 1. Introduction

Of our physical assets, laptops are particularly hard to protect. With the increased data storage capabilities of laptops, the loss of even a single laptop can induce dramatical costs to the organization or an individual. Protection against laptop theft is researched by the computer science and the crime science community. In the computer science community, the accent is on protecting the data residing in the laptop and finding the location of the stolen laptop. Many solutions exist for protecting the laptop being stolen, protecting the data in them, tracing the laptop even if it has been stolen by anybody. These solutions are various techniques like GPS, hardware locks, point-point tokens, WiFi based etc. Next section in this synopsis gives a brief about the techniques mentioned here.

## 2. Literature Survey

**A. Using Software based approach for tracking laptops:** Laptop tracking software is the tool used for protecting and tracking the laptop if it is lost or stolen. It reduces the problem for the users and corporate when dealing with the laptop theft case. There are noteworthy tools and software available in the market which would minimize theft risk. But the users have to pay for these applications and sometimes it can prove to be cost ineffective and more client/user dependent. Since the

percentage of the population is less technology oriented and cannot afford to spend extra money for security, it becomes necessary to build a system which is less user dependent.

**B. Using Hardware Based Approach for tracking laptops:** The paper titled 'Anti Theft System for Laptop Tracking', authors have built a technique to prevent laptops from being stolen and to track back misplaced laptops. Here the author has proposed a technique to protect laptops by adding sensors and if stolen an alarm will make a noise to trigger the owner of the laptop. The advantage of this system is that it is developed by integrating few sensors which will be connected to the laptop and to receive/transfer data from sensors, processing and forwarding to GPS and GSM and other sensors the Arduino Nano is used.

**C. Using available mobile communication technologies for tracking laptops:** In this technique the researchers have created an application for maintaining privacy and security of data. In case if any employer or an individual misplaces his laptop the organization will be able to track and locate the position. The system is designed to retrieve IP address information of particular PC/laptops and then reverse engineer them into city coordinates. These city coordinates are then mapped onto a google map in order to graphically map them on a google map. This provides a robust and efficient PC/laptop tracking system for companies.

**D. GPS, GSM and CDMA:** Basically in this technique mentioned in the paper titled 'An offline strategy of securing confidential data in a misplaced or stolen laptop and track back the laptop with location and pictorial metrics of unauthorised user' a kernel program or an operating system program, stored in ROM of a device handles important and basic operations from switching ON/OFF to data transfer between operations. If the stolen laptop is unable to trace with the help of GPS, GSM and

CDMA technology the owner of that particular system is able to track back the location and also able to activate the Kernel program which will automatically turn off the laptop.

### 2.1 Summary of Related Work

The summary of methods used in literature is given in Table 1.

Table 1 Summary of literature survey

Literature	Software Based	Hardware Based	Hybrid
Pushpa K.G, Sharanappa.K, Pramod S.N, Prashanth C.H, Sujithkumar C, IRJET, 2020.	No	No	Yes
Ms. Maimoona M, Ms. Fathimath Zakiya, Ms. Sameeha Khatheeya, Mr. Mahesh B.L, IRJET, 2020.	No	Yes	No
Nirit Datta; Ashutosh Malik; Mukund Agarwal; Anirudh Jhunjhunwala	No	Yes	No
Ms. P. Infant Ansiya, Prof. P. Sruthi Mol, Dr. S. Dharmalingam, 2017.	No	No	Yes

The overview of comparison of different parameters are given in Table 2

Table 2 Summary of literature survey

Literature	Cost Efficient	Preemptive	Real Time
Pushpa K.G, Sharanappa.K, Pramod S.N, Prashanth C.H, Sujithkumar C, IRJET, 2020.	No	No	Yes
Ms. Maimoona M, Ms. Fathimath Zakiya, Ms. Sameeha Khatheeya, Mr. Mahesh B.L, IRJET, 2020.	No	Yes	Yes
Nirit Datta; Ashutosh Malik; Mukund Agarwal; Anirudh Jhunjhunwala	No	Yes	Yes
Ms. P. Infant Ansiya, Prof. P. Sruthi Mol, Dr. S. Dharmalingam, 2017.	No	Yes	Yes

### 3. Proposed Work

The solution proposed in this paper is to trace the stolen laptop using its MAC address. The Police

stations/authorities will share a common central database where a report will be lodged and its details including name, address, laptop details specifically MAC address will be registered. ISPs share the same database. If the stolen laptop is detected in the ISPs log file, an alert is generated to the police station under whose jurisdiction the ISP operates. The station would get an alert of the stolen laptop along with the IP address and other user details. Upon finding the stolen device, the station can update the database.

### 3.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.



Fig. 1 Proposed system architecture

#### A. Police Complaint :

The first part is to register the MAC address of the stolen laptop. The owner of the laptop will give the details of the stolen laptop to the police authority. The authority will then add the details in the website. The website will be connected to the database.

Every time there is a new complaint, the authority will update it in the database.

This website is very user friendly and simple to use.

#### B. Database System:

The second part receives the data from the police and it stores them in it.

This database will have different attributes to it. It will consist of the Name of the owner of the laptop, contact number, address of the owner, MAC address, and other details of the laptop.

This database will send the data to the Internet Service Providers (ISP). It will not send the entire database but just the MAC address.

If the laptop is found then the police administrator will update it manually. This way the database is maintained.

#### C. ISP:

Once the MAC address is received by these Internet service Providers (ISP) they search for that MAC address

in their log. This is done by using the searching algorithm. This step may take a lot of time as there are so many MAC addresses connected to that log in under a minute. Hence here the system starts searching the MAC Address in a few different segments i.e. in different time slots. Here after the search is done and if the MAC address is matched then it will send the details of that particular MAC address to the police.

### 3 Requirement Analysis

The experiment setup is carried out on a computer system which has the different hardware and software specifications as given in Table 3.1 and Table 3.2 respectively.

#### 3.1 Software

Table 3.1 Software details

Operating System	Windows /Linux
Programming Language	JavaScript, Python
Database	SQL Database

#### 3.2 Hardware

Table 3.2 Hardware details

Processor	2 GHz Intel
HDD	180 GB
RAM	2 GB

#### ACKNOWLEDGMENT

We deeply express our sincere thanks to our guide Dr. Prashant Lokhande sir for giving us this opportunity to work on the project 'Laptop Tracking System'. Sincere thanks to our Head of Department Dr. Sharvari Govilkar for encouraging and preparing us throughout the project. We would also like to express our gratitude to our Principal Dr. S.M. Joshi sir for his kind support. We would also like to thank all our teachers for helping us whenever we faced issues. Last but not the least we would like to thank all our friends and family for their love,

cooperation and support throughout the project.

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# Learndash: A Cheating Free Platform for Online Learning

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## Abstract

*During the Covid-19 pandemic, all countries were in lockdown. In this lockdown, many sectors are not able to do their job. One of them is the most important sector is the education sector. In the education sector everyone is moving towards e-learning. Students from various streams are doing study from online platforms and They are also appearing for exams from online platforms. But that online platforms are not sufficient for examination. According to the research on e-learning platform especially on topics within the category of examination, it shows that neither of the platform is cheating free. We are proposing an e-learning platform. That will help students as well as teachers to continue towards education. By considering it, we are proposing a cheating free examination e-learning platform. The proposed system will help teachers as well as students for better exposure in regards to the subject with the virtual lab, online video tutorial, discussion forum, whiteboard, etc.*

## 1. Introduction

We are living in the era of the information revolution, with a lot of devices such as computers and mobile devices sprouting everywhere thereby making it easy for information to be communicated, and the education sector is not left out in this growing development. Computers and mobile phones have become an unavoidable part of our lives. There are a lot of things which we can do with these technologies.

In this year of 2020, the world witnessed a drastic shift to internet usages. Education is such a sector which has got affected due to the global pandemic. We have seen that nowadays students are getting used to e-learning technology. Whenever a doubt arises within students regarding any topic, they immediately google it or search it in youtube. But they are not getting all the information in one place and Some concepts are much more difficult to understand with self-study. And institutes are also

facing difficulties in conducting online exams. To overcome this difficulty everyone decides to use an online platform for learning.

Now, technology has improved and there are some e-learning platforms where students can register, login and refer notes, watch video lectures, appear for exams, etc. Some of the **e-learning platforms** are **Udemy, Coursera, Byju's etc.**

**Learndash** is an e-learning platform that is user-friendly, i.e. students and teachers get a better interface to use this platform. There is a separate login for students as well as teachers. Apart from the other learning platforms, **Learndash** provides its user "**cheating-free platform**". Here, teachers can conduct the examination of their students without the worrying of cheating. **Learndash** provides one of its users, i.e. students first watch the video and **Test** their knowledge through answering the questions whenever and wherever possible. **Learndash** also provides its another user i.e. teachers all the materials needed for them to provide information about the subject. It is **accessible from both mobile and computer**. It takes a quiz on the topics which are covered by the students.

## 2. Literature Survey

### 2.1 Literature survey on various platform

Table 2.1 Literature survey of various platform

Platform	Class Schedule	Exam	Quality	Area
Udemy	Self-directed	Chances of cheating	Good	Large
Coursera	Self-directed	Chances of cheating	Very Good	Medium
Khan academy	Self-directed	Chances of cheating	Good	Large

Udacity	Self-directed	Chances of cheating	Good	Medium
Physical Classes	Must be Scheduled	Anti Cheating	Very Good	Small

## 2.2 Literature survey on various technology

[1] The paper titled as **“Designing Pedagogic Strategies for Dialogic Learning in Higher Education”** presented by Prof Alyson Simpson. This paper focuses on the pedagogic value of dialogue to strengthen pre-service teachers’ reflective practices and improve their knowledge about the power of talk for learning. Dialogic learning was introduced to a unit of study taken by a final-year cohort of students in an initial teacher education degree. Various opportunities for dialogue were designed into the unit through blended learning such as face-to-face tutorials, social networks and Viva Voce contexts. In the face of mixed opinion on their efficacy, the author profiles the use of social networks as a means of incorporating more interactive discourse through Web platforms in higher education.

[2] The paper **“The Effects of Student Engagement, Student Satisfaction, and Perceived Learning in Online Learning Environments”** presented by Prof Julie.A Gray, Melanie DiLoreto. Studies show that course organization and structure, student engagement, learner interaction, and instructor presence have accounted for considerable variance in student satisfaction and perceived learning in online learning environments through a range of pathways, although no research to date has tested the mediational relationship identified. This study expanded upon the existing literature about online learning and the variables that influence student satisfaction and perceived learning. The researchers investigated the relationships among course structure/organization, learner interaction, student engagement, and instructor presence on student satisfaction and perceived learning. The results of this study were intended to inform practice related to increasing retention and improving the quality of online teaching and learning.

[3] The paper **“Self-regulated learning strategies & academic achievement in online higher education learning environments”** presented by Prof Jaclyn Broadbent and walter poon. Shows that given the rapid growth of online learning in the last decade, there is a need to understand how students can best utilise SRL strategies to achieve academic success within online environments. Self-regulated learning strategies of time management, metacognition, critical thinking, and effort regulation were found to have significant positive correlations with academic success in online settings, albeit these effect sizes were smaller than those found in the traditional classroom. In contrast, rehearsal, organisation, and elaboration were found to be the least empirically supported SRL strategy within the online environment, indicating that there is less benefit in these strategies for online learners. Lastly, we argue that increased peer learning should be prioritised in the context of online learning and that further research is needed to determine an appropriate measure of this strategy. Future research would benefit from exploring how mediating factors (such as motivation) work together with SRL strategies to improve our understanding of the influence of learner self-regulation on academic success within the online environment

[4] The paper **“How People Learn in an Asynchronous Online Learning Environment”** Prof Beomkyu Choi. Shows the purpose of this study was to examine the relationships between learners' learning strategies and learning satisfaction in an asynchronous online learning environment. In an attempt to shed some light on how people learn in an online learning environment, one hundred and sixteen graduate students who were taking online learning courses participated in this study. The result revealed that "metacognitive strategy" and "time and study environment" had positive correlations with learners' satisfaction, while "help seeking" had a negative correlation. The findings of a multiple regression analysis showed that "metacognitive strategy" and "peer learning" led to learners' satisfaction in an online learning environment. The findings of this study contribute to a better understanding of how successful learning occurs in an online learning environment, and provide recommendations on designing an effective online learning.

## 2.2 Literature Summary

Table 2.2 Summary of literature survey

SN	Research Paper	
1.	<b>Prof Alyson Simpson.</b> <b>Designing Pedagogic Strategies for Dialogic Learning in Higher Education</b>	<b>Advantages:</b> Communication and follow through make it easy to understand. <b>Disadvantages:</b> Every individual is different he/she may find it difficult to interact with the faculty or the instructor over the mass people.
2.	<b>Prof Julie.A Gray, Melanie DiLoreto.</b> <b>The Effects of Student Engagement, Student Satisfaction, and Perceived Learning in Online Learning Environments.</b>	<b>Advantages:</b> Comfortable learning from user perspective. Less material gets used to explain different things. <b>Disadvantages:</b> Medical effects like eye strain and back pain may occur to some users.
3.	<b>Prof Jaclyn Broadbent, walter poon.</b> <b>Self-regulated learning strategies &amp; academic achievement in online higher education learning environments.</b>	<b>Advantages:</b> users can learn on their own at any time from anywhere. Ease of access. <b>Disadvantage:</b> Lack of clarification

		sometimes may lead to weaker performance in the further operations.
4	<b>Prof Beomkyu Choi</b> <b>How People Learn in an Asynchronous Online Learning Environment</b>	<b>Advantages:</b> User gets to enroll in preferred subjects and can research thoroughly with the help of instructors and guides. <b>Disadvantage:</b> Can be time consuming and costly.

## 3. Proposed Work

### 3.1 Overview

Overview of a system includes studying different sites and research papers that have been previously implemented and extracting useful features and architecture from the same in order to use in our proposed system. The fig. 3.1 below gives us a basic overview as to what was the operational flow used in previous systems.

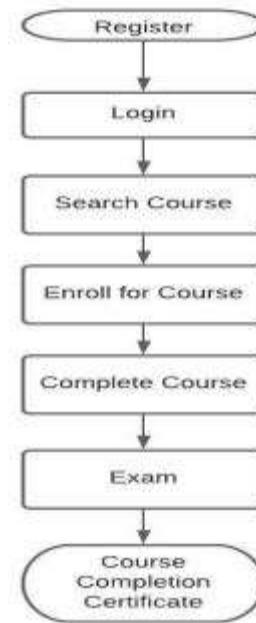


Fig. 3.1 System Overview

**Login/Registration:** Initially, every user has to register or login into the website. For accessing course registration is mandatory.

**Search course:** After the login user can search which courses he/she want to take.

**Register on course:** The user can take at a time multiple courses as per his/her requirements.

**Complete Course:** The user can take time to complete them as per his/her schedule

**Exam:** After completing the course there is an exam which will be used to show the user's knowledge about that course.

**Completion Certificate:** After completing the successful exam users will get a certificate which will help to showcase their talent.

### 3.1.1 Existing System Architecture

From the observation of the papers, we can say that there are certain stages that ignore the things which are very important for the quality content. Like while taking the exam there is very low security. Which is not sufficient to stop users from doing the cheating while taking exams. In the Existing system, some of the stages are very useful like storing data of users for future use. Users can do registration for multiple courses at a time. Some of the existing systems also have live interaction for instructor and user.

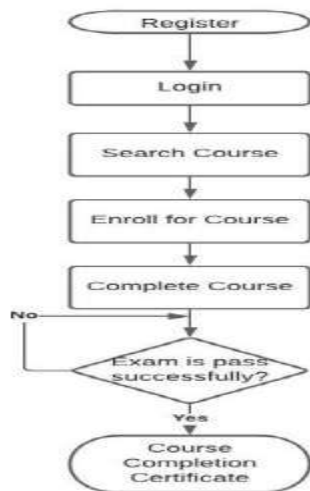


Fig. 3.2 Existing system architecture used for E-Learning Systems

### 3.1.2 Proposed System Architecture

In the proposed system we are going to make the exam more secure by using some constraints. While taking the exam if the user is detected as doing cheating he/she gets the warnings three times afterward they are disqualified from the exam and he/she never gets a chance to take the same exam again. If the user successfully clears the exam, he/she will get a certificate as proof of their course completion. There is live interaction also available during the course. There is no specific time constraint to the completion of the course.

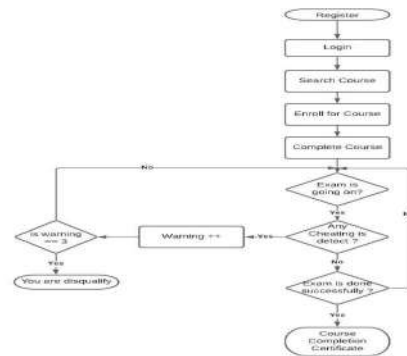


Fig. 3.3 Proposed system architecture

### 3.2 Use Case Diagram / Activity Diagram

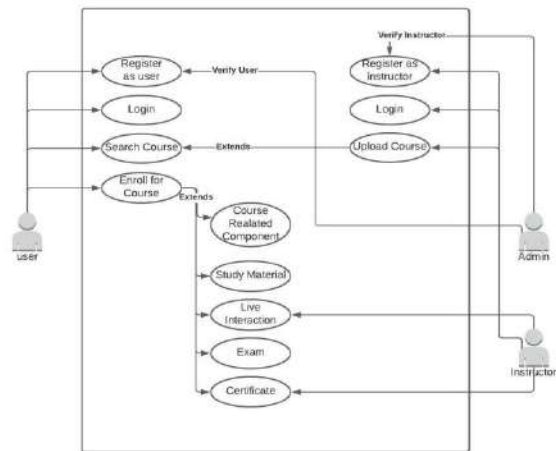


Fig. 3.2.1 Use Case Diagram E-Learning System

- **Roles:**

**User:** A user is a person who uses all those facilities



to learn the courses.

**Instructor:** An instructor is a person who uploads different courses as per their profession.

**Admin:** The admin is the authorized person of this e-learning system. He has all permissions and rights to the website.

- **Components:**

**Register as User/Instructor:** A user/Instructor needs to fill in all details which are required while doing registration.

**Login:** Login is used to verify authorized users/instructors.

**Upload Course:** An instructor creates different courses as per his/her profession and uploads them to the website.

**Search Course:** After the successful login user can see the different courses as per his/her choice.

**Enroll for Course:** The user decides which course he/she wants to do. After deciding they will make their enrollment for that course.

**Course Related Component:** Each course has its own requirements like some courses are related to mathematics for that calculator is required, some courses relate to the programming for that compiler is required. And also some basic components like a whiteboard, highlighter, notes, etc.

**Study Material:** In study material, there are video lectures or copies of notes.

**Live Interaction:** Live interaction is done during the course which beneficial for users to solve their doubts about the course.

**Exam:** After completion of the course syllabus, there is an exam. Which will help the user to show his/her knowledge about the subject.

**Certificate:** After successful completion of the exam user will get a certificate that will show his/her successful completion of the course.

## 4. Requirement Analysis

### 4.1 Software Requirement

#### 1. Flask:

Flask is a web framework. This means flask provides you with tools, libraries and technologies that allow you to build a web application. This web application can be some web pages, a blog, a wiki or go as big as a web-based calendar application or a commercial website.

