
PCE
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Journal of
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DEC 2020

COMMUNITY TALK

The technical journal team of Dec 2020 would like to congratulate students and staff members for their contribution of sincere efforts and hard work in departmental journal. We would like to thank our Principal Dr. S. M. Joshi and HoD of Electronics Department Prof. R. H. Khade for giving us this opportunity and freedom to express our views and ideas on departmental journal. We would like to extend our gratitude to the journal team who have worked tremendously hard to put everything together which made it possible for us to print the Dec 2020 issue.

The journal includes " Microstrip Patch Antenna" where our students made design techniques, fabrication and measurement result of rectangular patch and circular patch antenna for 5.6GHz using HFSS Software and compared the results of these two antenna with the simulated result. "Advances Vehicle Security System with Anti-theft Accident Notification" where A system consisting of the GPS and GSM module is developed to locate and inform the owner about the status of the vehicle. "Vehicle Movement Based Street Light Controller" in which our students have described the LED lights are used for street arrangement, the Photo diodes and IR sensors are used to sense vehicle moments. In the micro controller the control logic is implemented to control lights based on vehicles and pedestrian moments with bright and dim mode of operation and to switch off lights during no vehicles and pedestrian. "Robotic Arm Using Suction to lift Object" In this students build a Robotic Arm which will pick up different objects irrespective of their shape, using suction principle by a sucker present on the arm. This is small briefing of our journal for this issue. We greatly appreciate the contribution from all our writers, without which this would not have been possible.

Readers, we really hope you find this worth enough to share it with your friends. Please send us your valuable feedback at pce.etrx.journal@gmail.com and help us for improvement !!!

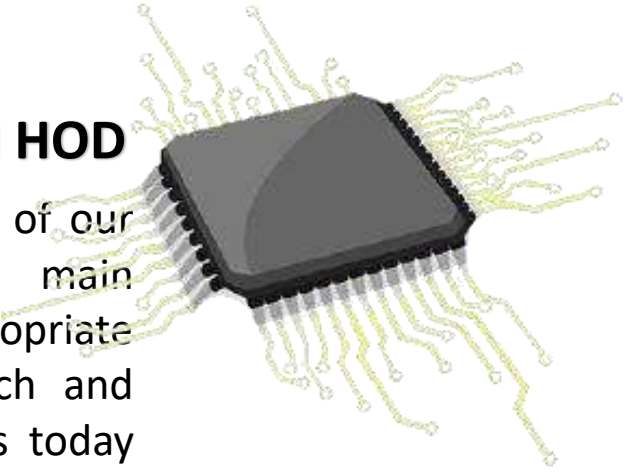
Best Regards,
Managing Editor Board

MESSAGE FROM PRINCIPAL

I am happy to know that Department of Electronics Engineering is bringing out its Dec 2020 issue of Departmental Journal. The journal covers all major technical areas in Electronics and reflects the latest trends in those. The product is a synergetic output of team work involving teachers and students. Students who have given technical papers for departmental journal encompasses innovations and improvisations based on their projects. I express my compliments to Head of the Department of Electronics, editorial / reviewer board and publication team for their commitment and effort for bringing out this journal.

Best Wishes,
Dr. Sandeep M. Joshi

MESSAGE FROM HOD



It is my privilege to present Dec 2020 issue of our journal of Electronics department. The main endeavor of this journal is to create appropriate environment that stimulates vision, research and growth in the area of Electronics. Engineers today have propelled the world to a new era of technological advancement. Blending curiosity with scientific temperament among students is the need of the hour. Hence we encourage our students to publish papers on their project work. Many students have contributed their ideas by means of papers. In this issue we have accommodated 9 technical papers. I thank my beloved students for writing good quality papers for this journal. Finally, I express my sincere gratitude to our editorial / reviewer board, publication team for their continued support and invaluable contributions and suggestions for the advancement of the journal. I hope you will enjoy reading this issue and we welcome your feedback on any aspect of our journal.

Best Regards,
Prof. R. H. Khade

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Vehicle Movement Based Street Light Controller

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Abstract: - **The proposed work is to have two controls like, one is to switch of lights during no vehicle moments in streets and automatically switch it on when vehicles arrive and the other modes are to give less intensity light for pedestrian and to switch on bright mode during vehicle moments at sides on the roads. In this work the LED lights are used for street arrangement, the Photo diodes and IR sensors are used to sense vehicle moments. The control signals of sensors have been fed to micro controller 8051. In the micro controller the control logic is implemented to control lights based on vehicles and pedestrian moments with bright and dim mode of operation and to switch off lights during no vehicles and pedestrian. From the proposed method the overall energy being utilized now-a-days for lighting can be minimized.**

Keywords:- ***PIC Microcontroller, LED,IR Sensor,LDR,Solar Panel***

I. INTRODUCTION

Vehicle movement based street light system using pic micro controller is a system, which turned on or off the street lights after sensing the vehicle movement in a street. Basically, this an energy conservation system which saves the energy when there is no any vehicle movement in a street. Now days if we see in our vicinity areas, then there are so many lights which are always in turned on condition (day and night). Besides this, turned on/off the street light on daily bases also a big problem. So, for resolving this problem and energy conversation here we have designed a system that is called a vehicle movement based street light system using pic micro controller with the help of PIC (16F887A) micro controller, transformer, voltage regulator and **IR sensors.**

II. METHODOLOGY

The proposed work focuses on automatic reduces intensity of the lights for the parts of the streets having no motion detection and increases intensity of the light for the parts of streets where motion is detected when it is dark. In the intension to efficient energy consumption solar energy is used instead of electrical energy. In this the LED lights are used to increase the lifetime of lamp.

III. PRESENT SYSTEM

The automatic streetlight control system operates on 12V DC supply. The automatic streetlight controller has a photo-conductive device whose resistance changes proportional to the extent of illumination, which switches ON or OFF the LE D with the use of transistor a switch. Light dependent resistor, a photo conductive device has been used as the transducer to convert light energy into electrical energy. The central dogma of the circuit is that the change in voltage drop across the light dependent resistor on illumination or darkness switches the transistor between cut-off region or saturation region and switches OFF or ON the LED. As we know property of LDR that during the time of day resistance is low therefore voltage at the inverting input (IE pin 2) is higher than the voltage at the non-inverting input (pin3) hence the output at the pin6 is low so the transistor goes into the cut off state which means LED or bulb will not glow.

IV. WORKING

A dynamic control strategy is given for the smart road control project. As per the proposed arrangement indicates, all the road lights continuously glow for a few moments and switches off. At the point when a vehicle is moving by, a block of road lights switch ON and as the vehicle moves ahead, the following block of lights turns ON whereas the preceding light turn OFF. The present HID lights are more costly then LED s. Due to this reason, the high intensity discharge lights are replaced by light emitting diodes. The power utilization and cost can be saved in the present field of utilization of electrical gadgets and their advancements. The

road lighting systems are becoming complex systems with proper energy conservation techniques due to the fast development of industries and urban areas. For controlling the complex road lighting system, the advancement techniques have been used which includes infrared sensors to differentiate the movement of vehicle after which the lights switch ON. As the vehicle passes away the sensors, the road lights, which were in switched ON condition will turn OFF (Minimum Light Intensity) and the preceding lights will switched ON (Maximum Light Intensity) as shown in flowchart below .

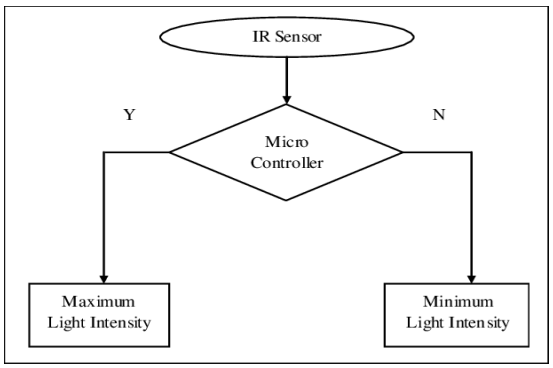


Fig. 1. Flow chart for detection of Vehicle.