Flask is part of the categories of the micro-framework. Micro-framework are normally frameworks with little to no dependencies to external libraries. This has pros and cons. Pros would be that the framework is light, there is little dependency to update and watch for security bugs, cons is that some time you will have to do more work by yourself or increase yourself the list of dependencies by adding plugins. In the case of Flask, its dependencies are:

- Werkzeug a WSGI utility library
- Jinja2 which is its template engine

Example:

Hello World! Code:

```
from flask import Flask, render_template
app = Flask(__name__)

@app.route("/")
def hello():
    return render_template("index.html") # Make index.html in folder name templates

if __name__ == "__main__":
    app.run(debug=True)
```

#### 2. Firebase

Firebase is a tool set to “build, improve, and grow your application”, and the tools it gives you cover a large portion of the services that developers would normally have to build themselves, but don’t really want to build, because they’d rather be focusing on the application experience itself. This includes things like analytics, authentication, databases, configuration, file storage, push messaging, and the many more. The services are hosted in the cloud, and scale with little to no effort on the part of the

developer.

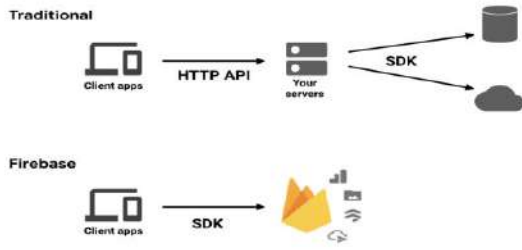


Fig. 4.1 Firebase System

### 3. HTML5:

HTML Stands for "Hypertext Markup Language". HTML is the language used to create web pages. "Hypertext" refers to the hyperlinks that an HTML page may contain. "Markup language" refers to the way tags are used to define the page layout and elements within the page. Below is an example of HTML used to define a basic webpage with a title and a single paragraph of text.

```
<!doctype html>
<html>
<head>
<title>Learndash : A Cheating Free
Platform for Online Learning</title>
</head>
<body>
<p>This is an example of a paragraph
in HTML.</p>
</body>
</html>
```

The first line defines what type of contents the document contains. "<!doctype html>" means the page is written in HTML5. Properly formatted HTML pages should include <html>, <head>, and <body> tags, which are all included in the example above. The page title, metadata, and links to referenced files are placed between the <head> tags. The actual contents of the page go between the <body> tags.

### 4. CSS:

CSS Stands for "Cascading Style Sheet." Cascading style sheets are used to format the layout of Web pages. They can be used to define text styles, table sizes, and other many more aspects of Web pages that previously could only be defined in a page's HTML.

### 5. JavaScript:

JavaScript is a client-side scripting language, which means the source code is processed by the client's web browser rather than on the web server. This means JavaScript functions can run after a web page

has loaded without communicating with the server. For example, a JavaScript function may check a web form before it is submitted to make sure all the required fields have been filled out. The JavaScript code can produce an error message before any information is actually transmitted to the server.

### 3.4.2 Hardware Requirements

The processor needed is 2GHz, Hard Drive capacity needed is 180gb, RAM 2 GB is required.

### Acknowledgement

It is our privilege to express our sincerest regards to our supervisor **Prof. Sheetal Gawande** for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks to our Head of the Department **Dr. Sharvari Govilkar** and our Principal **Dr. Sandeep M. Joshi** for encouraging and allowing us to presenting this work.

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<https://doi.org/10.1109/ACCESS.2018.2802325>.

# NANO SNIFFER - Network Security & Reconnaissance Framework

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**Abstract-- Network Security is a serious concern in all organisations, leading to loss in resources. Such cases are not easy to deal with, due to the lack of time and resources available. Software solutions available are difficult to set up in an online environment. The Packet Sniffer proposed sniffs and spoofs packets passing through a network and analyses them for detecting network intrusion attempts on the same network or on other network users and critical servers and collects sensitive information such as server to server communications or performing penetration testing to test infrastructure and network security. This helps you target new resources when expanding your network capacity, manage your bandwidth, ensure delivery of business services, enhance security, and improve end-user experience. Nano Sniffer has the ability to perform both sniffing in combination with spoofing which gives the advantage in security testing for organisation's networks as well as foreign networks. It can be used directly with a network switch to perform DHCP spoofing to test security functionality of the switch.**

**Keywords-** DHCP spoofing, sslstrip module, HTTPS traffic, Arp spoof, DNS spoof, Raspberry Pi Zero W

## I. INTRODUCTION

According to internet world stat, the global internet penetration rate is 53% which continues to grow. With such growth, packet sniffers are extensively used to analyze and monitor the network. Packet sniffer is the tool which can be a piece of software or hardware to monitor the network. Packet Sniffing is a technique used to monitor the packets that travel through the network. Using the information captured by the packet sniffers, an administrator can identify issues in the network and maintain efficient network data transmission. The security threat presented by sniffers is their ability to capture all incoming and outgoing traffic, including clear-text passwords, usernames or other confidential data.

Network Protocols use network packets to transmit information between nodes of the communication channel. Majority of network protocols like HTTP, FTP which transfer information in plain text are susceptible to packet sniffing attacks. Since, network packets carry secret information cyber criminals search

for secret information in packets and can manipulate packet data. So, encryption technology is used while transferring secret information over the networks. Packet Sniffing is often considered an insider threat by various organizations.

## II. LITERATURE SURVEY

### A. Discussion of suspicious activities in network traffic

NEEDHAM and Lampson(2014) acknowledge that IP is the most popular networking protocol that is used by most devices in a networked environment. Owing to the nature of operation of the IP protocol where it does not provide authentication services or confidentiality, most attacks can emanate from this vulnerability and compromise the network or the systems in the network. These attacks can be launched from within the LAN or be within the WAN.

#### i) Attacks on Local Area Networks

This kind of attack requires the victim machine to be powered off so that they cannot be alerted when this theft of identity happens. Either attackers can be patient enough to execute this or they can decide to launch another attack that forcefully brings down the victim's machine.

#### ii) Attacks that take advantage of WAN connections

Servers are the target for these kinds of attacks. Message redirecting in networks is also an activity that goes on silently without the administrator noticing there is an attacker, effectively saying, "You should have sent this message to the other gateway instead".

#### iii) The broad umbrella of DDoS attacks

DDoS attacks are an extrapolation of Denial of Service attacks (Visbal, 2015). As much as DoS prevents legitimate users from using a system, DDoS will do the

same thing but the method of deployment is what sets these attacks apart.

*B. Existing techniques used to detect suspicious activities in network traffic*

An anomaly detection technique in networks refers to the problem of finding exceptional patterns in network traffic that do not conform to the expected normal behaviour. Detection of anomalies is moving from the manual process where the security analysts are required to continuously audit network activities and make sound judgments when detecting network outliers. Network anomaly detection techniques that Bhuyan et al. (2014) broadly discusses in his work can be categorized into four classes. They are statistical, classification-based, clustering and outlier-based. A statistical method usually bases its aberration detection procedure by looking at activities from a given data set that have a low probability of being generated. Applying statistical inferences, the technique can then decide if the activity belongs to the statistics model or not.

*C. System developed for detecting suspicious activities in network traffic*

Minnesota Intrusion Detection System (MINDS) employs the use of data mining to detect network intrusion (Ertöz et al., 2005). It collects data through flow tools that act as its input, the system then looks at the packet header information and builds a one-way session to the flows. Integrating Elasticsearch and Kibana (ELK stack) and packet capturing applications like Wireshark in doing real time network analysis Kibana is a web interface for Elasticsearch.

*D. Summary of Related Work*

The summary of methods used in literature is given in Table 1.

Table 1 Summary of literature survey

Literature	Advantages and Disadvantages
Roshan Poudél	Advantages: Secret Credentials Packet Sniffer Disadvantages: Doesn't monitor the whole network

Henry N. O. and Agana M.	Advantages: Sniff packets in LAN, at IP, MAC layer from switch, limited HTTP packets Disadvantages: Only analysing small
Ahsan N., Ahsan W. and Sirajuddin Q.	Advantages: Passive network monitoring for LAN, Uses ntop apart from usual Wireshark, Analysis on Application layer protocols Disadvantages: Only Software solution
Nimisha Patel, Rajan Patel, Dr. Dhiren Patel	Advantages: Discusses potential use of Sniffing on non-switched networks, Also discusses AntiSniff to detect sniffers on network Disadvantage: The research is quite old and doesn't stand to today's standard

III. SYSTEM ANALYSIS AND METHODOLOGY

A. Proposed Work

It can be used directly in the network switch to perform DHCP spoofing to test security functionality of the switch. It uses various modules such as ARP spoof, DNS spoof etc to sniff the entire network. Reliable because of its portability and automation. It is implemented on hardware which makes itself a standalone hardware sniffer which can be used anywhere in the entire network or other places to perform security testing.

B. System Architecture

The system architecture is given in Figure 1.

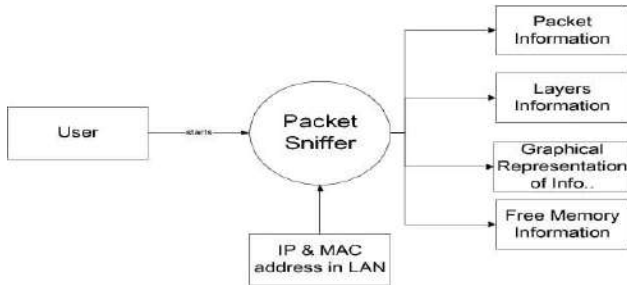


Fig. 1 Proposed system architecture

The Nano Sniffer performs 3 types of spoofing viz ARP spoofing, DNS spoofing and DHCP spoofing.

*i) ARP spoofing*

ARP spoofing is a type of attack in which a malicious actor sends falsified ARP (Address Resolution Protocol) messages over a local area network. This results in the linking of an attacker’s MAC address with the IP address of a legitimate computer or server on the network. Once the attacker’s MAC address is connected to an authentic IP address, the attacker will begin receiving any data that is intended for that IP address. ARP spoofing can enable malicious parties to intercept, modify or even stop data in-transit. ARP spoofing attacks can only occur on local area networks that utilize the Address Resolution Protocol. The effects of ARP spoofing attacks can have serious implications for enterprises. In their most basic application, ARP spoofing attacks are used to steal sensitive information.

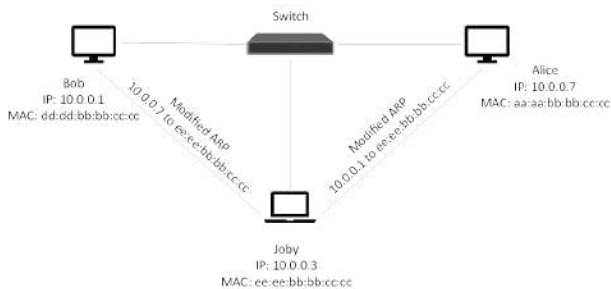


Fig. 2 ARP Spoofing

*ii) DNS Spoofing*

Domain Name Server (DNS) spoofing (a.k.a. DNS cache poisoning) is an attack in which altered DNS records are used to redirect online traffic to a fraudulent

website that resembles its intended destination. Once there, users are prompted to login into (what they believe to be) their account, giving the perpetrator the opportunity to steal their access credentials and other types of sensitive information. Furthermore, the malicious website is often used to install worms or viruses on a user’s computer, giving the perpetrator long-term access to it and the data it stores. Methods for executing a DNS spoofing attack include:-

1. Man in the middle (MITM)- The interception of communications between users and a DNS server in order to route users to a different/malicious IP address.
2. DNS server compromise- The direct hijacking of a DNS server, which is configured to return a malicious IP address.

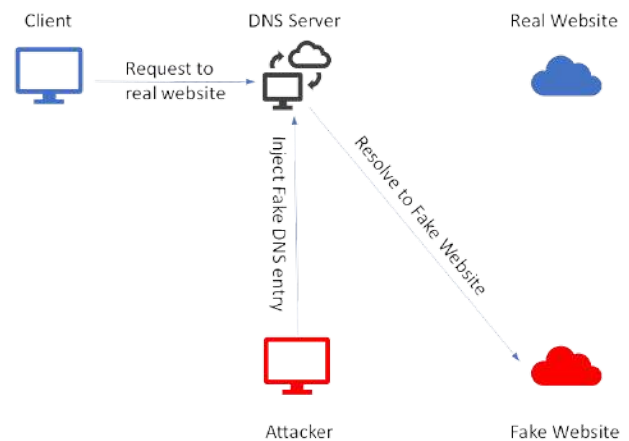


Fig. 3 DNS Spoofing

*iii) DHCP Snooping:*

This module’s purpose is attacking Microsoft Windows hosts by replying to DHCPv6 messages and providing the target with a link-local IPv6 address and setting the attacker host as default DNS server. DHCP spoofing occurs when an attacker attempts to respond to DHCP requests and trying to list themselves (spoofs) as the default gateway or DNS server, hence, initiating a man in the middle attack. With that, it is possible that they can intercept traffic from users before forwarding to the real gateway or perform DoS by flooding the real DHCP server with requests to choke ip address resources.

### C. Requirement Analysis

The implementation detail is given in this section.

Table 2 Hardware details

Hardware	Raspberry Pi Zero W
Mini HDMI	B-type
SD card	8 gb
Networking	Simple Switch

Table 3 Software details

Operating System	Debian Kali Linux ARM image
Programming Language	Golang, Python, Bash
Modules	net.recon, net.show, net.probe, net.sniff, net.fuzz, wol.etc MAC, spoofers-arp.spoof, dns.spoof, dhcpv6.spoof, Https.proxy, caplets, libpcap, libnetfilter-queue

## IV. APPLICATIONS

Every administrator should have packet sniffing software in their arsenal for detailed insight into response time. A network packet sniffer will tell you directly if an application or the network is affecting the end-user experience. Administrators know unanticipated spikes in network traffic can spell trouble - like mail server problems, malware, or a full-blown security breach. This network packet sniffer's Wi-Fi packet capture tool helps you differentiate normal traffic from abnormal traffic by detailing data and transaction volume according to application.

Real-time information about user activity,

application activity, web activity, etc., is delivered in context to a central management portal from where network administrators can drill down into the data for deeper insight.

### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof. K S. Charumati for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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# Online Collaborative Project Management System

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**Abstract**— *The idea of the project is to develop a platform that allows users to find relevant projects and work together, for this purpose searching and matching algorithms will be used to maximize the possibility of finding a good developer for the project. This will be based on multiple parameters like their skills, time taken to do previous projects, relevant domains, etc. The platform will enable a user to quickly add members, assign tasks, customize workflow, and track the progress of their work to completion. The project would be primarily focussing on effective usage of searching and recommendation techniques for collaboration of developers to increase efficiency and hence overall user experience .*

**Keywords**— Project Management, Online Collaboration , Recommendation System , User Matching

## 1. Introduction

Web Engineering is the application of systematic, disciplined and quantifiable approaches to development, operation, and maintenance of Web-based applications. It is both a proactive approach and growing collection of theoretical and empirical research in web application development. Web engineering focuses on the methodologies, techniques, and tools that are the foundation of Web application development and which support their design, development, evolution, and evaluation.

The Online Collaborative Project Management System is a web based application to manage various types of projects and to find people with similar interests to work with on a project through a recommendation system. The Online Collaborative Project Management System can be used for creating, updating, and managing projects. The project owners will be able to add other members to the project to work with them. The leaders can assign different tasks to the project members and also add deadlines to these tasks. A user can keep a track of their projects and their assigned works and update it as they complete it. The Online Collaborative Project Management System is intended for people who want to keep a track of all their individual or group projects in one place.

## 2. Literature Survey

**A. "Survey of Web-Based Project Management System" - T. H. Shaikh, F. L. Khan, N. A. Shaikh, H. N. Shah and Z. Pirani, (2018):** [1] The paper presents a comprehensive survey of existing web-based project management systems and proposes a system based on the findings. Project management systems widely used in organisations and among open source developers include various features such as Task Management, Real-time Monitoring, Chatbox, Notifications, and Alerts. Most of the work is carried out only for managing the projects but other features such as task assignment, prediction regarding the on-time completion of the project are not implemented. Based on the above findings , the paper sums up the drawbacks of existing systems and proposes a better system that includes features like predictive analysis that are currently not common with available systems.

**B. "Recommender System based on Extracted Data from Different Social Media. A Study of Twitter and LinkedIn " - Vahid Pourheidari ,Ehsan Sotoodeh Mollashahi ,Julita Vassileva , Ralph Deters - (2018):** [2] The main purpose of this research paper is to develop a functional recommender system which can recommend user accounts to computer scientists based on their skills and interests and predict their skills based on the accounts they are following on Twitter. The most important hubs in this network are identified and the position of programming languages in this network is investigated. A collaborative, a content-based, a mix, and a feature combination algorithm was developed and studied. The proposed algorithm, the feature combination recommender system, shows better performance because it needs less time to create the suggestion list in comparison to the content based and mix methods.



**C. "The Design and Implementation of a KNN-based Mobile Application "- Jingbo An, Zhiyi Fang, Qun Liu, Min Liu , Haoning Liu (2017): [3]** This paper focuses on designing a kind of social media software. The majority users of the software are college students. The novelty of this software lays in the personal interests-based friends match patterns when a user wants to add friends. The software also could support both online and offline communications with achieving the purpose to enrich the users' extracurricular activities. In order to increase the accuracy of the friend-matching function, various classification algorithms are studied and found that the "K-nearest neighbor" is optimal to be incorporated into the project with considerable performance. The paper discusses the improved friend-matching algorithm, a large part of which draws on the ideas and steps of KNN algorithm.

**D. "Social Account Matching in Online Social Media using Crosslinked Posts"-Waseem Ahmada , Rashid Ali (2019): [4]** In this paper, an efficient framework for user identity search and matching by exploiting user-generated posts on Twitter is proposed. An online user often reveals his/her identity on different social networks to collect followers. The proposed method retrieves the self-disclosed personal information from Twitter and automatically extracts the most relevant feature to match the user identity across three semantically different social networks within the recall range of 0.48 to 0.72 for a different set of social networks. The experimental results show that a large number of users publicly share information on the source social networks. The application of this research work may be in the item or product recommendation, profile integration, etc.. The proposed method may be used as a baseline for user identity resolution across multiple social networks. This work can be extended up to five social networks for user account matching.

**2.1 Summary of Related Work**

The summary of methods used in literature is given in Table 1.

Table 1 Summary of literature survey

Literature	Advantages	Disadvantages
T. H. Shaikh et al. 2018 [1]	Proposes better features like that are currently not common with available systems.	Only provides an outline for the future systems instead of detailed implementation details.
Ralph Deters et al. 2018 [2]	Compares a set of algorithms and points out the optimal one that shows better performance.	System needs to be further developed in terms of efficiency of algorithms for more accuracy across platforms.
Jingbo An et al. 2017 [3]	The project could support both online and offline communications with achieving the purpose to enrich the users	The accuracy of the project currently achieved needs to be further improved with future learning accumulation.
Rashid Ali et al. 2019 [4]	Provides a baseline for user identity resolution across multiple networks and can be extended up to five social networks for user matching.	It can only work based on publicly available self disclosed information

**3. Proposed Work**

The aim of the project is to develop a platform that allows users to find relevant projects and work together, for this purpose searching and matching algorithms will be used to maximize the possibility of finding a good developer for the project. This will be based on multiple parameters like their skills, time taken to do previous projects, relevant domains, etc. The platform will enable a user to quickly add members, assign tasks, customize workflow, and track the progress of their work to completion. The project would be primarily focussing on effective usage of searching and recommendation techniques for collaboration of developers to increase

efficiency and hence , overall user experience .