The PIC micro controller PIC16F877A is one of the most renowned micro controllers in the industry. This controller is very convenient to use, the coding or programming of this controller is also easier. One of the main advantages is that it can be write-erase as many times as possible because it uses FLASH memory technology. It has a total number of 40 pins and there are 33 pins for input and outpu t. As it has been mentioned before, there are 40 p ins of this micro controller IC. It consists of two 8 bit and one 16-bit timer. Capture and compare modules, serial ports, parallel ports and five input/output ports are also present in it.

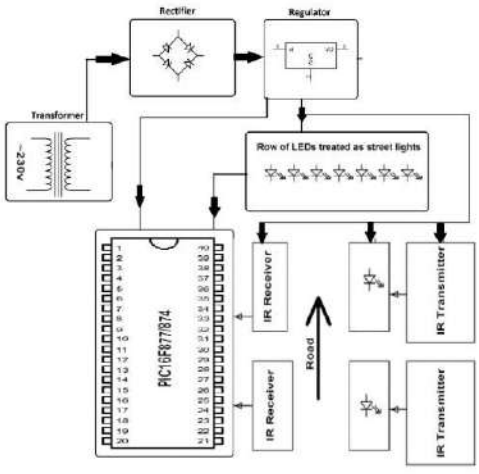


Fig. 2 .Proposed system architecture.

V. EVALUATION METRICS

Measure Light Intensity using Light Dependent Resistor (LDR). Luminous intensity, the quantity of visible light that is emitted in unit time per unit solid angle. The unit for the quantity of light flowing from a source in any one second (the luminous power, or luminous flux) is called the lumen. The lumen is evaluated with reference to visual sensation..

The resistance of the Light Dependent Resistor (LDR) varies according to the amount of light that falls on it. The relationship between the resistance R_L and light intensity Lux for a typical LDR is RL=500/Lux…(1)

If the LDR connected to 5V through a 3.3K resistor, using the voltage divider rule, the output voltage of the LDR is Vo=5×RL/RL+3.3…(2)

Substituting R_L from equation 1 into equation 2, we obtain the light intensity

Lux=2500/Vo−500/3.3…(3)

For a low cost LDR, at the same light intensity, the part to part variation in resistance can be as high as 50%. Therefore, such a low cost LDR is seldom used for measuring light intensity but more for light presence/absence detection.

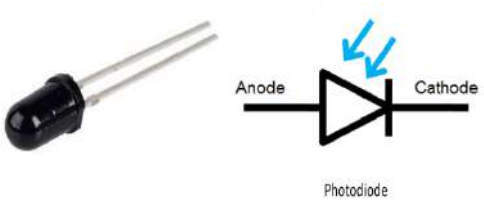
VI. SENSORS AND CONTROLLER

PIC 16F877A :The high performance of the PIC micro devices can be attributed to a number of architectural features commonly found in RISC microprocessors. These include Harvard architecture, Long Word Instructions, Single Word Instructions, Single Cycle Instructions, Instruction Pipelining, Reduced Instruction Set, Register File Architecture , Orthogonal (Symmetric) Instructions.General purpose I/O pins can be considered the simplest of peripherals.

LDR: An LDR or light dependent resistor is also known as photo resistor, photocell, photoconductor. It is a one type of resistor whose resistance varies depending on the amount of light falling on its surface. When the light falls on the resistor, then the resistance changes. These resistors are often used in many circuits where it

is required to sense the presence of light. These resistors have a variety of functions and resistance. For instance, when the LDR is in darkness, then it can be used to turn ON a light or to turn OFF a light when it is in the light.

IR Reciever:A photodiode is one type of light detector, used to convert the light into current or voltage based on the mode of operation of the device. It comprises of optical filters, built-in lenses and also surface areas. These diodes have a slow response time when the surface area of the photodiode increases. Photodiodes are alike to regular semiconductor diodes, but that they may be either visible to let light reach the delicate part of the device. Several diodes intended for use exactly as a photodiode will also use a PIN junction somewhat than the usual PN junction.



Photodiode

VII. Applications

This vehicle movement based street light system using pic microcontroller could be used in streets for controlling the street light. This system could be used in shopping malls, universities and hospitals corridor for controlling their respective lights. This system could be also used in homes for controlling the lights of store or vehicle garage. By using this system, the customer can save the time, light energy and decrease the monthly bill. This system less costly, less installation and maintenance cost and more efficient as compared to the others system

.

VIII. RESULTS

Vehicle movement based street light system using pic micro controller is a system, which will increase or decrease intensity of the street lights after sensing the vehicle movement in a street. Basically, this an energy conservation system which saves the energy when there is no any vehicle movement in a street. Now days if we see in our vicinity areas, then there are so many lights which are always in turned on condition (day and night). Besides this, turned on/off the street light on daily bases also a big problem. So many streets lights could be turned on/off automatically by using this single system. In other words, this system turned on the lights when any vehicle passes through the street and turned off after passing them. By implementation of an automatic street light control system, it efficiently turns street lamps ON/OFF. By this energy consumption and cost are drastically reduced.

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to our HOD Dr. R.H.Khade, our project guide Prof. .Ujwal Harode and our project coordinator Prof.Ujwal Harode who have significantly guided and encouraged us to proceed with this newly proposed idea. We would also like to thank our principal Dr. Sandeep Joshi for providing us with all the facilities and environment to bring out the best of our capabilities.

REFERENCES

[1] International Journal of Innovative Research in Computer and Communication Engineering (An ISO 3297: 2007 Certified Organization) Website: www.ijircce.com Vol. 5, Issue 3, March 2017 Smart Street Light Using Arduino Uno Microcontroller

[2]. S. Suganya, R. Sinduja, T. Sowmiya& S. Senthilkumar, Street light glow on detecting vehicle movement using sensor

[3]. K.Santha Sheela,S.Padmadevi, Survey on Street Lighting System Based On Vehicle Movements

[4]. Srikanth M, Sudhakar K N,ZigBee Based Remote Control Automatic Street Light System

[5] M.Abhishek, Syed ajram shah, K.Chetan,K,Arun Kumar, Design and implementation of traffic flow based street light control system with effective utilization of solar energy, International journal of Science Engineering and Advance Technology, IJSEAT, Vol 3, Issue.

Vehicle Speed Limiter Using Microcontroller and RF Module

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***Abstract*— The speed of the vehicle and the limits are displayed on an LCD. Thus, this system greatly helps in curbing the speed of over speeding vehicles ensuring the safety of vehicles on accident-prone roadways. The speed of the vehicle can be incremented/decremented manually with the help of pushbuttons. Vehicle Speed Limit Controller Project is a great solution to this problem as it not only provides speed limitations, it also implements it through a controlling mechanism. The project works with RF communication between the speed signpost and the vehicle controller system. Whenever a vehicle comes in a range of the RF speed signpost, the signpost transmits the speed limit for that particular road to the vehicle system. The vehicle control system receives this signal through an RF receiver and further perceived by the microcontroller.**

***Keywords*— vehicle speed limiter, Microcontroller, Transmitter, Receiver, LCD Display.**

I. INTRODUCTION

Nowadays road facilities are a major concern in the developed world. Recent studies show that one-third of the number of fatal or serious accidents are associated with excessive or inappropriate speed, as well as changes in the roadway (like the presence of road-work or unexpected obstacles). Reduction of the number of accidents and mitigation of their consequences is a big concern for traffic authorities, the automotive industry, and transport research groups. One important line of action consists of the use of advanced driver assistance systems, which are acoustic, hectic, or visual signals produced by the vehicle itself to communicate to the driver the possibility of a collision. These systems are somewhat available in commercial vehicles today, and future trends indicate that higher safety will be achieved by automatic driving controls and a growing number of sensors both on the road infrastructure and the vehicle itself. A prime example of driver assistance systems is cruise control, which has the capability of maintaining a constant user preset speed and its evolution, the adaptive cruise control (ACC), which adds to CC the capability of keeping a safe distance from the preceding vehicle. A drawback of these systems is that they are not independently capable of distinguishing between straight and curved parts of the road, where the speed has to be lowered to avoid accidents.

However, curve Warning systems (CWS) have been recently developed that use a combination of global positioning systems (GPS) and digital maps obtained from a Geographical Information System (GIS), to assess threat levels for a driver approaching a curve too quickly, Likewise, intelligent speed assistance (ISA) systems warn the driver when the vehicle's velocity is inappropriate, using GPS in combination with a digital road map containing information about the speed limits However useful, these systems are inoperative in case of unexpected road circumstances (like roadwork, road diversions, accidents, etc.), which would need the use of dynamically generated digital maps. This research aims to maintain the speed control over the restricted area like (schools, hospitals, colleges, etc.,) by using GPS technology.