### 3.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.

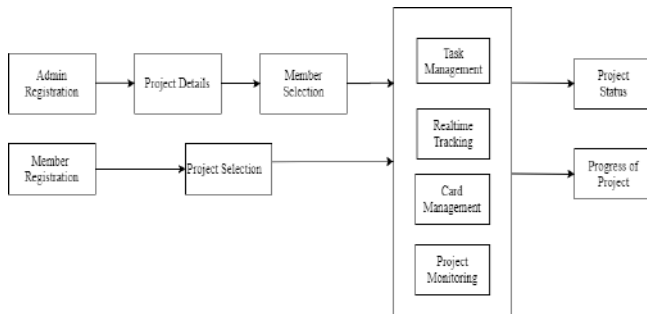


Fig. 1 Proposed system architecture

#### A. Account Management Module Components :

1. Admin Registration - The creator of a new project becomes leader of the project by default, adds other members to projects and assigns work to other members
2. Member Registration - Any user looking to work on a project can register as a member and search for relevant projects using suggestion cards.
3. Card Management - Users are given choices to make multiple changes to their existing profile cards .

#### B. Project and User Matching Module Components :

1. Member Selection - The admin/project owner can choose project members from a list of recommendations of profiles having similar interests and relevant work experience.
2. Project Selection - Users on this system will get project recommendation cards on their profile from which they can choose projects that seem relevant .

#### C. Project Management Module Components :

1. Task Management - The project owner can assign tasks and set deadlines for each team member.
2. Project Monitoring - The leader will be able to monitor the overall work being performed by each member .
3. Project Status - This would provide details of all past projects that have been completed / ongoing projects.

#### D. Time Management Module Components :

1. Realtime Tracking - Here all the work being done will be trackable and all users can check current status
2. Scheduling of meetings and Setting calendar deadlines for tasks assigned .

**E. Prospective Algorithms for the Proposed System:** The main purpose of algorithms here is to match user profiles with other users according to their interests and provide them with relevant profile suggestions. The possible solutions can be -

1. K means Clustering Algorithm -

This algorithm takes values in n-dimensional space to categorize the items into k groups of similarity. To calculate similarity, euclidean distance is used as a measurement.

2. Agglomerative Hierarchical Clustering Algorithm -

This is another clustering algorithm used to group objects in clusters based on their similarity. The algorithm treats each object as a singleton cluster.

Next, pairs of clusters are successively merged until all clusters have been merged into one big cluster containing all objects. The result is a tree-based representation of the objects.

### 4 . Requirement Analysis

The experiment setup is carried out on a computer system which has the different hardware and software specifications as given in Table 3.1 and Table 3.2 respectively.

#### 4.1 Software

Table 4.1 Software

Operating System	Debian Linux - DeepCyber Hardened Image
Programming Language	C++, Python, Javascript
Frameworks	ReactJs, NodeJs, GraphQL
Database	Postgresql, DGraph

#### 4.2 Hardware

Table 4.2 Hardware

Processor	Any x86_64 architecture processor
HDD	180 GB and above
RAM	1GB

### 4.3 Dataset and Parameters

As the idea of the system is relatively new and it is still being developed as a new concept, thus sample datasets related to the project are not available currently. Thus there is a need to develop the sample dataset ourselves for testing purposes. The parameters for the dataset will be based on intralist similarity of all items in a list of recommendations. This uses characteristics of each item in the list to calculate similarity. For our model, we will use characteristics such as the Programming language, project domains, number of members working on the project, past experience etc.

### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof. Sujit Tilak for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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# SMART WHEELCHAIR

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**Abstract—** *The needs of many individuals with disabilities can be satisfied with actively manual or powered "wheelchairs, however a segment of the disabled community finds it difficult or impossible to use those wheelchairs or " are just not equipped with ability to get access to extra help for the use of the manual wheelchairs. There is extensive research on remote-controlled chairs where sensors and AI control algorithms have been used to minimize the level of human intervention and be able to provide auxiliary support to the user. A smart wheelchair can restore autonomy to patients with sensory-motor disabilities by enabling them to move around freely without depending on anyone else. Our main focus is to design and develop a smart wheelchair using inexpensive hardware and simple software to make the final cost of the product affordable and accessible to all while catering to the needs of the disabled to give "a comforting safety and support in their day to day activities. Our goal is to design and develop a system that " allows the user to robustly interact with the wheelchair at different levels of the control, sensing and safety. We also plan to provide with an easy to use and view panel-based control system so as to make sure the technical level of the user not be the restrictive. Multiple sensors ensure that the safety of the user takes priority and enable navigation through their daily activities with ease.*

## 1. Introduction

### 1.1 Fundamentals

Although the current developments in the field of science and technology has radically changed the way a normal person used to live his life, there are certain category of people who haven't benefited from the occurred development. On particular, people with a handicap having restricted mobility are still living a wretched life. The smart wheelchair being developed aims to provide help to handicapped and physically challenged people by providing them with a sort of mobility which would make them less dependent on other people.

### 1.2 Objectives

The smart wheelchair consists of main controller unit which allows the person to supply input through infrared resistive touch screen. The controller unit then processes the given input/command and performs the required action so that the wheelchair moves in the specified direction.

1. The objective is to provide aid to those handicapped and physically challenged persons by providing them with some sort of mobility which would greatly help them.
2. It also aims to provide an opportunity for physically impaired persons to move from one place to another.

### 1.3 Scope

The scope of the project is making wheelchair available to disable people for moving them from one place to another using touch screen. We are using IR sensors as an input for the touch screen which is assembling on wheelchair. Smart wheelchair mechanically controlled devices design to have self-mobility with the help of user command. Different types of smart wheelchair have been developed in the past but the new generations of wheelchairs are being developed and used which features the use of artificial intelligence and hence leaves a little to tinker about to the user who uses the wheelchair. This wheelchair is also cost efficient.

## 2. Literature Survey

[1] *Bharat Thakur, Kush Kulshrestha* used eyeball tracking to control the movement of the wheelchair. A USB webcam is used to send real-time eye movement data as input to NI Lab view using continuous Image acquisition. The eyeball motion tracking hardware includes a USB web camera which is carefully positioned on the head of the user. The live input from the webcam is then processed using image processing techniques in NI

Vision Assistant, where template matching is done using shape shifted mean shift algorithm. After successful template matching of the eyeball, object tracking comes into picture, and eyeball movements are tracked continuously. These movements of eyeball generate signals that are further utilized to guide the direction of motion.

[2] **Snehlata Sanjay Thakare, Prof. Santosh Kompelli** investigated implementation of the AT89C51 microcontrollers for speed control of DC motor fed by a DC chopper. The chopper is driven by a high frequency PWM signal. The paper was designed to develop a speed control system for a DC motor using microcontroller PIC AT89C51. The motor operated in four quadrants i.e. clockwise; counterclockwise, forward brake and reverse brake. It also has a feature of speed control. The design & implementation in this paper was done through the software.

[3] **Prof. Vishal V. Pande, Nikita S. Ubale, Darshana P. Masurkar, Nikita R. Ingole, and Pragati P. Mane** developed a wheelchair control which was useful to the physically disabled person with his hand movement or his hand gesture recognition using Acceleration technology. It was wheelchair which could be controlled by simple hand gestures. It employed a sensor which controls the wheelchair hand gestures made by the user and interprets the motion intended by user and moves accordingly. Their aim was to control a wheelchair and electrical devices by using MEMS ACCELEROMETER SENSOR (Micro Electro-Mechanical Systems) technology. MEMS ACCELEROMETER SENSOR is a Micro Electro-Mechanical Sensor which is a highly sensitive sensor and capable of detecting the tilt. This sensor finds the tilt and makes use of the accelerometer to change the direction of the wheel chair depending on tilt.

[4] **R. N. Aguilar, G. C. M. Meijer** described a new interface system for a fast-resistive X-Y 4-wire touch screen. The system enabled the determination of both the X-Y position and the touch-point resistance. The interface used advanced measurement techniques, which included three-signal auto-calibration, synchronous detection and two-port measurement. The interface electronics had been designed to interface between the touch-screen sensor and a Personal Computer, using the Universal Serial Bus (USB) protocol. The x-y position interface used a very linear relaxation oscillator, which converted x-y position and touch-point resistance signals to a period-modulated signal, to control the switches and to send the information to the Universal Serial Bus (USB) interface device. USB interface device was used to communicate between the microcontrollers with any device with Universal Serial Bus (USB) protocol, such as a personal computer.

[5] **Md. Mamunur Rahman, Swarup Chakraborty** proposed a system which helps the user to move safely and freely and also takes the activities of a therapist. It also has the ability to detect obstacles and provide few kinds of therapies. The proposed system was developed using voice recognition system to control the movement of wheelchair and also with Arduino interfaced joystick. An ultrasound system provides the facility of automatic obstacle detection.

[6] **2012, Megalingam, Rajesh Kannan et al,** proposed a system that uses a small camera mounted very close to the user's hand, which tracks the small movements of their fingers to understand the direction of movement of the wheelchair. A gesture recognition system which identifies the gesture is then interfaced to the wheelchair control system in order to move it to the desired location.

## 2.1 Literature Summary

SN	Year of Publication	Specifications and Characteristics	Advantages and Disadvantages
1	2002	Fast Interface electronics for a Resistive touch-screen	<p>Advantage: Touch screen technology for fast and smooth operation.</p> <p>Disadvantage: Expensive and difficult to manage</p>
2	2014	Eye Controlled Electric Wheelchair	<p>Advantages: Eyeball tracking to control the movement of the wheelchair.</p> <p>Disadvantage: Complex implementation, eye disease person cannot</p>
3	2014	Design and implementation of DC motor speed control based on pic-microcontroller	<p>Advantages: Speed control using pic-microcontroller</p> <p>Disadvantage: Not new user friendly as the speed controls are hard to grasp also expensive</p>
4	2014	Hand-gesture based Wheelchair Movement Control for disabled person	<p>Advantage: Hand gesture recognition and easy to use as well.</p> <p>Disadvantage: Highly</p>

		using MEMS	expensive and disability can make it harder to use
5	2017	Wheel Therapy Chair: A smart system for disabled person with therapy facility	<p>Advantages: Provides therapy and voice recognition</p> <p>Disadvantages: System can slow down when stacked with commands</p>
6	2014	Speech-controlled cloud-based wheelchair platform using low-cost available speech Web Kit	<p>Advantages: Speech Control means that it is useable by most of the people without much issue.</p> <p>Disadvantages: Web kit slows the processor down if too many commands are lined up</p>

### 3. Proposed Work

#### Algorithmic Design:

For proper implementation of the smart wheelchair the following algorithm is followed:

1. Start
2. Microcontroller receives the reading through the touchpad.
3. If command is stop then go to start.
4. If the command is right, left, back or front then send the signal to motor driver.
5. Based on the command the chair will move in the specified direction.

### 3.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.

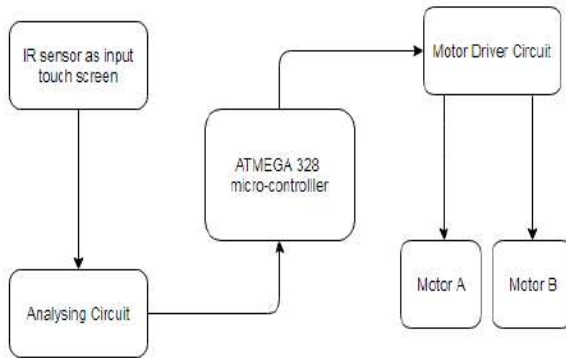


Fig. 1 Proposed system architecture

**A. Arduino Nano with Atmega328 Microcontroller:** The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x) or ATmega168 (Arduino Nano 2.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini-B USB cable instead of a standard one. The Arduino Nano can be powered via the Mini-B USB connection, 6-20V unregulated external power supply (pin 30), or 5V regulated external power supply (pin 27). The power source is automatically selected to the highest voltage source.

**B. IR LED Sensors:** IR LED emits infrared light, means it emits light in the range of Infrared frequency. We cannot see Infrared light through our eyes; they are invisible to human eyes. The wavelength of Infrared (700nm – 1mm) is just beyond the normal visible light. Everything which produces heat emits infrared like our human body. Infrared have the same properties as visible light, like it can be focused, reflected and polarized like visible light. Other than emitting invisible infrared light, IR LED looks like a normal LED and also operates like a normal LED, means it consumes 20mA current and 3vots

power. IR LEDs have light emitting angle of approx. 20-60 degree and range of approx. few centimeters to several feet; it depends upon the type of IR transmitter and the manufacturer. Some transmitters have the range in kilometers.

**C. L293DNE MOTOR DRIVER:** motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between Arduino and the motors. The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D has 16 pins. Enable pins on l293d. Pin 1 and pin 9, for being able to drive the motor, the pin 1 and 9 need to be high. There are 4 input pins for l293d, pin 2, 7 on the left and pin 15, 10 on the right as shown on the pin diagram. Left input pins will regulate the rotation of motor connected across left side and right input for motor on the right-hand side. The motors are rotated on the basis of the inputs provided across the input pins as LOGIC 0 or LOGIC 1.

**D. LM7805:** LM7805 is a voltage regulator integrated circuit. It is a member of 78xx series of fixed linear voltage regulator ICs. The voltage source in a circuit may have fluctuations and would not give the fixed voltage output. The voltage regulator IC maintains the output voltage at a constant value.

**E. LM7805 Op amp:** The LM124-N series consists of four independent, high-gain, internally frequency compensated operational amplifiers designed to operate from a single power supply over a wide range of voltages. Operation from split-power supplies is also possible and the low-power supply current drain is independent of the magnitude of the power supply voltage. Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits which now can be more easily implemented in single power supply systems. For example, the LM124-N series can directly operate off of the standard 5-V power supply voltage which is used in digital systems and easily provides the required interface electronics without requiring the additional  $\pm 15$  V power supplies on.

### 3 Requirement Analysis

#### 3.1 Software

**Arduino IDE:** The **Arduino integrated development environment (IDE)** is a cross platform application (for Windows, macOS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop that are compiled and linked with a program stub main () into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution.

**Embedded C:** Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.

#### 3.3.6 Hardware and Software Specifications

##### *Hardware Specification*

Micro-controller	Atmega328
Sensors	IR LED Transmitter Receiver
Op amp	LM324
Voltage regulator IC	LM7805
Motor driver	L298DNE

##### *Software Specification*

Programming Platform	Arduino IDE
Programming Language	Embedded C

### ACKNOWLEDGMENT

No project is ever complete without the guidance of experts who have already treaded this path before and hence are our guiding force. So, we would like to take this opportunity to thank all those individuals who have helped us in visualizing this project. We would also take this opportunity to thank our mentor **Prof. Sagar Kulkarni** for the guidance endows with for this project and also for providing us all the details for proper presentation of this project. We are also very grateful to our **HOD Dr. Sharvari Govilkar** for extending her help directly and indirectly through various channels in our project work. We would like to thank our **Principal Dr. Sandeep Joshi** for providing us with all the facilities to comfortably and successfully complete our project. We extend our sincere appreciation to all our Professors from **PILLAI COLLEGE OF ENGINEERING** for their valuable insight and tips during the designing of the project. Their contributions have been valuable to us in so many ways.

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# Survey On Driver Drowsiness Detection System

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**Abstract**— *the most significant causes of road accidents are drowsiness and fatigue. the drowsiness of the driver is one of the feasible ways of measuring driver fatigue. The main purpose of this system is to prevent accidents, save lives and vehicle. Numerous methods have been developed to detect the level of drowsiness, techniques based on image processing. We have perused 8 survey papers in which we found out image processing and machine learning to be viable and which produces results effectively keeping in mind as to how those unwanted dysfunctions can be minimized in the future.*

*If the drivers' eyes remain closed for more than a certain period of time, the driver is said to be drowsy and an alarm is sounded. with the help of OpenCV that uses the Haar Cascade library for the detection of facial features.*

**Keywords**— Face Recognition, Driver Drowsiness, EAR, Haar Cascade Classifier, OpenCv.

## 1. Introduction

Road accidents are normally caused by the drivers carelessness. However, injuries are also caused by drowsiness and exhaustion. The amount of casualties caused by them is rising year by year. It is also important to minimise the number of accidents caused by drowsiness and fatigue. To minimise the number of collisions, researchers around the world are developing several approaches to accurately detect drowsiness on the driver's face. Accidents can be monitored with the aid of this device as it can sense a person's drowsiness and also alert the driver and can control accidents. The system can sense drowsiness within a period of around two or three seconds. The driver is alerted by real-life warnings. Various characteristics, such as visual, non-visual and vehicular, are recommended for identification. Visual characteristics are taken directly from the driver's face and are captured by a camera. Non-visual characteristics are impulses that emerge from the driver's body that are used to obtain certain signals, in which case a special sensor is connected to the driver's body. Vehicle features can be achieved by observing the behavior of the driver as well as the vehicle while driving. But the first suggestion is to create a dataset of facial expression because it can predict drowsiness and exhaustion. The second concept is to merge visual, non-visual and vehicle elements into one for improved identification. And the last one is the

development of wearable hardware, such as smartwatches for easy-to-use and user-friendly drowsiness detection.

## 2. Literature Survey

### A. Behavioral Approach

Susheelamma K H and Smriti Gururaj describe Haar Cascade Algorithm, which is used in this paper. They have also explained how Raspberry Pi is used. OpenCV is also used for face recognition and detection.[1].

J. Rooban Roy says the Internet of Things based system which uses Raspberry Pi. ML- Machine Learning is applied for eye detection and region classification[2].

Nora Kamarudin, Nur Anida Jumadil Describes, In this system has four main steps for determining an object namely an integral image, Haar-like feature, Cascade Classifier and AdaBoost learning. First step is the detection of the face, Haar features are the important part of the Haar Cascade Classifier. The Haar cascade features are mainly used to determine the occurrence of features in the image[4].

According to Sukrit Mehta, Sharad Dadhich, Sahil Gumber, Arpita Jadhav Bhatt EAR (Ear Aspect Ratio) is used to compute the values. Dlib library is used to detect facial landmarks. Based on the value, detection is carried out and alarm buzzes. Eye Closure Ratio to detect driver's drowsiness is based on adaptive thresholding. Machine learning algorithms have been taken on to test the efficacy of the system approach. Algorithms used in this paper effectiveness are Random Forest Classification and SVM[6].

According to J. Rooban Roy, S. Sibi and V. Gowri in An IOT Based Alarm System in Car for Traffic, Alcohol and Drowsiness Detection and Accident Prevention alcohol sensor is used for alcohol detection. IC and Node MCU are also used. If the person did consume alcohol waves are detected and sent to IC. Eye Detection is done using machine learning algorithms. Esp8266 microcontroller performs operation related to detection of the obstacles on the way. A seat belt sensor is also installed. If the sensor

doesn't sense the seat belt locked it sends waves to the IC thus reminding the driver to wear it [2]

**B. Physiological Approach**

According to J.Rooban Roy, S.Sibi and V.Gowri in An IOT Based Alarm System in Car for Traffic, Alcohol and Drowsiness Detection and Accident Prevention alcohol sensor is used for alcohol detection. IC and Node MCU are also used. If the person did consume alcohol waves are detected and sent to IC. Eye Detection is done using machine learning algorithms. Esp8266 microcontroller performs operation related to detection of the obstacles on the way. A seat belt sensor is also installed. If the sensor doesn't sense the seat belt locked it sends waves to the IC thus reminding the driver to wear it [2]

In Embedded based drowsiness detection using EEG signals P Kingston Stanley, Jaya prahash T,Sibin Lal S,P Vijay Daniel describes how Hypovigilance is estimated through EEG system using BCI (Brain-computer interface) ,it's a process which prompts an alarm to alert the drowsy driver[3].