II. PROPOSED SYSTEM ARCHITECTURE

The proposed system offers a limiting of the speed of the vehicle movement in the streets, i.e. the in the public areas the vehicles with the higher speeds will be detected, Signals from the RF transmitter will be sent to the vehicles and different speeds can be managed using the push buttons attached in the control system. The Radiofrequency signals once sent to the Receiver end, RF Receiver, the automation process will start and the message will be displayed Limiting the speed of the vehicle and thus the automation process will start and speed will be limited until the area the vehicle receives the RF signal. ATMega328P is one of the most renowned microcontrollers in the industry. This controller is very convenient to use, the coding or programming of this controller is also easier. One of

the main advantages is that it can be write-erase as many times as possible because it uses FLASH memory technology.

III. TRANSMITTER

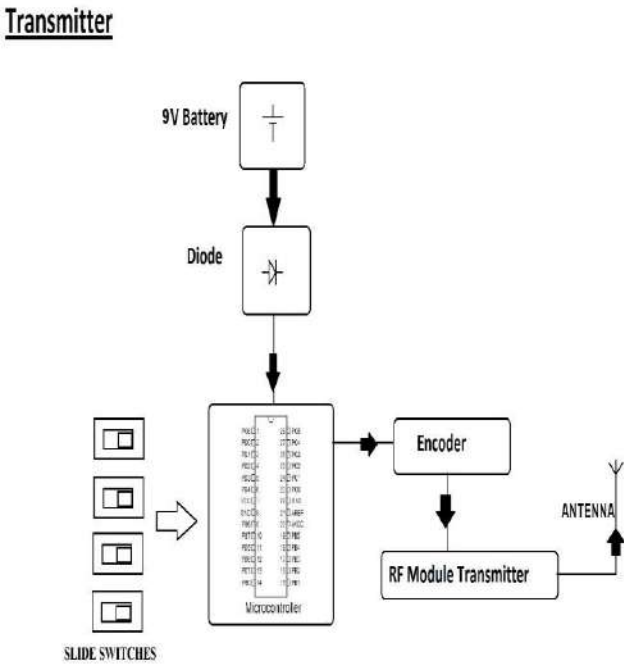

Figure 1: Block Diagram Of Transmitter

IV. TRANSMITTER SIDE SOFTWARE

The programming wireless transmitter unit involves programming the Arduino for wireless communication using radio module sand transmitting speed limit values on the RF link periodically. Following is the flow chart for the transmitter unit as per the final plan. RF module is interfaced with Arduino using hardware serial port. A specific coded structure for the message is used to eliminate noise from the same frequency.

V. TRANSMITTER PROCESS FLOW

1.Start
2.Configure pins
3.Initialize RF link
4.Transmit value on RF link
5. Wait for 1 sec.
6. Go back to step 4

VI. RECEIVER

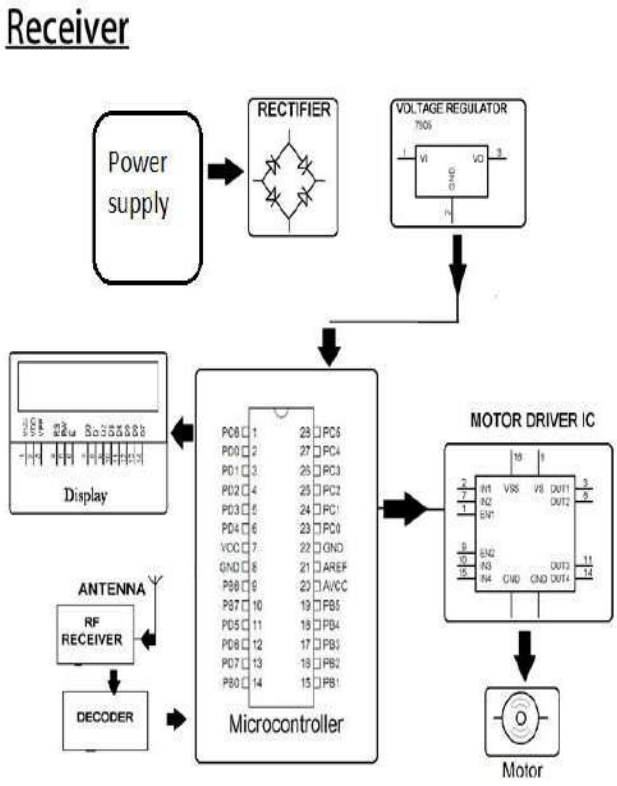

Figure 2: Block Diagram of Receiver

VII. RECEIVER SIDE SOFTWARE

The programming wireless receiver unit involves programming the Arduino for wireless communication using radio modules and receiving speed limit values on RF links when available.
These speed limit values are then converted to required servo angle and servo motion is brought about to implement speed limit. Following is the flow chart for the receiver unit as per the final plan. RF module is interfaced with Arduino using hardware serial port. The LCD interface is programmed to display process flow information.

VIII. RECEIVER PROCESS FLOW

1.Start
2.Configure serial link
3.Initialize RF link
4.Monitor data on RF link
5.Monitor current speed of the vehicle
6.If data available on RF link then convert that value to required servo angle
7.Implement speed limit
8.Display info on LCD
9. Go back to step 4

IX. APPLICATIONS

1. This vehicle speed limiter can be used at the traffic signals.
2. This system could be used in shopping malls, universities, and hospitals corridor for controlling the speed of Vehicles.
3. This system could be also used in government offices and high-security areas.
4. By using this system, the violation of the speed limit rules can also be measured.
5. This system less costly, less installation and maintenance cost and more efficient as compared to the other system

X. WORKING PRINCIPLE

The transmitter sends the speed limit of the particular lane entered by the vehicle and also gives alerts like "road works", "steep slopes", "school zone" in the form of acoustical messages and also in LCD. The receiver unit placed in the vehicle receives the messages and sends them to the microcontroller. When the speed of the vehicle nears the speed limit it displays the warning and if exceeds the limit, the microcontroller records the violated speed and time. The LCDs the lane speed limit and shows the number of times, speed was violated. A GSM module sends messages to the nearest traffic personnel immediately after a violation occurs. An authenticated device is also provided, which can be operated only by the traffic police in which he can retrieve the data stored at any time. An increase in the count of violation increases the penalty amount which can be collected in toll gates located nearby.

S.P. Bunker, et al [2] described a real-time online safety prototype that controls the vehicle speed under driver fatigue. The purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of the vehicle to avoid accidents. The main components of the system consist of several real-time sensors like gas, eye blink, alcohol, fuel, impact sensors, and a software interface with GPS and Google Maps APIs for location.

In Jyotika Kapur et al [5] dealing with India, there has been an increase of 17.4% in the total number of road accidents during the period of 2011-2012. This percentage has raised eyebrows and caught the attention of many to curb the growing rate. It is found that 80% of the time it is the fault of the driver. This can be avoided if we could devise a mechanism that could alert the driver about the coming jeopardy. This can be achieved by monitoring the distance between two cars using Bluetooth. If the distance decreases than the one specified, the driver would be signaled, and according to the signal, necessary actions will be taken by the mini gadget present in the car. This paper proposes that with the help of Bluetooth technology, we can keep track of the speed of the car and take appropriate actions to avoid accidents.

XI. HARDWARE AND SPECIFICATION

- ATmega328P AVR MC
- DC Motor
- Motor Driver IC
- Voltage Regulator IC
- IC Socket
- LCD’s
- Crystal Oscillator
- Resistors
- Capacitors
- Transistors
- Cables & Connectors
- Diodes
- PCB
- LED’s
- Transformer/Adapter
- Push Button
- Breadboard

- Radio Frequency Module (Rx, Tx)

XII. RESULT/OUTPUT

In this report, the study of different domain techniques is presented. Vehicle speed limits using a microcontroller and RF module, which limits the speed of the vehicle in the high security and public places. This a traffic and security efficient system that requires less power as well. Nowadays if we see in our vicinity areas, then there are so many Vehicles that move on very high speeds in the public areas. Besides this, the speed limiting boards, speed breakers, and traffic signals were also ignored. So to get the solution for all the drawbacks, this system introduced so that the streets, Hospitals, Schools, Colleges, and High-security area can be regulated properly.