T.Edison, K.Ulaga priya says the drowsiness detection method was developed that used a mobile device camera. In order to test a model in proper-time, used wearable EEG mechanism that consists of a bluetooth-enabled EEG headband.[7]

**C. Vehicular Approach**

In Driver Drowsiness Detection Based on Time Series Analysis of Steering Wheel Angular Velocity Gao Zhenhai, Le DinhDat, Hu Hongyu describes the driving behaviour under fatigue is evaluated, followed by the assessment of the time-detection window; and then, the data series Angular velocity of the steering wheel in time detection The window will be selected as the detection function. If it is detected the function meets the constraint of magnitude and uncertainty. Constraint in the time window.[8]

**D. Hybrid Approach**

In Prediction of drowsy driver detection by using soft computing technique, T.Edison, K.Ulaga priya, A.Saritha

provides the application of multifaceted convolution networks. Softmax Layer classifier is used and trained. Here after image acquisition meaningful information is collected using mathematical operations. A hybrid technique is used for detection. A neural based system is used for determining the amount of fatigue. Deep learning is used to detect driver drowsiness.[7]

**2.1 Summary of Related Work**

The summary of methods, advantages and accuracy used in literature is given in Table.

Papers	Methods	Advantages	Limitation
Drowsiness detection of drivers using iot image processing and machine learning techniques.[1]	Opencv picture handling Raspberry Pi	Recognize Mishaps, Alerts Medical Clinics and	The system fails if light is falling directly on the camera.
An IOT Based Alarm System in Car for Traffic, Alcohol and Drowsiness Detection and Accident Prevention.[2]	mysql JSP CSS Raspberry Pi	Non-Meddlesome And prompts Warning On time	System is very costly and is implemented only in very expensive vehicles.
Embedded based drowsiness detection using EEG.[3]	EEG Signal BCI(brain-Computer interface)	Drivers Safety is Assured Through EEG headband	Inability to Detect driver Eye closure
Implementation of Haar Cascade Classifier and Eye Aspect	Image Processing and Machine Learning	Less complex as compared to others.	Face & eyes won't be detected In glasses or shades

Ratio for Driver Drowsiness Detection Using Raspberry Pi.[4]			
Drowsy Driver Warning System Using Image Processing.[5]	Image Processing	It can be non-intrusive by using optical sensors of video cameras to monitor changes.	In summer it may lead to perspiration on sensors, diminishing their ability to monitor accurately.
Real-Time Driver Drowsiness Detection System Using Eye Aspect Ratio and Eye Closure Ratio, Amity University.[6]	Image Processing and Machine Learning	The findings indicate that it operates under all lighting conditions.	Invasive and may distract drivers, need costly sensors.
Prediction of Drowsy Driver Detection by using Soft Computing Technique.[7]	Soft Computing	Feasible for practical drowsiness detection system.	MATLAB, the software consumes a lot of time to Process videos.
Driver Drowsiness Detection Based on Time Series Analysis of Steering Wheel Angular Velocity, Jilin University.[8]	Calculating angular velocity using steering wheel.	Reflects the Driver's Movements immediately enhances the accuracy of recognition of drowsiness.	Affected by external factors such as the geometric Condition of roads and Weather

Table 1 Summary of literature survey

### 3. Conclusion

The systematic analysis offers descriptions of behavioural, and physiological parameters dependent on drowsiness detection techniques. Some methods are explained in depth and their strengths and weaknesses are debated. Behavioural techniques include algorithms like Haar Cascade and Random Forest. Apart from this Machine Learning techniques are used for eye and face detection. Raspberry Pi, Buzzer and Cameras are the main hardware used in this behavioural techniques. One of the papers describes different types of sensors used such as IC, Esp8266, Node MCU and other microcontrollers. A seat belt sensor is also installed which sends waves to the IC when the seat belt is not identified as locked and sends warning to the driver. Psychological based techniques like ECG and EEG give us accurate and fast results but are not feasible because they use hardware sensors and wires which should be connected to the drivers. One of the hybrid methods uses both psychological and Deep Learning Techniques. Neural based systems are used for determining the amount of fatigue. Here drowsiness is detected using deep learning. However, Haar Cascade is commonly used algorithm which provides good accuracy and derives results in less time period.

### 4. Future Scope

The system can be interfaced with vehicle airbag systems that alert vehicle occupants from getting injured. This can also be improved by adding a camera to the controller module that captures the accident spot and shares its location which makes the tracking easier. By analyzing the collected data we are going to find why accidents occur and provide ways to reduce the road accidents in future. In future, this model can be reached out to give alert before dozing by computing the heart beat measure without physical unsettling influence i.e., non nosy technique utilizing changed ECG strategies.

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# SURVEY PAPER ON HOUSING SOCIETY MANAGEMENT SYSTEM

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**Abstract**— “Simplicity is the ultimate sophistication”. The Housing Society Management System exactly follows this phrase and aims at making the current situation in society simple and efficient. During a pandemic such as the current covid-19, it's not appropriate to step out of the house for tasks such as viewing the notice board or conveying an important message to flat mates. Housing Society Management System reduces the conflicts that arise within the society by providing a huge variety of facilities such as Daily notifications, Monthly meeting schedules, updates on cultural events to be organized by the society, breakdown of funds distribution for maintaining transparency within the society, Special Health care facility; this feature generates an SOS signal on the devices of all the society members if any member falls ill or is seriously injured and in need of help this feature will be very beneficial in the current situation that has arisen due to the infamous COVID -19 pandemic this system also contains a chatbot which will help the members to navigate through the app and access all the features of the app. It automates certain attributes that occur within society and makes it easy for the members of the society to easily access the social happenings and ongoing. There's also a feature which provides emergency services like doctors/nurses aid.

**Keywords**— Android, Mobile Application, Notice, Messaging, Complaints, Social Grouping, Health Tracker.

## 1. Introduction

Society Management System whose main objective is integrating multiple applications into one single Android application for managing notices, health related updates and social activities. It also helps to manage the events and give updates regarding the event in the application. It notifies important issues & complaints about the existing problems (water, cleanliness). Society Management Application on Android is an application which will be useful for all the society members to get constantly updated with society related information.

## 2. Literature Survey

**A. Study of Implementation of Society Management System:** This application was developed by Shivganga

Gavhane, Rutuja Vatharkar, Swati Sonar, Pratiksha Patil. This was an android application which contained features like Notice Board, Calendar, Contact, Maintenance, Financial Report, Complaint or Suggestion. To overcome the drawbacks of the existing system, this application proposed a smarter way of communication. Application managed housing society through “Push Notification Technology” that assisted the members to play their role efficiently[1].

**B. Housing Society Management Web Application with recommendation system:** This application was developed by Saurabhi Raut , Priyanka Pawar , Masira Shaikh, Neha Bhat, Prof. P.N. Kalavadekar. The system helped residents to interact with each other and form social networks by becoming a part of any group either cultural or sports group. There was no need to personally meet the chairmen panel to give complaints or suggestions or take the panel's appointments. This job was done using the application by sending messages to the secretary and also getting the response of the job done. It made the residents of their respective societies to stay constantly updated with the current affairs of the surrounding they lie and also participate in various events promoting different cultures. [2].

**C. Society Management Application on Android:** This application was developed by Rahul Bhagwat, Aashay Bharadwaj, Vivek Harsode, Anurag Chawake, Mrs. Deepali Bhanage. This android application contained features like QR code authentication, Online Payment, Society Maintenance Amount. To overcome the drawbacks of the existing system, they provided a smarter and efficient way to handle the critical issues by reducing efforts and advancements in reliable communication. Different functions in the society like Complaints, Meetings, Notices, Suggestions, Rules, Miscellaneous Contacts were available within a single sight so that users can observe it and make use of it whenever is necessary[3].

**D. Housing Society Management:** This application was developed by Shantanu Kudale Chandan Amarnani, Harshal Sawakare, Shubhankar Kokate, Sujata Kadu. To address the shortcomings of existing systems this project served a solution for the smart way of communication through an android application. This application itself took care of automated man to man communication. Different functions within society such as Complaints Meetings, Notice, Suggestions, Rules, Miscellaneous Contacts were available within a single sight so that users can navigate easily among those. Application provided multiple calendar events for particular events if required so that admin did not require taking follow-up of reach ability of information[4].

**E. Society Management System:** This application was developed by Hitesh Solanki , Deshna Yadav , Aarti Yadav , Prof. Chintan Shah. This application had features like Auditing, Parking, Alert button, Notice board. The User module & Admin module maintained a maintenance list of all the flats in a society. - Admin maintained a maintenance list of all the flats in a society. - The user will get a prompt on UI about their pending maintenance payment & user has to pay predefined maintenance amounts - Admin manually clicks on respective name flats. The parking UI displayed a detailed chart of the parking slot status to the user. So, accordingly, they can book parking slots[5].

**Summary of Related Work**

Literature	Advantages	Disadvantages
<b>Study of Implementation of Society Management System</b> -Published in December 2015[1].	Notifications will be pushed so as to remind the user before time. Reduces efforts and time for conveying messages manually. Reliable and transparent.	Multiple reminders can be interruptible for users though it is necessary. To get domain knowledge by visiting various housing complexes and to understand their day to day requirements.
<b>Housing Society Management</b>	The system helps residents to interact with	It is a web portal, android application

<b>Web Application with recommendation system -</b> Published in 2017[2].	each other and form social networks by becoming a part of any group either cultural or sports group.	would be better. If the group exists, then and only then that group is recommended to the resident.
<b>Society Management Application on Android</b> -Published in May 2018[3].	Flat members can place the request for the services which they require so that staff can arrange the plumber, carpenter, electrician, for the flat members.	Application UI could have been better.
<b>Housing Society Management</b> -Published in May 2018[4].	Security for data theft.	The user must first get connected to the same network as the database, although to ensure security.
<b>Society Management System</b> -Published in April 2019[5].	Maintain transparency between society members and management. In case of any crisis or danger, send an auto sms.	Online maintenance bills cannot be paid via online payment applications

**3.Existing System**

In the existing housing society management system a traditional way of communication is used which includes a common notice board system operated by responsible society members. The data is stored in the files and the processing of the data is done manually and the report generation is slow. In the notice board system one has to take whole responsibility to operate and maintain the notice board. It creates dependability with the specific person. Sometimes the person has to compromise with his own time schedule for these common activities. It is observed that complaints by society members are neglected by higher management because one has to take

constant follow up until the issue gets solved. In the current framework, all the work is done physically. The notice board is traditional. Hence there is the problem of unreachable information & more time consuming .

#### 4. Proposed Work

To overcome the drawbacks of the existing system, Here we provide a smarter and efficient way to handle the critical issues by reducing efforts and advancements in reliable communication. Different functions in the society like Complaints, Meetings, Notices, Suggestions, Rules, Miscellaneous Contacts will be available within a single sight so that users can observe it and make use of it whenever is necessary. We propose an application which will be useful for all the society members to get constantly updated with society related information. Also in any of the existing apps, there is no feature for social interaction. So we came up with a chatbox, friend recommendations and pandemic tracker. In this way, no member can feel lonely, he/she can chat with any of the society members, also with friend recommendation module, they can find new friends and can interact with them via social grouping module.

#### SCOPE

The android application can also contain features like managing audits, bills. Elevation in a project such as paying maintenance online through some payment apps like phonePe or googlePay can also be made. Concept of data mining and advanced artificial intelligence can also be included for future scope. The private parking lots can be included in the system giving direction to the residents by allocating parking areas.

#### CONCLUSION

As Android is open source and has a flexible and customizable user interface, thus one of the most popular mobile operating systems...indeed a revolutionary. The application mainly featured fruitful solutions for Day to day notifications for meetings, water management, electricity management, parking, miscellaneous contacts, security alerts and high priority communication. It will definitely reduce the human efforts and errors to increase crystal clear transparency between society members and management. The residents can be a part of any group they want, but to simplify the process, the system is set up with a recommendation system which recommends the

residents a group the society has based on the hobbies, interests and sports they like which is already maintained by the system while signing up the resident. The applications of this domain are identified and presented.

#### ACKNOWLEDGEMENT

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# The Education Trust Recommendation System

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**Abstract**— *In this Era of ever increasing technology as we are going forward that much we are facing dilemma. Every day we hear or read about issues like an individual is not able to study further or many undesirable circumstances or due to financial weakness. Main facts are our government propose many scheme for common people ,Even though there are various organizations and trusts that provides different facilities regarding education to the poor seeking for financial help , but still some people are not able to receive those facilities due to lack of a centralized system. So the aim is to propose a system- The Education Trust Recommendation System which will categorize education Government scheme and charitable trusts in a centralized manner and it will recommend the ongoing or upcoming policy of Government along with NGOs which will provide a required help also will highlight the availability of funds to the users availed by several organizations. So the ERS will contain modules such as , Education, Posts and a module for upcoming events and it will analyze the users rating based on recommender system. Recommender system will be based on information about user's rating given to NGO in general and recommend the organizations based on their ratings to the users.*

**Keywords**—Education Recommendation System(ETRS),Collaborative Filtering(CF),Centralized System.

## 1. Introduction

Nowadays there is rapid growth of the Internet & Smartphone users and the magnitude of the applications depending on the internet. Every day we hear or read about issues like an individual is not able to study further or able to pay for higher studies due to financial weakness. Even though there are various organizations and trusts that provides different facilities regarding health and education to the poor seeking for financial help and there are several messages regarding such organizations that are forwarded over social networking sites and messaging applications, but still some people are not able to receive those facilities due to lack of a centralized system. So the aim is to propose a system-The Education Trust Recommendation System which will contain education charitable trusts in a centralized manner and it will highlight the availability of funds to the users availed by several organizations.

## 2. Literature Survey

**A. The Intelligent Health and Education Trust Recommendation System** - Bhavin Rathod, Deepraj Sawant, Tejas Shetye, Silviya D'Monte. Nowadays there is rapid growth of the Internet every day we hear or read about issues like an individual is not able to study further or able to pay for treatments of various diseases due to financial weakness. Even though there are various organizations and trusts that provides different facilities regarding health and education to the poor seeking for financial help and there are several messages regarding such organizations that are forwarded over social networking sites and messaging applications, but still some people are not able to receive those facilities due to lack of a centralized system. So the aim is to propose a system- The Intelligent Health and Education Trust Recommendation System (IHERS) which will categorize health and education charitable trusts in a centralized manner and it will highlight the availability of funds to the users availed by several organizations. So the IHERS will contain modules such as Health, Education, Posts and a module for upcoming events and it will analyze the users rating based on recommender system which will be supported by Collaborative Filtering.

**B. User-based Collaborative Filtering for Tourist Attraction Recommendations** - Zhiyang Jia, Wei Gao have proposed a suitable recommendation method with the help of Collaborative filtering for use in a Recommendation System Based on Tourist Attraction to provide personalized tourism information to its users. Suppose that users with similar interests should favourite to the same items as each other. So, as long as the maintenance of a database on the user's preference, the neighbour users with similar interests can be calculated by analyzing the stored preference, and then it can be recommended to the user based on the neighbour users' interest.The goal of this technique is that the recommendations of attractions are generated according to make certain decisions for development desired place.



**C. Personalized Location aware Recommendation System** - R. Shanmugalakshmi, Veningston. K have proposed a system which analyzes the location-aware reviews, so as to understand the experiences of community users and further it is matched with a specific user search preference to suggest preferable locations for meeting their goal especially when they visit a new place. The idea was to infer the user's preferences and thus to recommend nearby locations such as hospitals, food courts, shopping and so on. The main aim of Personalization in Location Recommendation system is to present the users with what they need without the need to ask for it explicitly. This means that a personalized system must somehow infer what the user requires based on either previous or current interactions with the user.

**D. A new user similarity model to improve the accuracy of collaborative filtering** - Haifeng Liu, Zheng Hu, Ahmad Mian, Hui Tian, Xuzhen Zhu have proposed a paper which focuses on the recommended performance in memory-based collaborative filtering algorithms. The core of collaborative filtering is to calculate similarities among users or items. The traditional similarity measures, such as the Pearson's correlation coefficient, cosine, mean squared difference, are not sufficient to gain or capture the effective similar users, especially for an inactive user who only rates very few number of items. This paper presents an improved heuristic similarity measure model. The new similarity model combines the local context for common ratings of each pair users and global preference of each user ratings. In order to test and verify the new similarity measure, experiments are implemented on three most used real data sets. In comparison with many state-of-the-art similarity measures, the new model can show better recommended performance and better utilizes the ratings in cold user conditions.

**2.1 Summary of Related Work**

Limitations of the related work are :

**A.** In e-tourism or e-shopping application domains, users prefer real time, locating and fine granularity recommendations. To handle these requirements, real time context awareness-based recommendation methods need to be further investigated.

**B.** In e-shopping or e-learning application domains, the distribution of data, such as the users' behavior towards, their interests keeps changing. Using the outdated data to predict users' current preferences will result in poor

performance. Concept drift techniques should be introduced into recommender systems to improve the recommendation performance.

The summary of methods used in literature survey is given in Table 1.

Literature	Year and publication	Title	Research Graphs
Bhavin Rathod, Deepraj Sawant, Tejas Shetye, Silviya D'Monte	2018 IJSR	The Intelligent Health and Education Trust Recommendation System	Need to make a centralized website.
Zhiyang Jia, Wei Gao, Yuting Yang, Xu Chen	2015 IEEE	User-based Collaborative Filtering for Tourist Attraction Recommendations	The recommendations based on visiting time of neighbours cannot be reliable always.
Veningston. K, R. Shanmugalakshmi	2015 ICACCS	Personalise Location aware Recommendation System	Travel locality property may not be recommending appropriate location.
Haifeng Liu, Zheng Hu, Ahmad Mian, Hui Tian, Xuzhen Zhu	2013 Elsevier B.V.	A new user similarity model to improve the accuracy of collaborative filtering	As different users have different preferences the rating preferences may not be accurate.