ACKNOWLEDGEMENT

We would like to express our sincere gratitude towards our guide**, Prof. Meera Kharat,** for the help, guidance, and encouragement, she provided during the special topic seminar. This work would have not been possible without her valuable time, patience, and motivation. It was a great learning and an honor to be her student.

We are indebted to the entire team in the Department of Electronics Engineering. They supported me with scientific guidance, advice, and encouragement, they were always helpful and enthusiastic and this inspired me in my work.

We take the privilege to express my sincere thanks to **Dr. Sandeep Joshi,** our principal for providing encouragement and support throughout my work.

REFERENCES

[1] Ankita Mishra, Jyoti Solanki "Design of RF-based speed control system for vehicles," International Journal of Advanced Research in Computer and Communication Engineering, Vol. 1, No 8, 2012.

[2] Vinod Rao, Saketh Kuma, "Smart Zone-Based Vehicle Speed Control Using RF and Obstacle Detection and Accident Prevention," International Journal of Emerging Technology and Advanced Engineering, Vol.4, No.3, 2014.

[3] Gummarekula Sattibabu, Satyanarayan, "Automatic Vehicle Speed Control With Wireless In-Vehicle Road Sign Delivery System Using ARM 7," International Journal Of Technology Enhancements And Emerging Engineering Research, Vol 2, No. 8, 2014.

[4] Deepa B Chavan, Abdul Rahim Makandar, "Automatic Vehicle Speed Reduction System Using Rf Technology," International Journal of Engineering Research and Applications, Vol.4, No.4, 2014.

[5] Jyothi Kameswari, Satwik, "A Design Model for Automatic Vehicle Speed Controller," International Journal of Computer Applications, Vol.35, No.9, 2011.

[6] Pérez J., González C., Milanés V., Onieva E., Godoy J., de Pedro T. Modularity, Adaptability and Evolution in the AUTOPIA Architecture for Control of Autonomous Vehicles. Proceedings of the IEEE International Conference on Mechatronics (ICM 2009); Málaga, Spain. April 14–17, 2009.

VOICE CONTROL DRONE

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Abstract—**A quadcopter can achieve vertical flight in a stable manner and can be used to monitor or collect data in a specific region such as loading a mass. Technological advances have reduced the cost and increase the performance of the low power microcontrollers that allowed the general public to develop their own Quadcopter a.k.a Drone. The goal of this project is to build, modify and improve an existing quadcopter kit to obtain stable flight & gather and store GPS data and perform autocommands using voice controlled such as landing. This project uses Raspberry Pi Zero, Raspberry Camera, APM Flight controller, The Drone Mechanism, Light Sensors, Barometer, Distance Sensors, 1.8km Long Range Serial Communication Module.**

Keywords: - Raspberry Pi Zero, APM Flight controller, Alexa

I. INTRODUCTION

A Drone or Quadcopter is a vehicle have large potential for performing tasks that are dangerous or very costly for humans. Ex are the inspection of high structures, humanitarian purposes or search and rescue missions. One specific type of drone is becoming increasingly more popular lately. When visiting large events or parties, professional quadcopters can be seen that are used to capture video for promotional or surveillance p purposes. From 2011 onwards, companies such as Parrot, DJI and 3DR began to attach cameras to drones and aerial photography as we know it today was born.

Now, it's not only high-definition cameras that can be attached to drones. They can also carry thermal Imaging units; sensors and all sorts of tools now being used in all sorts of industries.

But our focus is on photography. Camera drones are no being used to capture cinematic shots on Hollywood movie sets and selfies in back yards. Professional filmmakers and hobbyists have embraced the technology and the sky, it seems, is the limit.

II. METHODOLOGY

Aerial inspections of a property using a drone has real practical applications in the valuation of real estate and need to be addressed in the scope of work. Aerial drones give easy access too hard to reach places and can accent details that can't be displayed from ground-based shots. Not only can they show more of the property, they are also relatively inexpensive to use and can contribute to a safe working environment. Drones are enhancing appraiser's ability to inspect a The depth of the inspection is the appraiser's responsibility, and how much it is explained can vary from a minimal statement to providing a more detailed analysis. Most appraisals typically only state the minimum unless there was a limited or restricted inspection of some kind. The same options are reasonable if including a drone.

III. PRESENT SYSTEM

Quadcopters are uninhabited or unmanned aerial vehicles which are widely being used in modern aerospace industry. The wide area of operation and high maneuverability makes quadcopter even more useful. Quadcopters are used in scientific research, geological survey, aerial photography, weather sensing, spying, and reconnaissance.

Quadcopters are not limited to the above specified practices. They are light in weight, maneuverable, easy to build, easy to deploy, portable, and can be extended and optimized as per the specific task

IV. WORKING

On the Raspberry Pi, we used the open source node.JS library, node-bebop to control the Bebop drone. We initially built the library to include a limited set of commands: take off and land. Then also used two network cards to create two separate networks:

- Hotspot - one network adapter acting as the hotspot to connect to the drone, allowing the Pi to act as the bridge to the drone's network
- Internet - one for the internet to handle the connection to AWS SQS

On the Raspberry Pi itself, we ran two applications:

- System D - to manage what processes are started to connect to different networks
- Hostapd - open source software that lets you turn a Wi-Fi adapter into a hotspot

We then used the Echo Dot for voice input by creating a skill and a Lambda Function. And then rounded out the solution by using AWS SQS to create a queue of messages that the Pi could poll and the drone could react to.

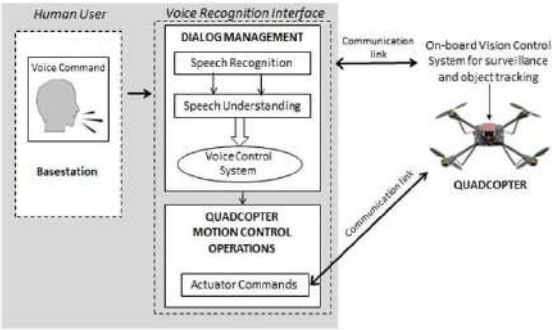

Fig. 1. Block Diagram of Voice Control Drone.

Unmanned Aerial Vehicles have gained well known attention in recent years for a numerous application such as military, civilian surveillance operations as well as search and rescue missions. The UAVs are not controlled by professional pilots and users have less aviation experience. Therefore, it seems to be purposeful to simplify the process of aircraft controlling. The objective is to design, fabricate and implement an unmanned aerial vehicle which is controlled by means of voice recognition. In the proposed system, voice commands are given to the quadcopter to control it autonomously. This system is navigated by the voice input. The control system responds to the voice input by voice recognition process and corresponding algorithms make the motors to run at specified speeds which controls the direction of the quadcopter

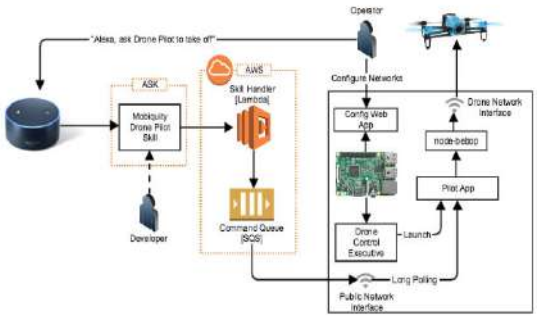

Fig. 2. Proposed system architecture.

V. EVALUATION METRICS

Quadcopter, Ground Control and Tracked animal. All of these are equally important to the overall goal of the design. The most important aspect of the design is how the signal from the tracked animal reaches the end-user and all components that support this process. In short: the signal from VHF collar propagates through space and reaches the VHF directional antenna; if the signal is in the main lobe of the antenna, where it is the strongest, the receiver can pick it up and demodulate the audio carried by the signal; afterwards using the 'Audio Out' port on the receiver we modulate the audio onto 5.8GHz carrier (in 5.8GHz transmitter), which then propagates through space and reaches the 5.8GHz receiver, which then demodulates the signal and the audio can be heard in the headphones by the end user. The VHF link between the animal and the quadcopter was chosen due to great propagation characteristics and inexpensive collar trackers. The 5.8GHz link between the quadcopter and the user was chosen due to it being least susceptible to interference from other system components.

VI. RASPBERRY PI

Raspberry Pi: On the Raspberry Pi, we used the open source node.JS library, node-bebop to control the Bebop drone. We initially built the library to include a limited set of commands: take off and land. Then also used two network cards to create two separate networks

The network challenge proved a bit more difficult since the connection to the internet could vary, based on location. For that, we created two different network states, with variations on the hotspot state. Depending on the network state, at certain times you want the Pi to be a hotspot so that you can connect to it and configure the known networks. In normal operations, you want the Pi to connect to two different networks. we achieved this by using System-D to manage what processes were started to connect to different networks.

Altogether, there ended up being four different Pi boot scenarios to account for:

1. Boot up in the presence of no known Wi-Fi environment
2. Boot up in the presence of 1 known Wi-Fi environment with internet access but no drone network
3. Boot up in the presence of a known drone network but no known internet-accessible Wi-Fi
4. Boot up in the presence of a known drone network and known internet-accessible Wi-Fi

If the Pi finds itself in any of the first three states, it will launch a hotspot, "DroneConfigNet" to which you can

connect via a laptop or phone. From there, you can configure the public network and your drone's private network. If the Pi finds itself in state four, it will start the Drone Pilot Control software, which listens for a command from Echo (via Lambda and SQS).

VII. APPLICATIONS

As drones get increasingly popular, the Federal Aviation Administration (FAA) creates more drone operation rules. Some of these rules include imposing minimum age restrictions of the driver of the drone, maximum flying height, drone weight, drone speed, and the times of day that a drone can be flown. They have also made attempts to require drone owners to register their drones. It is expected that there will be millions of drones in the sky by 2020 and with that, drone traffic needs to be managed. To some, drones can be seen as annoying and an invasion of privacy; delivery drones can be seen as an opportunity for theft. These thieves pose a risk for drones to be shot down and tampered with; how can we prevent drones from being shot down? As of right now, there is no mainstream technology available to prevent this. However, Amazon Prime Air drones will deploy landing cushions, send information back to the distribution center and play a loud signal when shot down.

VIII. RESULTS

To get the drone to fly, you invoke the skill, which connects to a Lambda function. The function takes the intents and maps them to a predefined command set. Version one supports take-off, land, rotate left, and rotate right. Then the command is queued into the SQS queue. The Pi does a long poll (makes a connection to SQS and waits 15 seconds, then reconnects and waits again). When it receives a command, it issues that command to the Drone Pilot Control software, which then gets the drone to respond by either taking off, landing, rotating left, or rotating right.

It sounds complicated but an example of the end result is:

"Alexa, tell drone to take off" - and the drone takes off!

So, in the end, Dom met the challenge and built a voice-enabled drone. But just as he wanted to make the original challenge more difficult by limiting his budget, he thinks he can make the drone even better and has several enhancements queued up for the future, including:

- Enabling the drone to go up and down
- Registering the Pi so that there are separate queues for each Raspberry Pi / drone - think drone army!

Putting AVS directly on the Pi, and adding a microphone and speaker, so that the complete setup is only two devices (Pi and Echo)

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to our HOD Dr. R.H.Khade, our project guide Prof. Seema Mishra and our project coordinator Prof. Seema Mishra who have significantly guided and encouraged us to proceed with this newly proposed idea. We would also like to thank our principal Dr. Sandeep Joshi for providing us with all the facilities and environment to bring out the best of our capabilities.

REFERENCES

Nimal, R.J.G.R., Hussain, J.H., Effect of deep cryogenic treatment on EN24 steel, International Journal of Pure and Applied Mathematics, V-116, I-17 Special Issue, PP-113-116, 2017 2.

Parameswari, D., Khanna, V., Deploying lamport clocks and linked lists, International Journal of Pharmacy and Technology, V-8, I-3, PP-17039- 17044, 2016 3.

Parameswari, D., Khanna, V., Case for massive multiplayer online role-playing games, International Journal of Pharmacy and Technology, V-8, I-3, PP-17404-17409, 2016 4.

Pavithra, J., Peter, M., Gowtham Ashirwad, K., A study on business process in IT and systems through extranet, International Journal of Pure and Applied Mathematics, V-116, I-19 Special Issue, PP-571-576, 2017 7.

Pavithra, J., Ramamurthy, R., Satya Pira Das, S., A report on evaluating the effectiveness of working capital management in googol soft technologies, Chennai, International Journal of Pure and Applied Mathematics, V-116, I-14 Special Issue, PP-129-132, 2017 8.

DEFENDER ROBOT

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Abstract— **The project presents a modern approach for surveillance at remote and border areas using multifunctional robot based on raspberry pi in defense and military applications. The robot works both as autonomous and manually controlled using wifi as a communication medium. An autonomous operation is controlled by ultrasonic sensor and infrared sensors. Manual operation is controlled by remote/ cell phones . The present work designs a robot, constructed with the help of chain wheels and connected to motors, where movement of the robot can be controlled in all directions An essential requirement of this situation is a robot which automatically detects trespasser in the border and reports nearby board security control unit. This system also enhances the use of renewable resources of energy by equipping with solar panels**.

Keywords—**RaspberryPi, Surveillance, wifi, Ultrasonic Sensor, Control Unit.**

I. INTRODUCTION

The robot is basically electro-mechanical machine or device that is controlled either by computer program or with electronic circuit to perform a variety of physical tasks. With the gradual development in technology scientists come up with new ideas and inventions of robots. Robots can be classified into different types based on their environment and mechanism of interaction such as mobile and remote. This project's main functionality is to deal with tough situations where human beings cannot handle situations like darkness, entering narrow and small places etc. Such hostile situation is occurring day by day in different parts of the world through terrorist attack or in natural catastrophes. This designed system is connected to a remote computer wirelessly through which the whole controlling of the system response is done. The proposed system consists of two units mainly a robotic unit and remotely control unit. The robotic unit is consisting of the webcam, sensors and the heart of the project, raspberry pi along with the PCB containing motor driven IC and voltage regulator circuitry.

A. SIGNIFICANCE

The important objectives of using Hologram Projectors are:
1. Military Application.
2. Saving of manpower.
3. Ability to work in any hostile environment.

B. SCOPE

Robots in the use of surveillance is emerging because of their miniature size allowing them to enter tunnels and mines. With growing technology, we can combine its miniature property with wide top view providing technology like drone. Advanced high speed internet connection can be exploited to get complete view under the area of surveillance. Landmine detection and other nonliving security threats detection should be incorporated without having to deal with software hardware tradeoff. With developing technologies, decreasing memory size of robot and increasing storing capacity is to be easier. This can support the posture change of robots allowing them to hide behind any available bushes. This can support ability of robot to transform from firm and rocky land surface, hot dry sandy place like dessert or water based mode or in drone. Clearly, there is significant scope for future development with increased internet properties, internet capabilities and reduced component size.

II.METHODOLOGY

The technology is currently evolving at a rapid rate and people design many things every day. The robot works in three steps, each of which is handled by a separate component:

1. Data Sensing
2. Monitoring Data
3. Response

- Data Sensing: This step includes the sensing of surrounding data with the help of ultrasonic sensor and night vision camera Ultrasonic sensors are used to detect the presence of enemy and capture it using camera. It continuously calculates distance and this data is sent to the remote area.

- Monitoring Data: Remote area consists of computer that continuously monitors the data received from data sensing module. Authorized person can watch the live streaming on computer using night vision camera.

- Response: Raspberry pi sends wireless command which is authorized person on web page and accordingly robot moves

III. COMPARISON WITH EXISTING TECHNOLOGY

There are many techniques which are used for Robot and some of the well-known methods are mentioned below:

A. EXISTING SYSTEM

- Already existing systems use robots that have limited range of communication as they are based on RF Technology, Zigbee and Bluetooth.
- Some existing robots can only be controlled with a manual mode which needs human supervision throughout the whole surveillance process.
- Packets arriving out-of-order due to wireless transmission may result in degraded video quality & stateful compression techniques are intolerant to packet loss.