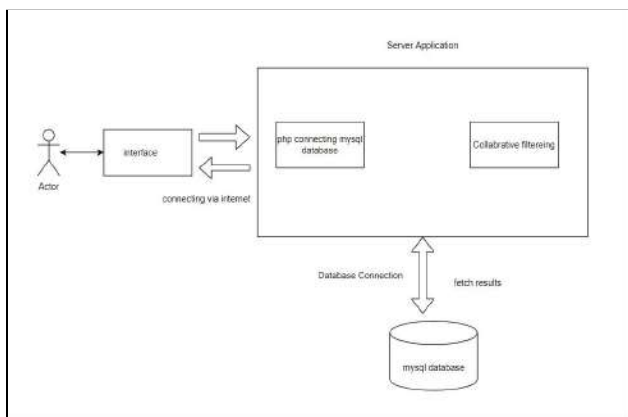
**Table 1** Summary of literature survey

### 3. Proposed Work

As mobile phones have become increasingly powerful and prominent in everyday life, their potential to be used to improve their knowledge in daily life also increases due to the increase in the number of internet users. The statistic of how data become big epochs back to seven decades when the first phenomenon of information explosion was recorded. Education applications targeting the end user are a reality: food recommendation systems, medication reminders are examples of such applications. But it is possible to extend the usefulness of mobile computing applications to education providers by creating a system to help the needy people who need funds for their studies. Today if anyone needs funds for education related purposes, they have to search on individual sites for it. Also many students can't follow their dreams because of financial problems, so sometimes they cannot get funds on time. There are many trusts for education but then also most of the needy people will not get funds. This may be because of lack of awareness about the organizations. People give away their used books to shop and don't know about the NGOs which collect those books and give them to poor people. So this project on education organizations focuses on the awareness and conditions for funds. It consists of modules namely, education grants, events and a module for posts in which people that are in need of financial aid can post their requests. The system will consist of a website application connecting to the remote server; the server will be integrated with a database which will store the information about all the Organizations, the posts and information about the user, etc. The system will also consist of a web portal for the admin to update the contents displayed to the users of the application.

#### 3.1 System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.



**Figure. 1** Proposed system architecture

**A. Education:** This module will recommend all the government and non-government organizations that provides all the necessary help like financial help for students who are willing to study but cannot afford it, study material at a low price, etc.

**B. Posts:** Along with searching for organizations, the user will also be able post about their needs along with their contact details on the posts section. And if an individual/organization wants to help the needy then they can check the Posts module to check for posts made by people and contact them.

**C. Events:** This module will recommend all the upcoming educational events like scholarships, exams, admissions , education camp, etc.

**D. Government Schemes** - This module will display various government schemes like scholarships ,etc with its individual information will be displayed.

**E. Non Government Schemes** - This module will display various non government schemes like college fees,exam,eligibility criteria with its individual information will be displayed.

**E. Rating Module** - This module will allow to rate the organisations based on users interest .

**F. ContentBased and Collaborative Filtering** - The Content-Based approach tries to suggest to the user items similar to her previous selections. To achieve this, content-based RSs need a representation in terms of features of the items. Such a representation can be created automatically for machine parsable items (such as news or papers) but must be manually inserted by human editors for items that are not yet machine-parsable (such as movies and songs). This activity is expensive, time consuming, error-prone and highly subjective. Moreover, for some items such as jokes, it is almost impossible to define the right set of describing features and to “objectively” classify them. Collaborative Filtering on the other hand, collects opinions from users in the form of ratings to items. When asked for a recommendation, the system identifies similar users and suggests the items these users have liked in the past. The interesting point is that the algorithm doesn't need a representation of the items in term of features (i.e. genre and actors for movies) but it is based only on the judgments of the user community. Because of this, CF can be applied to virtually any kind of item: papers, news, web sites, movies, songs, books, jokes, locations of holidays, stocks. Since CF techniques don't require any human intervention for tagging content, they promise to scale well to large

item bases. In the rest of this paper we concentrate on RSs based on CF.

The system's backend will have a SQL Server DB/Firebase. The Admin will be able to make updates to the system through the web portal like Add a new Organization in the Education module, view the list of registered users with the app, add new events to be displayed in the event notification section of the application. The figure 1 illustrates the block diagram for the system.

As illustrated in Figure 1, the user will search the organizations/trusts through the application. The server side will query the request onto the database and the database will return results according to the given query. With the help of Collaborative filtering, other related results are also displayed to the user.

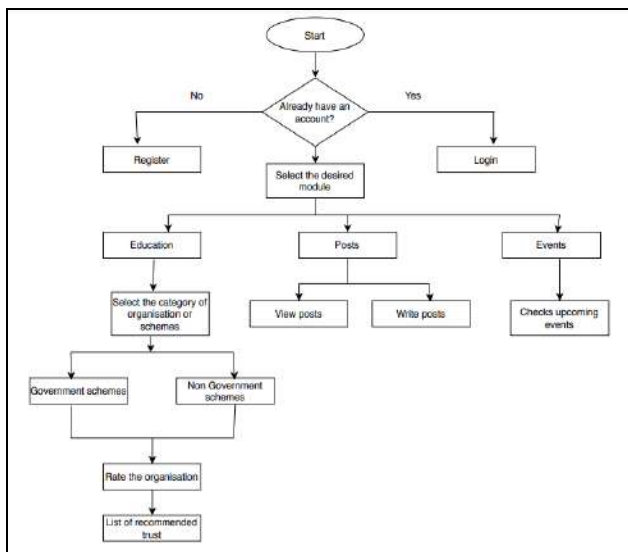


Figure 2 Flow Chart of the system

Figure 2 illustrates the steps of the proposed system, after opening the application the user will register if the user does not have an account. After this step, three modules of the application will be visible to the user and he can select the module according to his needs. If the user opens the h education module, the list of various organizations will be visible to the user. In the posts section the users will be able to post their requests. If any user wants to donate some unused books or buy such books at less cost then the user can contact the organizations.

## 4 Requirement Analysis

The implementation detail is given in this section.

### 4.1 Software

In the operating system we will require a Windows 7 or higher version. Programming languages will be HTML,CSS,PHP,Java,Javascript,Bootstrap. We will also need a database so we will make use of MYSQL and the server will be Xampp.

### 4.2 Hardware

The hardware requirements are 2GHz Intel ,Hard Disk 4GB and more , Memory 1 GB.

### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof. Suhas Lawand for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to presenting this work.

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# TV Show Popularity Analysis

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**Abstract—** *The television industry is a constantly evolving multi-billion dollar industry. With online streaming services such as Netflix and Amazon Prime, people have access to thousands of TV shows. The rating and reviews that the audience provides is the biggest indication of whether the show is successful or not. With such data available, we can find out what features the most successful shows have in common and the shows of which genre are likely to be more successful with the help of various Machine Learning techniques such as classification and clustering. Algorithms such as k-NN, SVM, Naive Bayes, Decision Trees and Gradient Descent can be employed to build a model with high accuracy. With the worded reviews provided by the audience, we can also perform sentiment analysis using natural language processing to find out what the audience thinks about any particular show. Based on the predictions made by the model we can also make favorable recommendations to different demographics based on their interests.*

**Keywords—** TV show popularity, Sentiment Analysis, Machine Learning

## 1. Introduction

The number of TV viewers who interact has grown considerably in the last few years – viewers are no longer individual elements. The Web has socially empowered the viewers in many new different ways, for example, viewers can now rate TV programs, comment on them, and suggest TV shows to friends through websites. Some innovations have been exploring these new activities of viewers but we are still far from realizing the full potential. For instance, social interactions on the Web, such as comments and ratings in online forums, create valuable feedback about the targeted TV shows.

## 2. Literature Survey

**A.** In the paper titled “Behind the TV Shows: Top-Rated Series Characterization and Audience Rating Prediction”, published by Yushu Chai, Yiwen Xu and Zihui Liu used regression models to predict viewer’s ratings of TV series based on the existing IMDb database. In particular, the classification model with ratings divided into three subgroups provides the best outcome and is recommended for prediction, although the outcome falls in a relatively wide range. Nevertheless, linear regression using selected features, either by using backward search or PCA, provides improved results compared to linear regression with all available features. The very basic model used is multiple linear regression. To improve the regression model they also fitted a locally weighted linear model and a reduced linear model by backward search and principal component analysis. However, the error rate was quite high,  $> 0.3$  [2]

**B.** Tejaswi Kadam et al proposed a system for sentiment analysis in the paper ‘TV Show Popularity Prediction using Sentiment Analysis in Social Network’. The process involves data cleaning, data preprocessing, tokenization (the process of inferring a flow of text into words, symbols, phrases, or other meaningful elements called tokens), normalization (eliminating the punctuation, converting the entire text into lowercase or uppercase, converting numbers into words, expanding abbreviations, canonicalization of text, removing stop words from input text data) and Natural Language Processing (NLP). The main drawback though is that it only considers user’s comments from social media. [3]

**C.** In the paper titled ‘TV Show Popularity Analysis using Social Media, Data Mining’, a predictive model to predict the popularity of TV shows based on user comments from social media is presented by Saura Sambit Acharya et al (2019) [4]. The datasets used to train the ML models were obtained from IMDB. They used algorithms like

“Decision tree”, “Random Forest”, “K-nearest neighbors algorithm”, “Support vector clustering”, “Naïve Bayes classifier”, “Stochastic Gradient Descent”. F1 score, precision score and accuracy was checked for all algorithms by using it on test sets. Out of all these whichever algorithm gave the highest overall score was to be used to predict the statement whether it’s a positive or negative. Stochastic Gradient Descent gave the highest accuracy in predictions. [4]

**D.** “A data mining approach to analysis and prediction of movie ratings” a paper published by M. Saraee, S. White & J. Eccleston of the University of Salford, used IMDb database of around 390,000 movies, television series and video games, which contains information such as title, genre, box-office taking, cast credits and user's ratings. They have found that it is difficult to apply data mining techniques to the data in the IMDb. The data needs extensive cleaning and integration, and this consumed a large proportion of the time available for this analysis. In addition, much of the data is in textual rather than numerical format, making mining more difficult. [1]

**2.1 Summary of Related Work**

The summary of methods used in literature is given in Table 1.

Table 1 Summary of literature survey

Paper	Advantages and Disadvantages
Yushu Chai et al [2] ‘Behind the TV Shows: Top-Rated Series Characterization and Audience Rating Prediction (2015)	Advantages: Very straightforward and simple approach.  Disadvantages: Uses a very basic regression model which gives a high error rate.

Tejaswi Kadam et al [3] ‘TV Show Popularity Prediction using Sentiment Analysis in Social Network’(Nov 2017)	Advantages: Takes user’s sentiment into consideration  Disadvantages: Very primitive sentiment analysis framework
Saura Sambit Acharya et al [4] ‘TV Show Popularity Analysis using Social Media, Data Mining’(May 2019)	Advantages: Considers user’s sentiment, considerably good accuracy.  Disadvantages: Scope is limited to comments extracted from viewer’s comments from social media websites.
M. Saraee, S. White & J. Eccleston [1], ‘A data mining approach to analysis and prediction of movie ratings’(2004)	Advantages: Identified trends in success of movies.  Disadvantage: Uses RDBMS approach, simplistic, not time efficient

**3. Proposed Work**

The disadvantage of the existing system architecture is that it explores only ratings and metadata but does not analyze what users have to say about particular media programs. Here, we argue that text comments are excellent indicators of user satisfaction. Sentiment analysis algorithms offer an analysis of the users’ preferences in which the comments may not be associated with an explicit rating. Thus, this analysis will also have an impact on the popularity of a given media show. Thus, the recommendation algorithm will consider both explicit ratings and the output of sentiment analysis algorithms to compute new recommendations.

**3.1 System Architecture**

The system architecture is given in Figure 1. Each block

is described in this Section.

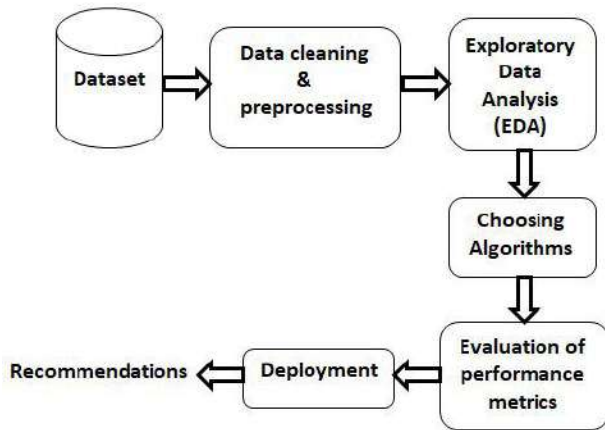


Fig. 1 Proposed system architecture

**A. Dataset:** A dataset is a collection of data, usually presented in tabular form. Each column represents a particular variable. Each row corresponds to a given member of the dataset in question. We have used the IMDb dataset for this project as it is very vast.

**B. Data cleaning and preprocessing:** Data cleaning and preprocessing is a process of fixing or removing incorrect, corrupted, incorrectly formatted, duplicate, or incomplete data within a dataset to make the dataset suitable for machine learning methods

**C. EDA:** Exploratory Data Analysis (EDA) refers to the critical process of performing initial investigations on data so as to discover patterns, to spot anomalies, to test hypotheses and to check assumptions with the help of statistical summaries and graphical representations.

**D. Algorithm:** It is important to perform EDA before determining which algorithm to choose. The technique to be applied depends heavily on the type of the dataset we have. It is also very advisable to apply many algorithms and then choose the one which provides the best results based on the performance metrics.

**E. Evaluation metrics:** Performance metrics like F1-score, accuracy, error, log loss, precision, AUC (area undercurve) play an important role in determining the best model and optimizing the model.

**E. Output:** After the evaluation of the Performance matrix we create a model in which these algorithms try to recommend items that are similar to those that a user liked in the past, or is examining in the present. It does not rely on a user sign-in mechanism to generate this often temporary profile. In particular, various candidate items are compared with items previously rated by the user and the best-matching items are recommended.

### 3 Requirement Analysis

The implementation detail is given in this section.

#### 3.1 Hardware

Processor	2 GHz Intel
HDD	500 GB
RAM	4 GB

Table 3.1 Hardware details

#### 3.2 Software

Operating System	Windows 10
Programming Language	Python
IDE	Jupyter Notebook

Table 3.2 Software details

#### 3.3 Dataset

IMDb dataset is easily available and it contains a very extensive database of movies and TV shows and is updated daily.

### 3.4 Evaluation Metrics

The quality of a domain system can be evaluated by comparing recommendations to a test set of known user ratings. These systems are typically measured using precision and recall.

**Precision:** Precision is the ratio between the True Positives and all the Positives.

$$P = \frac{TP}{TP + FP}$$

**Recall:** The recall is the measure of our model correctly identifying True Positives.

$$R = \frac{TP}{TP + FN}$$

#### ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our

supervisor Prof. Gayatri Hegde for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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3. *Tejaswi Kadam, Gaurav Saraf, Vikas Dewadkar, P.J Chate* 'TV Show Popularity Prediction using Sentiment Analysis in Social Network', Nov. 2017
4. *Saura Sambit Acharya, Ashvin Gupta, Prabhu Shankar K.C* 'TV Show Popularity Analysis using Social Media, Data Mining', May. 2019



# Virtual Classroom System

Ketaki Karambelkar , Aishwarya Nair , Jyoti Tiwari , Dhanashree Valanju , and Prof. Ranjita Chalke

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*Abstract— The importance of online virtual classrooms in the ongoing Covid-19 pandemic has increased since it has made teaching & learning accessible at the comfort of our homes . In addition to this a lot of training time is reduced with respect to travel, course materials, and accommodation. In this virtual classroom system we enable students to attend the video lectures where they can ask queries to their instructors at any point of time during the lecture . The process of teaching and learning can be made more fun and interactive by conducting live polls during the lecture. In addition to the video lectures the interaction between the students and instructors can take place using the discussion forum, where students and instructors can have discussions regarding certain topics . An additional plus point to this virtual classroom system is that students can view the recorded lectures and notes provided by the instructors at any point of time and as many times as they want . In order to get a better understanding of the lectures conducted by the instructors our system enables them to post assignments and multiple choice quizzes . Our goal is to offer a system that has a wide range of facilities which will maintain all student, instructor and course records in a much more efficient way with much less hassle.*

**Keywords**—Virtual classroom , live polls , discussion forum .

## 1. Introduction

Education through the Internet is the latest concept which has been implemented by everyone all over the world . The scope of learning online has increased abundantly over the last few years . This Virtual Classroom System is designed in such a way that the students can communicate with the faculty members when they have logged on to the system , along with this the student's can get access to the notes and previous lecture recordings by issuing a request to their respective faculty. Each student will be given a unique

Login Id and password, which will help them to log on to the system. The Virtual Classroom System can be accessed by the students at any given time of the day . It not only engages the students into a rich learning experience but also is a real time collaboration between a faculty and a student. The faculty members can upload notes, video recordings and many such important documents by logging on to the faculty module .The student's and the faculty members can make their session more interactive by discussing certain important topics in the Discussion Forum . Every student can check their performance after completing a particular quiz or an assignment .In this system we not only try to offer a range of facilities that will help maintain all student, faculty course records but also try to make learning more fun and accessible to all the students.

## 2. Literature Survey

**A. Technique One:** The Design and Implementation of an Online Course Management System which is published by Emmanuel N. Ekwonwune and Dominic C. Edebatu respectively , In this paper they have addressed the issue of learning abilities which may vary among individuals. In spite of this , schools teach them in one single classroom . Due to which managing learning abilities can be difficult. In order to overcome this problem the online Course Management System integrates all the learning techniques in which they have followed the waterfall model approach .The expectations from this system were to ensure that student evaluation questions are not out of context which covers the three domains of learning and to manage learners courses effectively, to integrate a feature which will enable learners to schedule reminders

for their assignments or evaluations, to develop a feature which will be used to make sure that all the levels of learning are covered in a course and to ensure that learners answer questions based on their learning abilities for evaluations [1] .

**B. Technique Two:** The Development of a Class Model for Improving Creative Collaboration Based on the Online Learning System (Moodle) published by Eunjoo Kim , Hyungsik Park and JungUn Jang . In this system, a Moodle-based online learning system was developed and a class model was derived to enhance learners creative collaboration capabilities. In addition to it , the results of creative collaboration were analyzed after applying the derived class model to university students. The conclusions drawn from these findings were as follows: First, the development of the Moodle online learning system focused on the functions of forms, real-time conversation, reciprocal evaluation, Wiki, and blogs to promote creative collaboration among college students. Second, the class model for promoting creative collaboration based on a Moodle-based online learning system consisted of self-reflection, learner-driven learning, cooperative learning, practical tasks, and the role of the professor. Third, after verifying the effect of application of the Moodle-based class model for university students, a positive effect was found with regard to the creative collaboration of university students. In addition, the application of the Moodle-based online class model for college students had a positive effect on improving the discussion activities, active options, active questions, and imagination, in addition to creative collaboration [2] .

**C. Technique Three:** The Design and Application of Flip Classroom Teaching Based on Computer Technology published by Jia Li , Xiaoxia Zhang and Zijun Hu , this paper aims to develop a new flipped classroom teaching model which is supported by

Moodle, this teaching model arranges learning tasks according to the different characteristics and needs of learners. The model mainly consists of three modules. In the pre-class guidance module, teachers record the class in the form of video and post it to the micro-class community section of the Moodle platform, along with a task list for pre-class preparation. Before class, students will receive the courseware and the learning schedule so that they can choose the appropriate time to preview the course content. The in-class activity module is used for the process of learning and communication in the class. After previewing the content of a lesson, students summarize the problems found and then exchange and communicate with group members or teachers in different ways to find the solutions by themselves. In the after-class knowledge supplement module, the students rethink about the problems and deepen their understanding after class, and then summarize the knowledge points. They are also allowed to share their learning experience on the blogs on the Moodle platform to help each other digest knowledge [3] .