B. PROPOSED SYSTEM

- By interfacing Wi-Fi module with Raspberry pi, we can get unlimited range of operation.
- Robots can be operated in both manual and automatic modes.
- Use of Border Routers eliminates packet loss and enhanced video quality.

IV. HARDWARE AND SOFTWARE USED

A. MICROCONTROLLER:

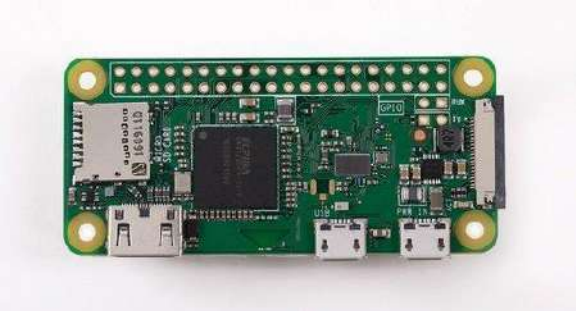

Figure 1 Raspberry Pi Zero W Board

Raspberry Pi Zero W is used as a microcontroller. It is installed with the Broadcom BCM2835 1GHz processor with 512MB RAM and is up-clocked to 1 GHz, making it 40% faster than the original Raspberry Pi.It is used to control all the sensed data and to produce output. The Raspberry Pi Zero W comes with added wireless LAN and Bluetooth connectivity. It has camera connector which is used to connect pi camera. It has features like Mini HDMI and USB ports, Micro USB,HAT compatible 40 Pin header .

B.PI CAMERA

Figure 2 Pi Camera

Pi camera is the interface module related to Raspberry Pi hardware. Pi camera has the advantage of high-definition video enabled service and can be enable to operate through Raspberry Pi.

C.DC AND SERVO MOTOR

Motors that operate on 9V DC power supply are used. These are rotary electrical machine that converts direct current electrical energy into mechanical energy. The motors used are of 300 rpm speed of operation. Motion of camera, ultrasonic sensors, shield & gun is done with the help of servo motors.

D.ULTRASONIC SENSOR

Figure 3: Ultrasonic Sensor

Ultrasonic sensor is a device that can measure the distance to an object by using sound waves at a particular frequency. It provides a 3cm to 12m range. It can work in any lighting conditions. Thus the robot easily dodges obstacles present on its way.

E.INFRARED SENSOR

Figure 4: Infrared Sensor

An infrared sensor is used to sense and determine the nature and aspects of the surroundings by emitting infrared radiation. The range is between 2 cm to 30 cm and the operating voltage is around 3v to 5v. Using this robot is worked as a line follower.

F.GUN AND SHIELD MODULE

To protect robot from attack gun and shield is used. it is manually operated. Whenever an obstacle is detected shield module is automatically operated.

G. POWER SUPPLY

12V Battery is used to supply power to system. Voltage regulator is used to regulate power to different modules. Use of solar panel enhances the power supply system.

H.USER INTERFACE

Remote or Mobile phone is used as a user interface. It is used to control the movement of robot as well as to control gun and shield module.

I.OPERATING SYSTEM

Raspbian operating system is used in raspberry pi . Python language is used to code the system.

V. WORKING

The basic block diagram of the diagram is shown below:

A. BLOCK DIAGRAM

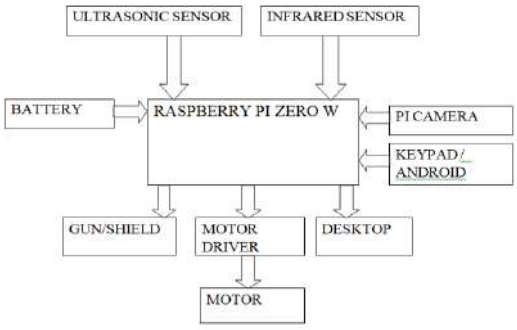

Figure 5: Block Diagram

The defense robot should provide surveillance which can be made possible using Line Follower Robot . The controlling core for this robot would be Raspberry pi. Communication interface which will be used for transfer of gather information and commands is Wi-Fi. The defense robot can be made capable of detecting trespassers or obstacle by using Ultrasonic Sensing. The control has to be flexibly switch between automatic and manual operation. The keypad or Remote can be a part of user interface making manual operation possible. The display device can be a Desktop or Android. The defense mechanism is by making use of gun module.

B. ALGORITHM AND FLOW DIAGRAM

The First step is to enable the raspberry pi and connect it to wifi. Start the motor so that robot can follow given path. Sensors continuously sensed the surrounding data and sends it to remote area. If the obstacle is detected, controller sends alert message to control unit and shield module operates. With the help of Camera , user can control the robot . If enemy tries to harm, aim the gun towards him. User can manually control all these operations.

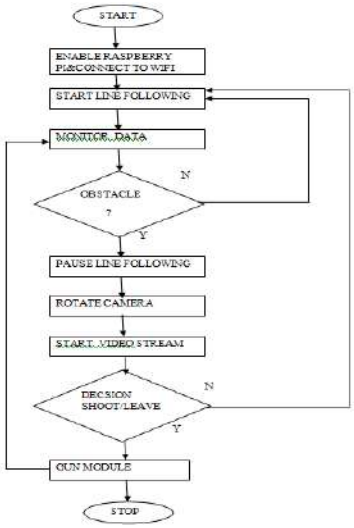

Figure 6: Flow Diagram

VI ADVANTAGES AND DISADVANTAGES

A. ADVANTAGES:

It is Flexible for dangerous situations and wars.
The Robot Reduces human casualties.
The System is Robust and durable.
It is possible to Rebuild and Reprogram the system This technology could be used in Security systems and many dangerous mission executions.

B. DISADVANTAGES:

Limited range of detection of obstacle.
It is not possible to capture the video streaming in more than 8Mbps.

VII APPLICATIONS

A. SOCIAL

The robot could be used in household security. It can be used to surveillance the particular area. User can capture and watch Live video streaming with the help of inbuilt cameras.

B. TECHNICAL

The Robot is used in Defense forces, Space exploration, Security systems and many dangerous mission executions. These are Flexible for dangerous situations and wars. Robots are used in surveillance because of their miniature size allowing them to enter in tunnels, mines and small holes in building and also have the capability to survive in harsh and difficult climatic conditions for life long time without any defect and causing no harm.

VIII CONCLUSION

In this project, we have studied different domain techniques defense robot. Pros and cons of existing system is explained. The different techniques such as line following , obstacle avoidance , Security using gun and shield module are explained. The use case diagram and algorithm of proposed system are mentioned. The different hardware and software requirements are explained . The applications of this domain is identified and presented.

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to our HOD Dr. R.H.Khade, our project guide Prof. Swati Patil and our project coordinator Prof.Ujwal Harode who have significantly guided and encouraged us to proceed with this newly proposed idea. We would also like to thank our principal Dr. Sandeep Joshi for providing us with all the facilities and environment to bring out the best of our capabilities.

REFERENCES

[1]S.Joshi, Aparna Todankar, Krishna Solankar ,Rohit Jagtap , “Surveillance Robot for Military Application”,IJECS,vol.7.issue 5,May-2018.
[2]] Koche , Kalbande (2018) ,*Line Follower Robot* ,Journal of Computers and Electronics Available.[Online]:https://www.academia.edu/36443089/Line_Follower_Robot.
[3] Bagathi Santosh Kumar and Asst. Prof. Gouri Shankar Sharma ,“ A Multi Functional Robot for Remote Surveillance in Military Application”,IJSER, vol. 8, issue 6,ISSN 2229-5518 June-2017.
[4] Prof. I. Y. Sheikh,Ms. Jaya S. Vyawhare, Ms.Sampada B. Mahajan, Ms. Prachi R. Bal, “Review Paper on Wi-Fi Surveillance Robot using Raspberry pi”,IJRAT,E-ISSN 2321-9637,April 2016 .
[5]Keerthi Premkumar and K Joe Nigel ,“Smart Phone based Robotic Arm Control using Raspberry Pi and Wifi”,ICIECS, March-2015.
[6]Quora,[Online].Available:https://www.quora.com/How-does-Ultrasonis-Sensor-Work

DESIGN OF RF SIGNALLING PROTOCOL FOR EMERGENCY VEHICLES RESCUE IN TRAFFIC SIGNAL

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Abstract— **Every second is valuable for an emergency vehicle. There is loss of life due to delay in the arrival of emergency vehicle in the golden hours. This delay is mainly caused by the waiting of vehicle at the traffic signal. So in order to avoid this we are presenting the system which will automate traffic signals using RFID Technique and IR sensor. IR sensors are used as proximity sensor at the traffic signal to monitor traffic density. The ARM LPC 2148 and Arduino Nano is being used to control (Implement) actions of various sensors like, Rf transmitter and receiver, IR transmitter and Receiver and signals.**

Keywords—**ARM LPC2148, Arduino nano, RFID technique, proximity sensor.**

I. INTRODUCTION

The traffic congestion is the biggest issue now days, which l eads to difficulties in movement of emergency vehicle. The paper presented here gives an idea in which traffic singles are automated with the help of RF module, IR sensor, microcontroller etc. The basic idea behind this project is to detect presence of emergency vehicle via proximity sensor and RF module. One of the Nationwide survey revealed that Chennai city has highest death rate in traffic accident than any other city of the country. So to avoid this RF singling protocol base emergency vehicle rescue system is proposed.

A. SIGNIFICANCE

The objective of this work is as follows:

- To reduce waiting time of emergency vehicles.
- Traffic regulation will be done automatically i.e No human intervention.

B. SCOPE

In this project we planned to make system which will monitor traffic signals based on the density of the vehicles on the road. For that purpose, we will use the IR Sensors. The pair of IR sensors are mounted in each side of 4way road. So it can detect traffic more efficiently. For eg. to detect the ambulance which need to move fast we will use The RF transmitter and receiver to communicate between the ambulance and traffic signals.

II. METHODOLOGY

The presented system can be divided into three units:

a. Input unit / Sensors / Switches: This unit mainly consists of sensors, IR sensors, RF transmitters and switches.

b.processing Unit / Microcontrollers: This unit consists of two microcontrollers 1. ARM LPC2148
2. Arduino Nano

c.Output Unit / toggling of traffic signals: The output pin is the traffic signal which will toggle according to the microcontrollers signal.

III. COMPARISON WITH EXISTING TECHNOLOGY

There are many similar systems which works to monitor and control traffic control system. The comparison with existing systems can be done as follows:

1) The normal control system which has pre-defined time interval to toggle signal at the traffic signal. But disadvantage of this system is it does not have any facility to toggle the signal in case of high traffic density or arrival of emergency vehicle.

2) The another system which works on image processing technique cannot be used practically. As its NRE cost and maintenance cost are too high. Thus, RFID based system is reliable.

IV. SENSORS AND CONTROLLER

A. MICROCONTROLLER:

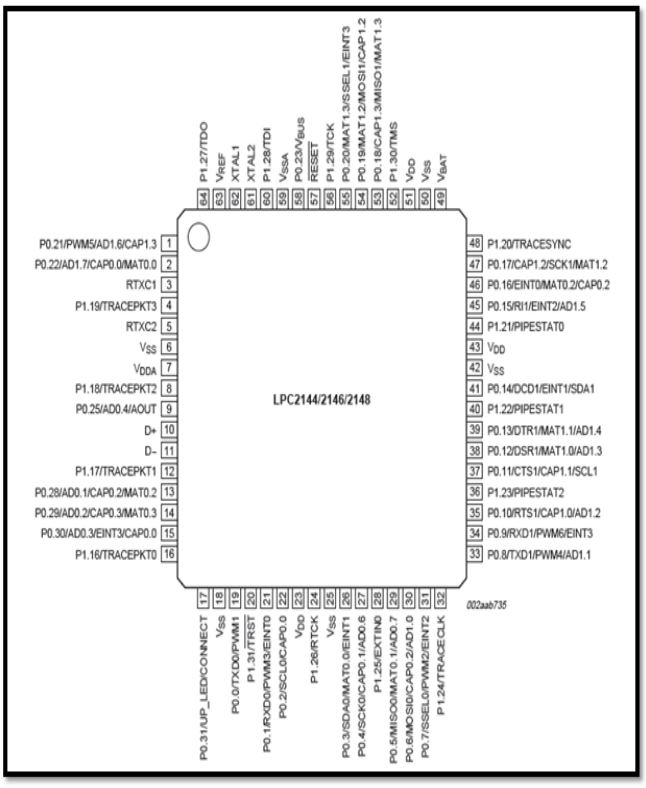

Figure 1 ARM LPC 2148

The LPC2148 is a 16 bit or 32 bit ARM7 family based microcontroller and available in a small LQFP64 package.

1) ISP (in system programming) or IAP (in application programming) using on-chip boot loader software.

2) On-chip static RAM is 8 kB-40 kB, on-chip flash memory is 32 kB-512 kB, the wide interface is 128 bit, or accelerator allows 60 MHz high-speed operation.

3) It takes 400 milliseconds time for erasing the data in full chip and 1 millisecond time for 256 bytes of programming.

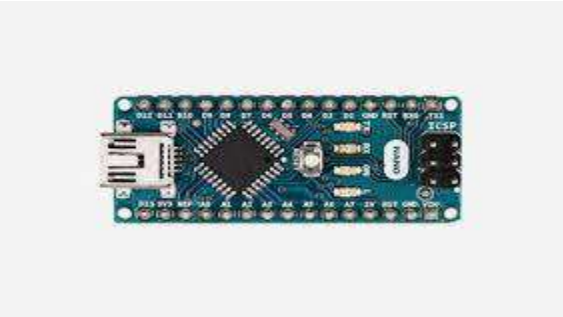

Figure 2: Arduino Nano

- Input Voltage (limits): 6-20 VDigital I/O Pins : 14 (of which 6 provide PWM output)
- Analog Input Pins: 8
- DC Current per I/O Pin: 40 mA
- Flash Memory 32 KB (ATmega328) of which 2 KB used by bootloader
- SRAM: 2 KB (ATmega328)
- EEPROM: 1 KB (ATmega328)
- Clock Speed: 16 MHz
- Dimensions: 0.73" x 1.70

V. WORKING

1.Vehicle section: This project deals with the remote sensing of the vehicle at traffic junctions by RF signalled automatically toggle / flip the traffic signals from Red to Green. This is done so as to enable the vehicle move faster in the traffic crowd and block all other vehicles moving from other directions. As seen from the following block diagram, the arrival of the vehicle is detected at the traffic junction with the aid of an IR Transmitter and Receiver set. The basic block diagram of the diagram is shown below:

A. BLOCK DIAGRAM

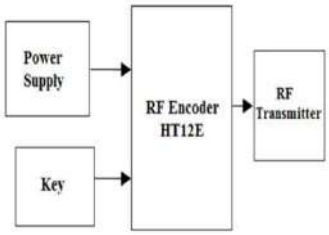

Figure 3: Block Diagram

2.Traffic section: Whenever traffic signal section receives the information about vehicle, the RF receiver in this section will clear the particular road for vehicle nearing the traffic signal. Whenever the vehicle reaches near to the traffic signal the traffic signal will be made to green through RF communication. Thereby the vehicle is recommended to reach the hospital in time. Whenever traffic signal section receives the information about vehicle, the RF receiver in this section will clear the particular road for vehicle nearing the traffic signal. Whenever the vehicle reaches near to the traffic signal the traffic signal will be made to green through RF communication. Thereby the vehicle is recommended to reach the hospital in time.

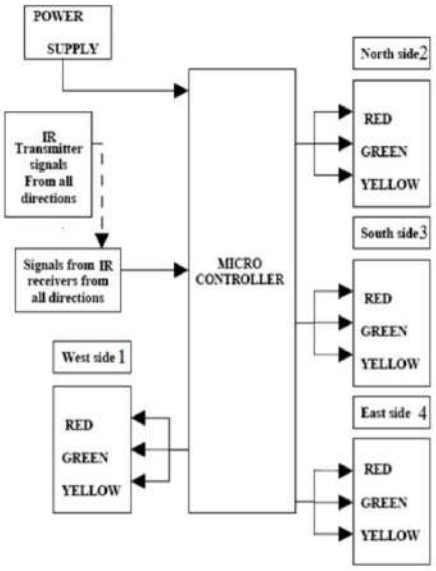

Figure 4 Block diagram of traffic signal section

VI. ADVANTAGES AND DISADVANTAGES

A. ADVANTAGES:

1.Very efficient as compared to traditional traffic control system.