**D. Technique Four:** The Design and Implementation of a Virtual Classroom System published by Nicholas A. Omoregbe , Ambrose A. Azeta , Uyiosaifo Bello-Osagie , Michael C. Agarana . In this paper, a virtual learning system has been developed , the new system is expected to serve as a remedy to the problems and weaknesses observed in the old system in which it combines open learning techniques based on new technologies with conventional classroom teaching . The system consists of two main modules: Lecturer module and Student module . In the lecturer module, the lecturers can create and view Lecturer modules, create and view questions and solutions , contribute to discussion forums and check the student's performance along with the course coverage and view discussion forum messages . In the student user module , the

student's can cover lecture modules , answer questions & view solutions . They can check their performance and contribute to forums , along with this students can view the discussion forum messages [4] .

**2.1 Summary of Related Work**

The summary of methods used in literature is given in Table 1.

Table 1 Summary of literature survey

Literature	Creative Collaboration method	Moodle Based method	Flipped classroom method
Emmanuel N. Ekwonwune, Dominic C. Edebatu . 2019 [1]	Yes	No	No
Eunjoo Kim , Hangsik Park and JungUnJang. 2019 [2]	Yes	Yes	No
Jia Li , Xiaoxia Zhang and Zijun Hu . 2018 [3]	No	Yes	Yes
Nicholas A. Omoregbe, Ambrose A. Azeta ,Uyiosaifo Bello-Osagie , Michael C. Agarana . 2015 [4]	Yes	No	No

**3. Proposed Work**

This Virtual Classroom System provides a better interface for faculty and students so that they can

communicate with each other, share documents and videos when the system is logged on. Students can retrieve the text files from the database by issuing the request. Both the users have their own login id and password, which help them to get connected with the server. The System is available anytime without any restriction that means, learners have the freedom to absorb content and engage with peers, at a time and location that they will learn best. It engages students in a rich learning experience. It provides a means of collaborative learning for the students. Another big advantage of the virtual classroom is the ability to record the class as it happens, including presenters’ audio and video inputs. Each session is captured in a video and the recordings can be viewed online or downloaded and distributed to the students. These recordings become a great learning tool for the students if they have missed any lecture.

**3.1 System Architecture**

The system architecture is given in Figure 1. Each module is described in this Section.

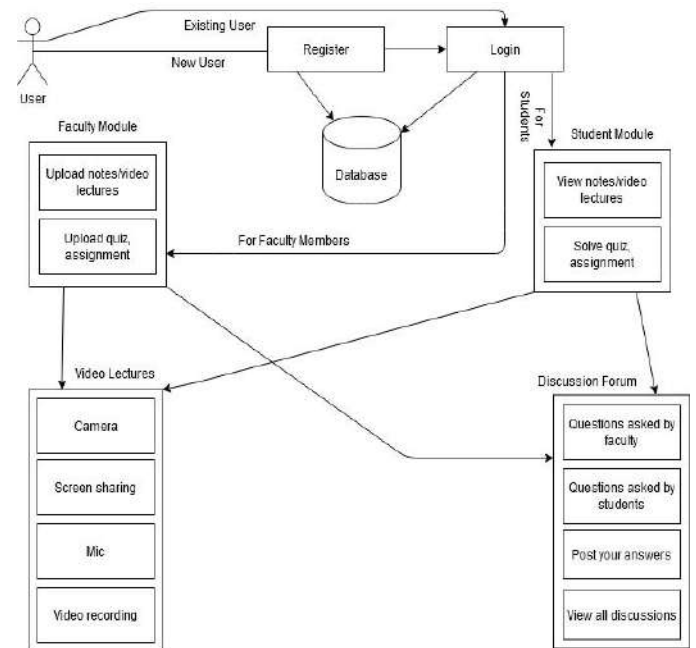


Fig. 1 Proposed system architecture

### **A. CONTROL MODULE**

- **Web application:** The Application provides an interface between the user and the database and it acts as a communication medium between the users of the system.
- **Database:** The database is used to store the user activities and all the users that are allowed to access the system and also stores the authorized user's credentials such as login id, password.
- **Registration page:** Every user must register all the necessary information like name, username, password, user type to login on the system.
- **Login page:** This page provides the login option according to the role of the user that is either Faculty or student.

### **B. FACULTY MODULE**

- **Upload notes/videolectures:** Faculty can upload the recorded lectures and notes here so that students can refer to it.
- **Upload quiz/assignment:** Faculty can upload quiz or assignments at any point of time to test the student's attention and understanding from the lectures.

### **C. STUDENT MODULE**

- **View notes/video lectures:** Students can refer to the notes for study and video lectures uploaded by faculty if they have missed any

lecture.

- **Solve quiz/assignment:** Students can solve a quiz or upload a solved assignment which was given by faculty.

### **D. VIDEO LECTURES MODULE**

- **Camera:** The camera is used to capture the faculty who are taking lectures through video conferencing and students who are attending the lectures. There is an option to turn on or turn off the camera.
- **Mic:** The mic acts as a medium to send the audio of lectures from a faculty to a student and vice versa through the system.
- **Screen Sharing:** Screen sharing option is used to share the content on the screen like notes or ppts with other users logged on the system.
- **Video Recording:** Using this option, users can start the recording of the class including presenter's audio and video inputs. Each session is captured in a video and the recordings can be viewed online or downloaded and distributed to the students.

### **E. DISCUSSION FORUM MODULE**

- **Questions asked by Faculty:** Faculty can post questions related to a particular topic taught in the lecture.
- **Questions asked by Students:** Students can ask questions or doubts about any concept that

was not cleared in the lecture.

- **Post your Answers:** Both the users can post the answers to the questions asked in the discussion forum.
- **View all discussions:** Students and faculty can view all the points discussed at that particular time period.

#### 4. Requirement Analysis

The implementation detail is given in this section.

##### 4.1 Software

Operating System	Windows 7 or higher
Programming Language	JavaScript,PHP
Database	MySQL

#### ACKNOWLEDGEMENT

It is our privilege to express our sincerest regards to our supervisor Prof. Ranjita Gaonkar for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this work. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari

Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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# Voice Based Smart Robotic Arm

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*Abstract: A robotic arm is a type of mechanical arm, usually programmable, with similar functions to a human arm; the arm may be the sum total of the mechanism or may be part of a more complex robot. There are many places where humans are expected to interact with incendiary objects such as explosives and hazardous objects. Since ages such situation has caused casualties or life for many. In this project with the available technology we aim to build a voice controlled robotic arm capable of performing remote operation under above mentioned places, contributing a lot to human safety. Prime features of this arm will include its ease to operate and low build cost without compromising on its functionality. With few amendments in hardware following project can be extended in arc welding, oxyacetylene welding, plasma welding. They find a great application in dangerous works like a nuclear experiment, greater precision and repeatability can be availed with robotic arm. Thus, these offer high productivity. Advances in assistive technologies have begun to provide an increase in independence for these individuals, but there is great potential for further technological developments to significantly improve their abilities, independence, and overall quality of life.*

**Keywords**—Speech Recognition, Robotic arm.

## 1. Introduction

Robotics is a branch of engineering that involves the conception, design, manufacture, and operation of robots. This field overlaps with electronics, computer science, artificial intelligence, mechatronics, nanotechnology and bioengineering. A robotic arm is a machine that can execute different tasks repeatedly with high accuracy. Hence many functions like collecting information and studies about hazardous sites which is too risky for humans to venture is one of the most common applications of robotic arms. Robotics in general has revolved around the idea of replacing humans in order to improve the overall life style of mankind or do chores more efficiently.

## 2. Literature Survey

### A. Voice Controlled Personal Assistant Robot for Elderly People

Jishnu U K, Indu V and K J Ananthakrishnan [1] proposed a model which describes the design and development of a personal assistant robot, which is controlled by voice commands to pick long/short distance

objects. Voice communication between the robot and android smartphone is done via Bluetooth which is achieved using HC05 module interfaced with android device or equivalent desktop application. The proposed four wheeled robot consists of a camera and robotic arm. The camera is used for object detection, distance measurement, and a robotic arm to perform pick and place actions which are achieved by producing calculated torque in servo motors. It can be widely used in many applications such as chemical industries, healthcare for the disabled and elderly population.

### B. Voice Control Robotic arm as a physical assistant for paralyzed people:

Adarsh Singh, Omkar Naik, Amit Ghadi [2] proposed a model which is used for persons who are paralyzed or the person may have lost their hand. This project presents a system whereby the human voice is used to command the robotic arm for specific needs. It is very similar to the human arm, and this robotic arm has a 6 D.O.F. The two main software used in this project is Matlab and Solid works. The main aim is to assist them in daily feeding activities. It can be a real boon for handicapped people who are paralyzed or lost their hands in some accident. This arm can be fixed on either wheelchair or on a bed as per individual needs.

### C. Robotic arm using voice and Gesture recognition:

Dr. Nabeeh Kandalaft and Padma Sandeep Kalidindi [3] proposed a human machine interface for Explosive Ordnance Disposal is proposed based on gesture control. With the growing role of Remotely Operated Vehicles in bomb defusing scenarios aiding experts to locate, handle and destroy hazardous objects, new intuitive gesture based systems can be modeled on human hand movements to make the control of a complex gripper arm instinctive. Integration of such an arm for more precise control in accurately manipulating explosive devices would allow the ROV to actively assist in defusing the bombs as well. In this study, an adaptive manipulation scheme is proposed through a communication interface between an Arduino Uno Microcontroller, Leap Motion controller and OWI robotic arm. The results of the implementation demonstrate the ease of operation and effectiveness of gesture control as a technique. The user's hand movements are captured by the Leap Motion Controller and sent to the computer. The software

algorithm performs all necessary computations, and information is received-from/sent-to the Arduino Uno via Bluetooth. Additional sensors, actuators, and display systems can also be attached via the micro-controller board. The Arduino Board in turn drives the motors of the robotic arm.

**D. Speaker Dependent Voice Controlled Robotic Arm :**

Doğa Akçınar, Mustafa Kemal Arıtürk and Tülay Yıldırım [4] proposed to integrate the speech recognition system into the robotic arm and accordingly move the robot arm with the voice commands given instantaneously, hold the object and leave it the set of commands being {movements: Up, Down, Left, Right, Catch, Drop}. At the same time, the voice recognition system to be used in this work depends on the person and will only detect the voice of the desired person to make the system more reliable. Simpler models for signal processing are chosen over complex one. The hardware used is a basic computer in the form of raspberry pi 3, servo motors for producing torque and light and durable materials to create a base of arm. High torque motors are preferred to achieve low angles.

**3. Proposed Work**

Robotic applications are becoming ubiquitous. They are widely used in several areas (e.g., healthcare, disaster management, and manufacturing). However, their provisioning still faces several challenges such as cost efficiency. Cloud computing is an emerging paradigm that may aid in tackling these challenges. It has three main facets: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). Virtualization is a technique that allows the abstraction of actual physical computing resources into logical units; it enables efficient usage of resources by multiple users. Its role is a key to resource efficiency. Virtualization can be performed at both node and network level. This thesis focuses on the IaaS aspects of robotic applications as cloud computing services.

**3.1 System Architecture**

The system architecture is given in Figure 1. Each block is described in this Section.

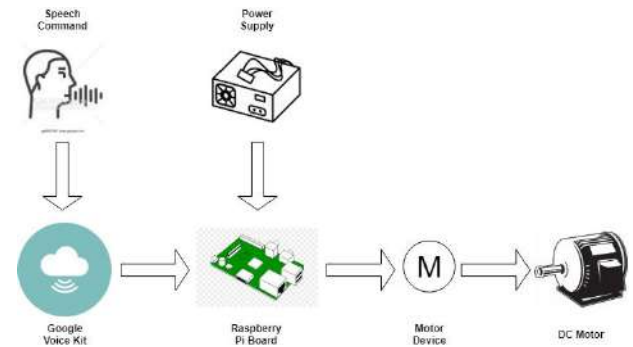


Fig. 2 Proposed system architecture

**A. Google voice kit:** The AIY Voice Kit from Google lets you build your own natural language processor and connect it to the Google Assistant or Cloud Speech-to-Text service, allowing you to ask questions and issue voice commands to your programs. All of this fits in a handy little cardboard cube, powered by a Raspberry Pi Figure 1.

**B. Raspberry Pi board:** The Raspberry Pi 4 uses a Broadcom BCM2711 SoC with a 1.5 GHz 64-bit quad-core ARM Cortex-A72 processor, with 1 MiB shared L2 cache. ... The Raspberry Pi Zero and Zero W use the same Broadcom BCM2835 SoC as the first generation Raspberry Pi, although now running at 1 GHz CPU clock speed.

**C. Motor Device:** An electric motor is an electrical machine that converts electrical energy into mechanical energy. Most electric motors operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of torque applied on the motor's shaft.

**D. DC Motor:** A DC Motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields.

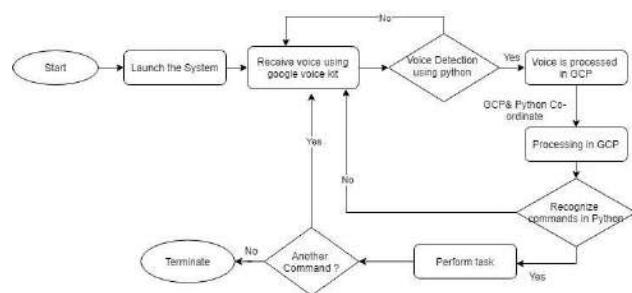


Fig. 1 Proposed system flowchart

In our proposed system the whole database system is replaced GCP (Google cloud platform) .GCP requires no authentication for the voice input. We have used GCP software service for controlling movement. GCP has various features like it is an on demand service you use it when you need it. It uses the internet as a medium and it

can have multiple clients .SAAS (Software as a service) SAAS the first level of GCP can be accessed anywhere at any platform. It's a lightweight application that can be accessed through any browser.

The main advantage of our system is that the command can be dynamic unlike the existing system in which the voice commands should match the previous voice samples from the database.

### 3 Requirement Analysis

The implementation detail is given in this section.

#### 3.1 Software

The Python programming language is the programming language that is used to implement our prototype. Google App Engine (GAE) to implement the Wildfire Suppression Application. GAE is a Platform as a Service (PaaS) cloud computing platform used for developing and hosting web applications on Google's Infrastructure. And OS being Raspbian OS

#### 3.2 Hardware

The experiment setup is carried out on a computer system which has the different hardware and software specifications as AIY voice-kit, servo motor (6), connecting wires, Speakers, microphone , memory card ,card reader, HDMI cable and LAN cable.

Device with 4GB RAM.ACKNOWLEDGMENT

It is our privilege to express our sincerest regards to our supervisor Prof.Rupali Nikhare for the valuable inputs, able guidance, encouragement, whole-hearted cooperation and constructive criticism throughout the duration of this

work. We deeply express our sincere thanks to our Head of the Department Dr. Sharvari Govilkar and our Principal Dr. Sandeep M. Joshi for encouraging and allowing us to present this work.

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# MEDDOC - THE AI DOCTOR

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**Abstract**— AI is taking over the healthcare domain with AI-driven applications. Many applications development companies are looking forward to make AI applications in the healthcare space. The AI applications have high impact in medical areas like radiology and cancer detection. The aim of this paper is to give a brief idea about an automated chatbot interaction system that will contribute to health maintenance by solving the problems of many people as it will suggest to them the perfect diet plan and exercises. As an automated system will be responsive in nature, so the patients will be more comfortable to ask their personal queries too. Messaging applications are becoming the new generation of digital products after the web and mobile applications. MedDoc will be a pocket-size medical specialist available for quick advice. The AI specialist will be a chatbot who will listen to the patient's symptoms, ask and remind, about follow-up questions, attempts to diagnose the problem, and also will suggest the doctor to be visited. It will use Artificial Intelligence to understand a patient's query and select additional questions which it will ask the user to get more detailed patients' symptoms. It will be a bilingual chatbot. Users can chat in English as well as Hindi language.

**Keywords**— NLP, Morphology, Chatbot, health guide, python, Healthcare Domain, NLU, NLG, VUI

## 1. Introduction

Automated chatbot interaction system which will contribute to health maintenance by solving the problems of many people as it will suggest to them the perfect diet plan and exercises. Using Artificial Intelligence to understand a patient's query and difficulties virtually can save time & resources. Messaging applications are becoming the new generation of digital product design after the web application. MedDoc will be a pocket-size medical specialist available for any advice in English or Hindi.

## 2. Literature Survey

Authors Jeevan Thukrul et.al. gives the information regarding products which are useful for consumers to obtain what they want exactly. Question Answering (QA) systems can be identified as information accessing systems which try to answer natural language queries by giving suitable answers making use of attributes available in natural language techniques [1]. The system takes a plain text as input and answering all types of questions output by the qualified user is the output. The purpose is to provide a

General solution to this problem. Recognizing the reality in texts and giving the past content for developing a

conversation is presented by authors M.S Bennet Prabha that is used in middle-school CSCL scenarios [2].

“Designing for Health Chatbots” by authors Ahmed Fadhil et.al. describes a smart chatbot [3] for customer care by using Software as a service which analyzes the message of each application server. It helps the user to resolve the issue by providing a human way of interactions using LUIS (Language Understanding Intelligence Service) and cognitive services which are implemented on AWS public cloud.

Urmil Bharti develops a system in which Admin feeds the input to the machine so that the machine can identify the sentences and take a decision itself as a response to a question. The database used in the project is MySQL. The illustration and execution of SQL in the pattern-matching operation are required. The conversation can be done so that it can add some knowledge to the database as it has not been modeled before. If in case the input sentences in the database did not match then it will be remodeled [4]. Paper uses artificial intelligence to predict the diseases based on the symptoms and give the list of available treatments. It can facilitate us to figure out the problem and validate the solution [2].

For conversational application, the Hybrid model is used to employ a partially Rule-Based and Machine Learning approach. To recognize user expressions and classify the text into one of the intents, the Dialogflow agent uses machine learning algorithms to map them to intents and extract structured data. The two algorithms used by Dialogflow for intent matching are Rule-based grammar matching and ML matching. By default, Dialogflow attempts both of these algorithms and chooses the best result out of the two. The hybrid model attempts to match according to rule-based grammar. If a match is not made, it switches to ML matching. According to Urmil Bharti this mode is considered to be the best and an optimized solution for most use cases considering that it works accurately with a sufficient number of training phrase examples, thereby allowing quick updation of the models [4].

### 2.1 Summary of Related Work

The summary of methods used in the literature is given in Table 1.

Table 1. Summary of Literature Survey

Literature	LUIS	VUI	Hybrid
<i>"DoctorBot - An Informative and Interactive Chatbot for COVID-19"</i> [1]	Yes	No	No
<i>" Ai Healthcare Interactive Talking Agent using Nlp"</i> [2]	Yes	No	No
<i>"Designing for Health Chatbots"</i> [3]	No	No	No
<i>"Medbot: Conversational Artificial Intelligence Powered Chatbot for Delivering Tele-Health after COVID-19"</i> [4]	No	Yes	No
<i>"A Literature Review On Chatbots In Healthcare Domain"</i> [5]	No	Yes	Yes
<i>"A Medical ChatBot"</i> [6]	Yes	No	No
<i>"Artificial Intelligence in the Battle against Coronavirus (COVID-19): A Survey and Future Research Directions"</i> [7]	Yes	Yes	Yes

The overview of comparison of different parameters are given in Table 2

Table 2. Summary of literature survey

Literature	NLP	NLG	SSML
<i>"DoctorBot - An Informative and Interactive Chatbot for COVID-19"</i> [1]	Yes	Yes	No
<i>" Ai Healthcare Interactive Talking Agent using Nlp"</i> [2]	Yes	No	No
<i>"Designing for Health Chatbots"</i> [3]	Yes	No	No
<i>"Medbot: Conversational Artificial Intelligence Powered Chatbot for Delivering Tele-Health after COVID-19"</i> [4]	Yes	Yes	Yes
<i>"A Literature Review On Chatbots In Healthcare Domain"</i> [5]	Yes	Yes	Yes
<i>"A Medical ChatBot"</i> [6]	Yes	Yes	No

<p>“Artificial Intelligence in the Battle against Coronavirus (COVID-19): A Survey and Future Research Directions” [7]</p>	<p>Yes</p>	<p>Yes</p>	<p>Yes</p>
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### 3. Proposed Work

Our conversational bot is ML-powered. It is embedded with ML algorithms to understand the user's query and return respective responses. The first level of processing in our architecture deals with text I/O. In the second level of processing, the extracted text from the user input is used as a basis for performing Natural Language Understanding on the generated text to decode the semantic meaning of the user input and recognize morphemes.

#### 3.1 Proposed System Architecture

The system architecture is given in Figure 1. Each block is described in this Section.

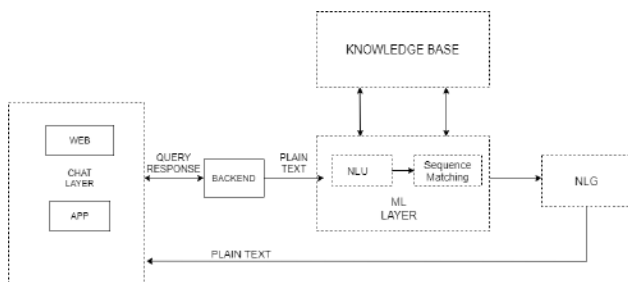


Fig. 1 Proposed system architecture

**A. Chat Interface Description:** This unit is the front end of the system. It is responsible for collecting the user queries from the user which are the input to the system. It is also responsible for displaying the system generated results to the user. Chat interface is the mediator of conversation between the system and the user. The query that the user fires on the chat interface is passed on to the chatting backend which acts as a message delivering system between the Chat interface and the Machine Learning Layer. The type of interface depends on the requirements of the user that are to be satisfied by the system. If the system is accessed from a smartphone, the interface will be in the form of an app and if the system is accessed from a website, then the interface will be in the form of a website.

**B. NLU Engine Description:** Natural Language Understanding is a subpart of NLP (Natural Language Processing) which enables the system to understand the natural language or the conversational language spoken by

the users.

The input received from the user is in unstructured text format which cannot be understood by the system directly. It understands input only in structured formats. The unstructured text received from the user is converted to structured format by extracting important words and patterns from the user text using the NLU techniques.

To understand a complete sentence, the NLU system needs to understand each word of that sentence. It means that the initial task is the segmentation of the sentences into individual words. Next, to understand the word, the system needs to understand the grammar of the sentence. This can be done by knowing the parts of speech of each word in that sentence. Here comes the POS (Parts-Of-Speech) tagger into picture. After knowing the Grammatical weightage of each word, all of them are parsed to know the dependency among them. This is the most important step wherein the word with the highest dependency is extracted, from which the intent of the system can be known.

**C. ML Engine Description:** Inclusion of ML in chatbots enables it to compute the replies from scratch. It is used to make predictions to predict the responses for the user queries and also to update the system from its experiences. It keeps updating the databases as and when it encounters something new from the user. This engine uses supervised or unsupervised or both techniques to analyze what the user requires. It further uses a model to interpret the intent of the user and provides the appropriate results.

Most of the machine learning models are based on statistical and probabilistic evaluations of the instances occurring and the calculations makes a prediction for the test instance. The decision engine not only includes models for predictions, but also includes algorithms for information retrievals like entity extractions, multiple text classifications, etc. The chatbots that are used in healthcare domain for disease predictions can use a wide range of algorithms, some of which are clustering, Bayesian networks, decision trees, etc. The methods of their execution and the comparison of the algorithms for the appropriate selection of the same is briefed here. A decision engine is the brain of the system. It includes the Incorporation of ML algorithms for predictions, statistical and probabilistic calculations, etc. Also, ML enables the

system to learn from its past experiences, so as to provide better and revised results.

**D. Decision tree algorithm for prediction:** This type of decision tree is the improvised version of the traditional decision tree. It creates this tree at runtime, based on the user's queries and keeps updating the tree on new user messages. Consider its working for disease prediction. In this algorithm, the symptoms detected in the user query are added as child nodes to the root node. The nodes keep on getting added for new symptoms detected. Further for every symptom, the algorithm checks for the second symptom which has the highest occurrence with the earlier symptom and asks the user for that symptom. If he says yes, then the system traces that path to check for the disease present at the root node. This will keep iterating for all users and the tree keeps getting updated for new entries or traces the path available.

#### 4. Requirement Analysis

The implementation detail is given in this section.

##### 4.1 Software

Flask is a web application framework written in Python. Flask is based on Werkzeug WSGI toolkit and Jinja2 template engine. Web Server Gateway Interface (WSGI) has been adopted as a standard for Python web application development. WSGI is a specification for a universal interface between the web server and the web applications. Werkzeug is a WSGI toolkit, which implements requests, response objects, and other utility functions. Jinja2 is a popular templating engine for Python. A web templating system combines a template with a certain data source to render dynamic web pages.

##### 4.2 Hardware

Minimum hardware requirements include a processor of Intel Core i5 4210M.

Memory requirements are HDD of 180 GB, RAM 4GB, and operating system Windows XP Professional with Service pack 2.

##### 4.3 Dataset and Parameters

Correlation is a measure of the degree to which two variables agree, not necessary in actual value but in general behavior. The two variables are the corresponding pixel values in two images, template and source. Cross Correlation is used for template matching or pattern recognition. Templates can be considered a sub-image from the reference image, and the image can be considered as a sensed image.

#### ACKNOWLEDGMENT

We sincerely thank our Project Guide Prof. Madhura Vyawahare for guidance and encouragement in carrying out this project. We are grateful for the timely help & support extended by Ma'am. We would also like to thank our Head of Department Dr. Sharvari Govilkar for guidance and encouragement in carrying out this project.

We deeply express our sincere thanks to our Principal Dr. Sandeep Joshi for encouraging and allowing us to present the project on the topic "MedDoc- The AI Doctor".

We take this opportunity to thank all our lecturers who have directly or indirectly helped us in our project. We pay our respect and love to our parents and all other family members and friends for their love and encouragement throughout our careers.

Last but not the least, we express our thanks to our friends for their cooperation and support.

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ask-in-5-minutes-574i

# Survey on adaptive smart signal

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**Abstract—** Computer vision is a field of artificial intelligence that trains computers to interpret and understand the visual world. Using digital images from cameras and videos and deep learning models, machines can accurately identify and classify objects. Digital image processing is the use of a digital computer to process digital images through an algorithm. Traffic light control systems are extensively used to control and efficiently manage the flow of automobiles. Other possible solutions are using ultrasonic sensors for detecting vehicles, or using PIC microcontroller that would evaluate the traffic density using IR sensors. The major disadvantages with these systems are it would be very expensive to implement and maintain and are completely dependent on Sensors and Input Factors. Using a dynamic & efficient approach to meet the requirements of the traffic control system. The continuous changes of state in traffic and the requirement to respond quickly are the specific characteristics of the environment in a traffic control system. In this approach, image recognition algorithms and machine learning are used to identify the automobile. Reinforcement learning to create a dynamic traffic control model which quickly responds to the actual conditions found in the environment while simultaneously learning about it. In this system another feature is added which is regarding the priority to special/emergency vehicles. Using Google maps as a reference for the city roads.

**Keywords—** Smart Signal, Digital Image Processing, Reinforcement Learning, Threshold, IR Sensor, Traffic Control System, Vehicle Priority

## 1. Introduction

Traffic lights have become an important part of our life. With increasing traffic and road accidents, it has become necessary to create a safer and more efficient traffic control system. The conventional traffic management systems cannot deal with the variable flow of traffic approaching the junctions. So traffic light control systems are used to manage and control the flow of vehicles through the junction of various roads. The input of a traffic light control system is generally an image, video or readings from a sensor such as an ultrasonic sensor. The output is the timing of the signals according to the vehicle density on each lane. The vehicle count is generally calculated from the given input using detection algorithms

. Then based on this count the various techniques are used to control the signal lights such as reinforcement learning or fuzzy-logic.

## 2. Literature Survey

**A. Reinforcement learning Agent:** Authors in [1] proposed a network structure contains a straightforward Softmax classification branch and Q-value network branch, specifically Mixed Q-network (MQN), which is trained by Q-learning with a memory palace that maintains completely different replay buffers for various classifications. The comparative deep Q-network (DQN) is trained using Q-learning with experience replay. The simulation of traffic is performed by using an open source traffic simulator software SUMO (Simulation of Urban MObility) which can be used for discrete time simulation. The entire reinforcement learning framework is implemented by using the tensorflow framework. It is a data-efficient method to learn and reuse the lower layer of neural networks under various traffic flow configuration. Also in this paper [8], authors projected a deep reinforcement learning model designed to deal with the traffic signal control problem. Their DRL framework utilized readily available real-world information sensor streams to be told the optimal policy for the agent in VISSIM. They tested their DRL agent's performance on real traffic information throughout high traffic demand periods. They conjointly mentioned thoroughly about the performance of their DRL agent with a linear increase in traffic demand. They will extend their DRL framework towards intersections with left and right turns and arterial corridors. They're going to explore creating intelligent control systems additional robust from adversarial perturbations towards traffic sensors.

**B. Neuro – Fuzzy Based Adaptive Traffic Light Management system:** In this paper [2], the authors have proposed a neuro-fuzzy based system which considers traffic on the current lane likewise as on its adjacent lane. Lanes are chosen using the round robin scheduling algorithm. So every lane gets a green signal in a fixed periodic manner. Fixed green light signal of 15 seconds is appointed to every lane. And if there are no vehicles present on a given lane then the green light signal is not given to that particular lane and passed onto the next lane. In case of emergency vehicles at an intersection, round robin algorithm is not used to select the lane, instead green

signal is given to the lane on which these vehicles are present.

**C. Using YOLO Object detection Algorithm:** Authors in [3] aim to create a model to produce an answer for current traffic problems by managing traffic signals on the idea of real time scenarios. Here a pretrained model YOLO is employed to perform the task of object detection, and correspondingly the count of the vehicles are stored in order to process further requests of signal processing. Additionally the model is compatible with nearly any type of camera, even the cheaper ones as well as the conventional surveillance camera and can be used to capture images at initial levels. These images are then passed to the model for vehicle detection followed by vehicle counting. And this entire process is replicated on all four sides of the road using a camera. When the object is detected then a rectangular box is created around the object. The count obtained from all the sides of the road is then passed as input to a raspberry board. The raspberry board calculates the result by comparing all the counts obtained from four different images. The model has some fixed threshold value and if the result from the four images is under the threshold value then simple static switching will be applied and every signal will be allotted with the same switching time. Paper [4] proposes an IOT system containing ultrasonic sensors for controlling the traffic. The timing of signals is dynamically monitored and adjusted according to the traffic density in a given area. The inputs from the ultrasonic sensor which rotates at 180 degrees with a digital camera are taken and then passed onto a Raspberry Pi microcontroller for processing. A program is then created in python and used to process the input data and make certain decisions to control the signal timer on the basis of the vehicle density. This algorithm is created and stored in the raspberry pi board. The Raspberry Pi board makes its interface to the signal through IR technique so as to manage and modify dynamically. The signal timer is going to be adjusted as per instructions by the controller. And this decision is given on the basis of an algorithm designed to control the timer. The algorithm consists of checking for density of traffic for a specific lane under the threshold timing. If the traffic density of any lane reaches above this threshold value, then the green light signal is provided for that particular lane..

**D. Density Based Smart Traffic Control System using IOT as the main engine:** Authors in [5] propose that the workflow of traffic control systems is mainly based on Density of the lane and the priority. The density is calculated using an IR sensor on each lane; the count of the vehicle on each lane is sent to Raspberry pi which is the main unit of the traffic system. This Raspberry pi will send the data to the cloud server and to send the data to the cloud it uses Message Queuing Telemetry Transport

(MQTT) which is mainly based on messaging protocol. The send by the Raspberry pi will be stored in the cloud database which will be used for further process. This smart traffic control system uses web applications using which Admin can add the subscribers to the system; then subscribers are able to login to the system and get the information about the traffic. As the count of the vehicles in lane reaches the threshold, traffic light for that lane will be activated. If the vehicles in one lane do not reach the threshold but the opposite lane is conjunct then the subscriber will get the information about the alternative route. During this survey paper [9], an effort made to travel through the concept of smart city and smart community. It's different aspects were reviewed and a few of their challenges presented. additionally, it indicated that among all categories including Environment, Healthcare, Energy and smart transportation, the latter one has received more attention in recent years. Some Recent work on smart control and autonomous vehicles were presented and eventually a posh path planning framework was discussed as our future challenge for smart cities. At the top, we tried to introduce a number of the longer term challenges during this concept.

**E. Vehicle Detection, Tracking and Counting:** In literature [6], The paper principally focuses on the essential plan of designing a system that uses a camera and functions according to a camera-based algorithmic program so as to manage the traffic flow on the road. The process of vehicle detection was done by subtracting the background and foreground images. The following of the vehicles was done by using Kalman. The system maintained its accuracy in day as well as evening time from the videos. The detection of vehicles, calculation and following was done using computer vision application. BLOB analysis was used to separate the vehicles from the background. The model has enlarged its scope in detection and is a lot of flexible in terms of cluster variance.

**2.1 Summary of Related Work**

The summary of methods used in literature is given in Table 1.

Table 1 Summary of literature survey

Title	Technique Used	Advantage	Disadvantage
Training Reinforcement Learning Agent for Traffic Signal Control [1]	Reinforcement Learning	It is a data-efficient method to learn and reuse the lower layer of neural networks under different traffic flow configuration	Stagnate traffic can cause haywire
Neuro – Fuzzy Based Adaptive Traffic Light Management system [2]	Neuro - Fuzzy Based System	System provides negligible waiting time for the priority vehicles.	Doesn't work on a bigger intersection.
Real Time Traffic Management Using Machine Learning [3]	YOLO	The model is compatible with almost every type of camera, including the normal surveillance camera can be used to capture image at an initial level	It is completely dependent on the input sensor
Proposed Algorithm for Smart Traffic Control Using Ultrasonic Sensors [4]	YOLO	Usage of sensors help in determining the pollution caused by vehicles.	It is expensive to implement and maintain

Density Based Smart Traffic Control System for Congregating Traffic Information [5]	IOT	Accuracy is very high as sensors provide precise information	Cost of implementation is high.
Vehicle Detection, Tracking and Counting [6]	Kalman Filter	Compatible even with low resolution camera	Doesn't work in harsh weather conditions
A Brief survey on smart signal controlled Transportation [7]	Efficient, Road network management	Controlled by centralised system	Completely dependant on sensors
Deep Reinforcement Learning For Adaptive Traffic Signal Control [8]	DRL, VISSIM	DRL framework utilized readily available real-world data sensor stream.	Doesn't work for intersections with left and right turns

After carrying out a detailed survey on related technical papers we found out that using IOT and ultrasonic sensors as input devices for the system can easily cause haywire as equipment can be easily hampered. Using a camera as an input for the system can be much more reliable and resourceful for differentiating between vehicles. Conclusively the program can control and manage a traffic signal faster and more accurately. Saving resources wasted on a traffic signal due to congestion.

**3. CONCLUSION:** After considering paper [1] and adapting the data efficient method to learn and reuse to train the neural network in order to make the network smaller and more efficient. The network then can easily handle different loads of traffic data supplied to it. [2] paper provides a neuro-fuzzy driven algorithm which can reduce computational time irrespective of hardware installed. [3] source provides an approach which works efficiently with a huge range of resolutions provided by cameras but cannot be considered as it relies on other sensors more, hence defeating the motive/purpose of the project. Paper [4] concentrates on using ultrasonic sensors as main input to the program which can not be considered as ultrasonic sensors are vulnerable to multiple hindrance on Indian streets.



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# Speech Reproduction Using Lip Reading

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***Abstract - In video streaming/meeting services and video calling platforms, sometimes, due to network connectivity issues, there is an audio lag/packet loss which results in the listeners not being able to understand what the host is speaking. This usually results in delays/communication error in the meet/streaming and the audience is not able to clearly understand the message being conveyed. Lip-Reading is an art that helps the listener to understand what a speaker is trying to say even without hearing him and just by observing the Lip-Movement. It's this combination of using a person's lip gestures, facial eloquence, and other nonverbal cues to "read" speech. We describe a recurrent neural network-based system for text-to-speech (TTS) synthesis that can generate speech audio in the voice of different speakers by reading their Lip-movements, including those unseen during training. Our model will demonstrate these capabilities by reading the speaker's face by extracting the Lip features. Next, the model will convert the Lip-movements to sound waves using relevant APIs. Following this, our model will generate artificial speech, synchronous to the speaker.***

**Keywords—** Lip Reading, text-to-speech

## 1. Introduction

Technology has become an important aspect of human life. It has a great influence on many facets of our day-to-day life and has also helped improve our environment. The introduction of technology in communication with the invention of mobile phones and the internet has caused

people to rely on it to improve their way of working and also provide easy ways to use various applications to enhance their standard of living. This establishment of technology in one's life has enhanced not only the way people communicate or trade goods but also in a variety of fields such as medicine, agriculture, home security, etc.

With the increase in demand of online mode for lectures, schools, conferences and meetings during COVID-19, there is an increase in cases where there can be lag in the connection due to poor internet connectivity or due to bandwidth. Also for disabled people to use the online technology speech reproduction is necessary.

Main concept that is used to reproduce speech is lip reading. Lip reading, also known as lipreading or speechreading, is a technique of understanding speech by visually interpreting the movements of the lips, face and tongue when normal sound is not available. It relies also on information provided by the context, knowledge of the language, and any residual hearing. Although lip reading is used most extensively by deaf and hard-of-hearing people, most people with normal hearing process some speech information from sight of the moving mouth.

Deep learning (also known as deep structured learning) is part of a broader family of machine learning methods based on artificial neural networks with representation learning. Learning can be supervised, semi-supervised or unsupervised. It is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called artificial neural networks.

This paper proposes a system where speech will be generated from the lip movement of a person. By adopting the system, users can be able to get uninterrupted audio. The final objective is to develop a comprehensive system which can regenerate speech by simply reading the lip movements of the speaker. Implementation of such a system would immensely help in regeneration of speech lost in pre-recorded videos or live streams due to various technical errors like audio codec conversion error, transmission delay etc.

## 2. Literature Survey

**A. Deep voice 2: Multi-speaker neural text-to-speech. Advances in neural information processing systems:** Andrew Gibiansky, Sercan Arik, Gregory Diamos, John Miller, Kainan Peng, Wei Ping, Jonathan Raiman, and Yanqi Zhou. It was published on 24 May 2017.

**B. Signal estimation from modified short-time fourier transform :** The Authors are Daniel W. Griffin and Jae S. Lim. It was published on 16 April 1983.

**C. Tcd-timit: An audio-visual corpus of continuous speech. :** Naomi Harte and Eoin Gillen. It was published on 26 February 2015.

**D. Deep residual learning for image recognition.:** Kaiming He, Xiangyu Zhang, Shaoqing Ren, and Jian Sun. It was published on 10 Dec 2015.

## 2.1 Summary of Related Work

The summary of literature survey and their important remark

Table 1: Literature Survey Summary

Date	Title	Author Name	Remarks
Oct 28th 2020	Wav2Lip: Accurately Lip-sync Videos to Any Speech	K R Prajwal, Rudrabha Mukhopadhyay, Vinay P. Namboodiri, C V Jawahar	Syncing lip with the video and making and making proper video
Jul 6th 2020	Learning Individual Speaking Styles for Accurate Lip to Speech Synthesis	K R Prajwal, Rudrabha Mukhopadhyay, Vinay P. Namboodiri, C V Jawahar	Made complete synthetic voice of the user from the video (without the original audio )
Dec 10th 2018	Deep lip reading: a comparison of models and an online application	Triantafyllos Afouras, Joon Son Chung, Andrew Zisserman	Comparison of new model with previously existing models
Aug 9th 2018	The conversation: Deep audio-visual speech enhancement	Triantafyllos Afouras, Joon Son Chung, Andrew Zisserman	They made voice more clear and speech enhancement

### 3. Proposed Work

We aim to develop a model which can facilitate alternatives over the air transmission of speech. This model will read lips via video of the speaker and generate text of the speech. This text will then be transmitted over the air to the receivers end and will be converted to the respective audio format.

#### 3.1. Proposed System Architecture

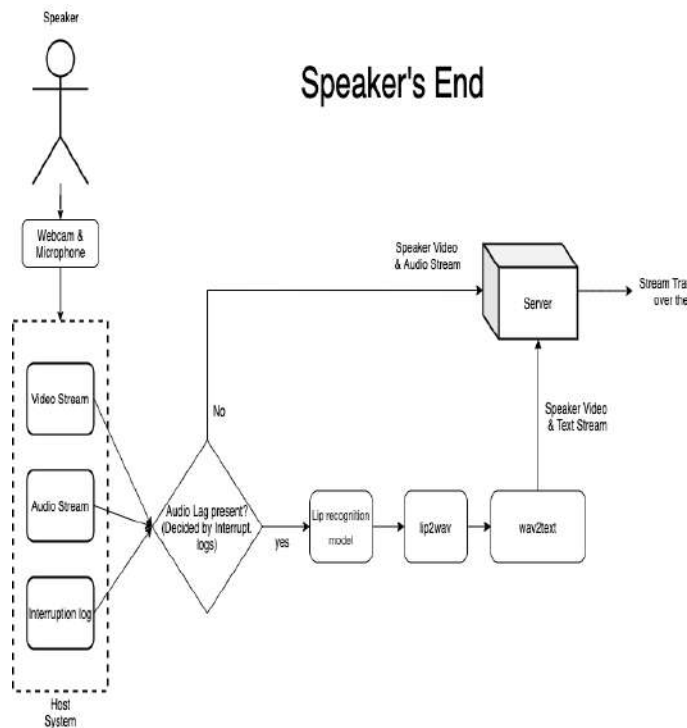


Fig. 1: Proposed System on Speaker's End

#### Modules on Speaker's End:

- **Lip Recognition Model:** Used to detect the exact coordinates where the lips are located in the video stream of the speaker. This process uses computer vision. The model first utilises a haar cascade classifier to read face coordinates in the frame. Once a face has been read in the frame a coordinate set is returned. Using this, the model then starts reading a set of predefined coordinates in the box to determine the specific edges of lips. Once a set of coordinates is returned for the lips being read,

the model then passes these coordinate parameters to the Lip2wav API.

- **Lip2wav:** This API utilises physics. Over here the API performs the operation of tracking lip movement angles and generating a respective sound waveform. It is a highly trained convoluted neural network model processing several neuron features over multiple hidden layers.
- **Wav2txt:** This smart API reads the particular waveform generated by the lip2wav API. It then reads particular features of the waveform to produce respective text. It is a highly trained recurrent neural network model processing each neuron feature in a given waveform order. Eg: gSTT.

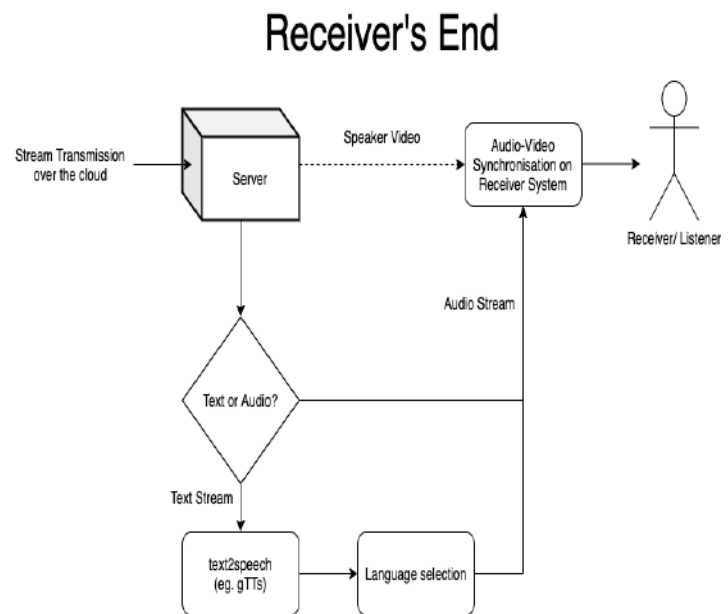


Fig. 2: Proposed System on Receiver's End

#### Modules on Receiver's End:

On the receiver's end, the following constituents process the received stream from the server to present it to the listener. Components:

- **Text2speech (or TTS):** This API processes the input text from the stream and converts it into

respective speech waveform

- **Language selection:** This optional step gives the listener an option to convert the respective speech into a language of their choice. The speech will then be played in the language mode selected.

#### 4. Requirement Analysis

The speaker's and receiver's end are working together in a complementary manner. Both ends need to be time synchronized via the internet for the livestream to work. This system is designed to work on any pre-existing platform without any hindrance of installing system specific modules.

This system will require the user to accept several permissions for access of camera, microphone(optional) and screen. Access to the camera is required for recording and transmitting video footage of the speaker. Screen reading is utilised for reading the video stream on the receiver or listener's end (for the event of a delayed stream or pre-recorded video where file cannot be read).

This system primarily utilizes a camera, as it records or reads the live video feed of the speaker. The speaker is given controls of the quality of feed which they want to transmit; higher the streaming quality, more the processing power required on the system. The system detecting the lip movements will also prompt the user to change lighting conditions, if the model is unable to equalize the image lighting.

The receiver is given the option of choosing the receiving streaming quality, so that receiver is able to manage quality based on resources available on their system.

This system requires a GPU, be it cloud-based or on the user's own system, for the processing of video codecs and merging of the audio-video files.

#### 4.1 Dataset

Development of this application will require datasets of pre-recorded video streams containing faces of individuals who are speaking looking towards the camera from various angles on the X-axis and Y-axis. The dataset will only qualify for being used for training if our face and lip detection models are able to detect respective features for at least 70% of the feed time.

#### 5. Technical Applications

- **Speech impaired individual:** People who are disabled who cannot communicate with others. They communicate using sign language but the drawback is not everyone understands the signs. This tool can be used to communicate easily.
- **Lectures:** During the online lectures there may be an issue of connectivity either from the student or from the professor's side. At such times only the lip movement of the speaker can be seen. In such cases to prevent the discontinuity of the flow this tool can be used.
- **Videographer:** Sometimes there can be background noise while capturing the video and it ruins the quality of the audio and video, this tool can be used to recover the audio for the same.
- **Recovering Vintage footage:** It is hectic work to find the audio of some old videos either because of unavailability or the file is damaged. This can be easily retrieved by using this tool.

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# UI Code Generation using Deep learning

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*Abstract— Implementation of GUI code in any project is a tedious, time-consuming job for front-end developers. It takes most of the time from effective logic building and working on the actual functionality of the code implemented in a project. Web technologies or languages used for a project are very specific to each target runtime system. Hence the work can be repeated several times. In our project, we describe a model trained end-to-end with gradient descent which simultaneously learns to model sequences and Spatio-temporal visual features to generate variable-length strings of tokens from a single GUI image as input. (to generate code from single image input) We are proposing our project model based on Convolutional Neural Network (CNN) and Gated recurrent units (GRU). Using Deep Learning Techniques, the model takes input as a single GUI screenshot, breaks it down into various tokens to give us the ultimate code for it. We can even train the model on different data sets for different effective output codes.*

**Keywords - HTML, Deep Learning, Dataset, Convolution Neural Network, Gated Recurrent Unit..**

## 1. INTRODUCTION

The very first step in creating an application or website is to sketch a wireframe or to make a graphical user interface screenshot. Designers face a challenge when converting their wireframe or GUI into code, this work often consumes time for the developer and therefore increases the cost.

The process of implementing a Graphical User Interface (GUI) mockup created by a designer and converting directly into a website is the responsibility of developers.

Most present-day user-facing software programming applications are Graphical User Interface (GUI) driven, and depend on alluring User Interface (UI). But implementing GUI code is, however, time-consuming and prevents developers from dedicating the majority of their time to implementing the actual functionality and logic of the software they are building. The project is from a single GUI image as input to generate computer UI code, using Deep Learning Techniques. To train the model on different data sets for different effective output codes. We want to build a neural network that will generate HTML/CSS markup that corresponds to a screenshot. When you train the neural network, you give it several screenshots with matching HTML. It learns by predicting all the matching HTML markup tags one by one. When it predicts the next markup tag, it receives the screenshot as well as all the correct markup tags until that point.

## 2. LITERATURE REVIEW

Present-day, front-end developers work so hard for a perfect GUI interface. Avoid the disappointments that front-end engineers and originators face with building precise GUIs, this exposes the need for more effective resolution in web page designing. In this study, an approach has been created to automatically produce the HTML code for the mockup of a website page. It is planned to perceive the parts made in the mock-up images and to encode them as indicated by the website page hierarchy. The deep neural network model including Convolution Neural Networks (CNN) is utilized to train the images present on the data sets.

A recent example is pix2code, an approach based on Convolutional and Recurrent Neural Networks allowing the generation of computer tokens from a single GUI screenshot as input but their Model was trained on a relatively small dataset, hence accuracy was less. Whereas, Sketch2code used classical wireframe techniques and deep learning techniques code was generated by pre-processing and segmentation but it also has moderate results since input is based on the camera of the device.

Another example is DeepCoder, a system able to generate computer programs by leveraging statistical predictions to augment traditional search techniques. The technique improves the runtime of a wide range of IPS baselines by 1-3 orders. Several problems in real online programming challenges that can be solved with a program in this proposed language. But the problems which are solved by the model are relatively simpler than any other competitive exams. As the DSL becomes more complex and the input-output examples become less informative

In this paper, Graves describes how to use an RNN to approximate the probability distribution function (PDF). The paper proposes using LSTM cells in order to have the RNN remember information even in the distant past. With that change, the PDF of the next value of the sequence can then be approximated as a function of the current value of the sequence and the value of the current hidden state of the RNN. The model fails to train on more complicated datasets, due to the more complex and diverse nature of each image.

In Improving pix2code based Bi-directional LSTM by Yanbin Liu, Qidi Hu, Kunxian Shu where model is optimized by Bidirectional LSTM, which allows the output layer to get complete past and future context information for each point in the input sequence. Decoder

exploits the advantages of CNN in feature extraction combined with the advantages of BLSTM in processing sequence problems to automatically generate code. The model's transforming accuracy in the test set has been significantly improved reaching 85%. But since, The model uses Bidirectional LSTM, hence the training time of the model is more.

### **3. PROPOSED WORK**

Generating computer code from a GUI image is the same as getting an English text from a photograph. Long Short-Term Memory(LSTM) is used to predict the sequences. Instead of this, GRU(Gated recurrent unit) can be used in the system. The GRU is like a long short-term memory (LSTM) with a forget gate, but has fewer parameters than LSTM, as it lacks an output gate. The key difference between GRU and LSTM is that GRU has two gates that are reset and update while LSTM has three gates that are input, output, and forget. GRU is less complex than LSTM because it has fewer gates. GRUs have been shown to exhibit better performance on certain smaller and less frequent datasets. Hence, this can increase our accuracy level in the proposed system. GRU is used for processing, analyzing the sequence of training data and Convolutional Neural Network (CNN) which is adequate for image recognition and analyzing segmentation. Both the techniques are trained with a dataset and give us target output code. Hence variable-length strings of tokens from pixel values are produced using these techniques. A full functional automated UI code generation system would be useful in GUI code Generation and Software UI Prototyping

#### **3.1 System Architecture**

A system having deep neural networks can learn latent variables describing objects in an image and their relationships with the corresponding variable-length



textual descriptions. To acquire this, our system is segregated into three sub-models mainly the computer vision model, language model and code generation.



Fig.1 Flowchart of the architecture.

**A. Input:** As an input, a dataset consists of GUI images, and some contextual code data is provided to the system. Data is not combined but is linked with each other and trained on two different models to give the optimum result. Deep neural networks can learn latently.

**B. Computer Vision Model:** Convolutional Neural Network helps to analyze visuals. In the Computer Vision model, CNN is used to perform an unsupervised feature which is learned by mapping an input image to a learned fixed-length vector, thus this acts as an encoder. Pixel values of an image are normalized before giving to CNN, hence the initial output vector is generated.

**C. Language Model:** Gated recurrent units consist of an update gate that decides how much past activation information is required for the next activation step and a reset gate that decides what information to forget. In the Language model, GRU trains on sequences of strings to generate a fixed-length vector. Domain-specific language (DSL) to represent HTML. Due to the high complexity of native web code, domain-specific languages (DSLs) are generally designed. DSL contains the syntax and the semantics which were needed for modeling, and DSL does not use loop statements or control statements, so it greatly shortens the vocabulary. A language model can achieve token level language modeling with a discrete

input by using one hot encoded vector; eliminating the need for word embedding techniques such as word2vec that can bring in expensive computing. Traditional RNN architectures suffer from vanishing and exploding gradients. preventing them from being able to model such relationships between data points spread out in time series. The Long Short-Term Memory(LSTM) neural engineering so as to address this very issue.

#### D. Code Generation:

**Training:** As shown in fig, vectorial represented image and tokenized vectors trained by respective models linked together in vector  $r_t$  and fed into the second GRU model to learn object representation in GUI image. The softmax layer is used to perform multi-class classification. Softmax calculates a probability for every possible output vector that is a DSL token which in this case is HTML/CSS code.

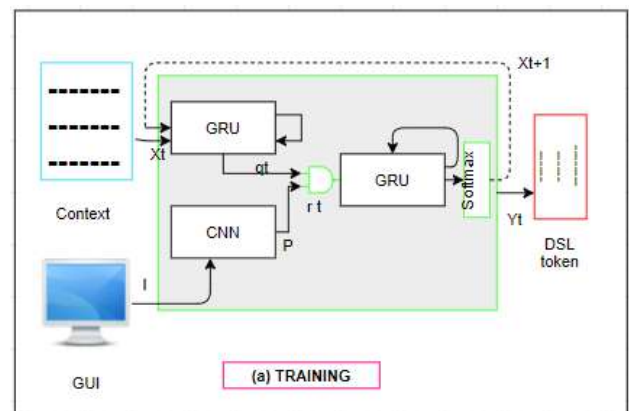


Fig. 2 Proposed system architecture

**Sampling:** During sampling, the input content is updated for each prediction to contain the last predicted token that is  $x_t$  is set to  $x_{t+1}$ , which gets output as  $y_t$ . With  $x_{t+1}$  the expected token, and yet the predicted token. The resulting sequence of DSL tokens is compiled to the desired target language using compiler techniques.

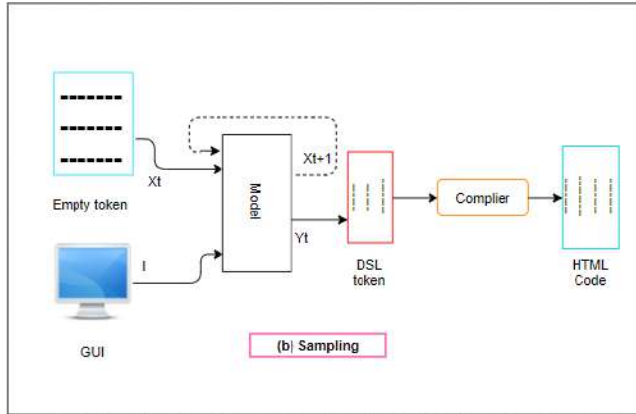


Fig. 4 Proposed system architecture

The model is optimized end-to-end and hence the loss is minimized concerning all the parameters including all layers in the CNN-based vision model and all layers in both GRU-based models.

### 3 REQUIREMENT ANALYSIS:

#### 3.1 Dataset:

For training we are using the same data set which is used by the pix2code model. The column Synthesizable refers to the maximum number of unique GUI configurations that can be synthesized using our stochastic user interface generator. The columns Instances refers to the number of synthesized (GUI screenshot, GUI code) file pairs. The column Samples refers to the number of distinct image-sequence pairs. In fact, training and sampling are done one token at a time by feeding the model with an image and a sequence of tokens obtained with a sliding window of fixed size  $T$ . The total number of training samples thus depends on the total number of tokens written in the DSL files and the size of the sliding window. Our stochastic user interface generator is designed to synthesize GUIs written in our DSL which is then compiled to the desired target language to be rendered.

Dataset type	Synthesizable	Training set		Test set	
		Instances	Samples	Instances	Samples
web-based UI (HTML/CSS)	$31 \times 10^4$	1500	143850	250	24108

Fig.3. Dataset

#### 3.2 Software

Operating systems of Windows 10 along with Python which is a largely used programming language for deep learning models is required. Keras is a python built neural network library which is required to build models in Tensorflow 3.3.0.10. Other libraries like NumPy are required for better computational performance. A stable cloud environment is required such as Google collab.

#### 3.3 Hardware

Training a Deep Learning model requires 2GHz of intel processor, a hard disk drive of 180 GB, and 16 GB RAM. Computers with the graphics card, GPUs can train models faster. But for our proposed system, building models on cloud service is more preferable and what has been used.

### 4. CONCLUSION:

Transforming website mock-ups into mark-up code with less time along with minimal cost has been a crucial point. In this paper, we developed an approach that accepts web page GUI screenshots, processes them, and generates structured HTML code. A dataset comprising pictures, including different mockups of web page structures were utilized to train the GRU model. GRU trains quickly. The accuracy of our model is increased and also does not comprise many limitations and is prepared on an earlier dataset. In fact, one could imagine crawling the World Wide Web of HTML/CSS code associated with screenshots within a few minutes.

More future work and knowledge is needed on further improving the performance of the code generation. There

is a huge need in the industry, in day-to-day life for such applications because every company wants to make their tedious work easy and efficient. This research proposes a system which automatically converts the input image data into html website. A direction for future research is to implement the system and check performance by applying proposed approaches to various benchmark data sets. Comparing performance of different classification methods to find the best one for our proposed code generation could be another future research direction. However, by increasing the data set and the training period we can increase the accuracy of our model for faster and accurate output. Introducing concept of transformer to replace it with RNN, LSTM is a area of great research for more effective model.

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