2.No human intervention.

B. DISADVANTAGES:

1.Signalling of RF module and IR sensor may disrupt sometime.

2.Timely supervison is required to see the performance of sensors specially.

3.Environmental conditions can affect the operation.

VII. APPLICATIONS

There are various applications of this domain system. The application is listed here.

1. The project is used to manage, secure and avoid the road Traffic for Emergency Vehicles such as Fire brigade and Ambulance.

2. This system is used to detect an incoming Emergency Vehicle like the Ambulance, Fire brigade in Traffic using Radio Frequency Sensors in the main Traffic Signal System.

3. The traffic is managed by IR sensors on either side of the traffic, possibly on light post or any pillars to detect the density of traffic and control it. If the obstacle, in this case a vehicle is detected at a range of 100m with the help of a with the help of an IR receiver it alerts the main traffic signal system to take necessary required actions.

4. This project can also be used by Cargo Companies to intimate their on-road vehicles about the next delivery spot or assignment. This system can be used to Identifying Multiple Vehicle in Traffic and can be managed with ease due to Automation.

5. It Excels the present system of Emergency vehicle management as automation in emergency vehicles management has not fully been adopted in India

VIII. CONCLUSION

In this project, we have studied different domain techniques for emergency vehicles system. The different techniques such as RFID, IR sensing technique etc is explained with examples. The comparative study of various techniques mentioned above is presented here. The working of the vehicle section and traffic signal section is explained using a block diagram. As RF module gives information about emergency vehicles whereas IR module gives information about traffic density at the traffic signal. Thus their co-ordinated working is handled and controlled by ARM LPC 2148 and arduino nano. For the programming part C language is used to program ARM LPC 2148 and arduino nano.

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to our HOD Dr. R.H.Khade, our project guide Prof. Dipti Nair and our project coordinator Prof.Ujwal Harode who have significantly guided and encouraged us to proceed with this newly proposed idea. We would also like to thank our principal Dr. Sandeep Joshi for providing us with all the

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REFERENCES

1] Wang wei, fan hanbo, traffic accident Automatic detection and remote alarm Device

[2] Zhaosheng yang. Study on the schemes of Trafficsignaltiming for priority vehicles Based on navigation system, 2000.

[3] Xiaolinlu,develop web gis based Intelligent transportation application Systems with web service technology, Proceedings of international conference on its telecommunications, 2006.

[4] Katsunoritawara, naotomukai, traffic Signal control by using traffic Congestion prediction based on Pheromone model, proceedings of22nd International conference on tools with Artificial intelligence, 2010.

[5] Malik Tubaishat, Qi Qi, Yi Shang, Hongchi Shi Wireless Sensor-Based Traffic Light Control IEEE CCNC 2008 proceedings 1- 4244-1457-1/08

[6] Qingfeng Huang and Ying Zhang. Dynamic balancing of push and pull in a distributed traffic information system. In IEEE ConsumerCommunications and Networking Conference (CCNC 2007), 2007.

[7] JianhouGan, Lingyun Yuan, Zhongqi Sheng and TianweiXu, Construction and Implementation of an Integrated WSID TrafficMonitoring Network System, Proc. 21st annual international conference on Chinese control and decision conference, 2009, pp. 4726-4731.

Robotic Arm Using Suction to Lift Objects

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***Abstract*—Automation has become an inseparable part of our lives. Every domain in our life has been improvised majorly using automation, may it be in factories, vehicles, homes or even in electronic gadgets. Automation has been a major boom to all the industries present today. Most of the time-consuming labour intensive jobs nowadays are done using robots. One such example is the usage of robotic arms to lift heavy duty objects in industries. These arms are way quicker than humans and help in saving time. In this project, we aim to build a Robotic Arm which will pick up different objects irrespective of their shape, using suction principle by a sucker present on the arm. This will be built on the same principle by which a chameleon extends it's tongue and then creates a suction to catch its prey. This arm with the sucker principle will help save some time in picking objects when compared to a traditional clipper robotic arm to pick objects.**

Keywords—Robotic arm, suction mechanism, Arm LPC2148, L293D motor driver.

I. INTRODUCTION

Today, technology is developing in the same direction in line with rapidly increasing human needs. Robotic arms work with an outside user or by performing predetermined commands. The machines which are operated with the need for human assistance in advance, have been made to operate spontaneously without the need of human power with the progress of technology. One of the most used components of automation systems is robots.

In the project, research has been done and implemented in order to have knowledge about mechanics and software during the operations carried out by the robot arm which is designed to fulfill the tasks determined in accordance with predetermined commands. There are various ways in which a robotic arm may be controlled, like through computer terminals, joysticks, keys and even interfacing them with the internet so they can be controlled from anywhere in the world. This project represents a simple accelerometer controlled robotic arm using Arm LPC2148 powered embedded system, as the core of this robot and also a computer to interface the robot with the sensors. The robot does not require training because the robotic arm is fully controlled by the user. This interfacing is done using wired communication but it can easily be switched to wireless.

Kinematics in robotics is the science of motion investigation. Robot arm links can be rotated or offset according to the reference coordinate frame. A systematic and general approach developed by Denavit and Hartenberg establishes the relationship between the robot endpoint and the total displacement of robot arm links. Angular and linear displacements between limbs are called 'joint coordinates' and are defined by limb variables. In order to determine the amount of rotation and displacement according to the reference coordinate system of the endpoint, the matrices A which represent the amounts of each limb rotation and displacement are multiplied in turn. If the coordinates of the end point are given, limb variables can be obtained by going backward. These operations are called forward and inverse kinematics. The general transformation matrix can be quite complex even for simple robots.

II OBJECTIVES

The objective of this project is as follows:

1. To study the techniques of fabricating a hardware model, and to identify its limitations

2. To understand the implementation of the Robotic Arm execution features for recommended systems and collaborative actions that will help users for object lifting.

3. To identify evaluation metrics used for performance analysis and modify the prototype model and develop it as per user needs.

4. To construct a hybrid approach which may overcome the drawbacks of the existing fabrication methods.

III SYSTEM DESIGN

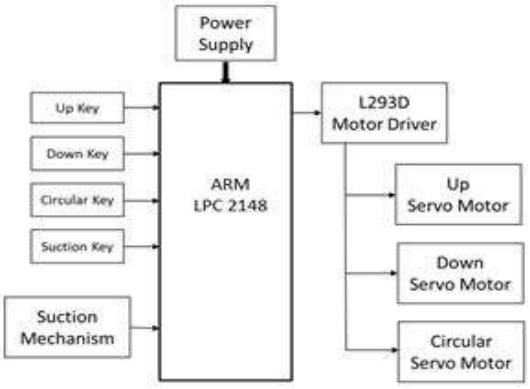

Figure 1 System Design

IV HARDWARE IMPLEMENTATION AND DESIGN

A. SERVO MOTOR

Servo refers to an error sensing feedback control which is used to correct the performance of a system. RC-Servo Motors are DC motors equipped with a servo mechanism for precise control of angular position. They usually have a rotation limit from 90° to 180°, but they do not rotate continuously. Their rotation is restricted in between the fixed angles. The Servos are used for precision positioning. They are used in robotic arms and legs, sensor scanners and in RC toys like RC helicopters, airplanes and cars.

B. ARM LPC 2148

The full form of an ARM is an 'Advanced RISC (reduced instruction set computer) Machine', and it is a 32-bit processor architecture expanded by ARM holdings. The applications of an ARM processor include several microcontrollers as well as processors. The architecture of an ARM processor was licensed by many corporations for designing ARM processor-based SoC products and CPUs. This allows the corporations to manufacture their products using ARM architecture. Likewise, all main semiconductor companies will make ARM-based SOCs such as Samsung, Atmel, TI etc.

C. L293D MOTOR DRIVER

It is a typical motor driver IC which allows DC motors to drive in either direction. It is a 16-pin IC which can control a set of 2DC motors simultaneously in any direction. The L293D chip works on the concept of H-bridge, which is a circuit that allows the voltage to flow in either direction. The H-bridge is the simplest circuit for controlling a low current rated motor.

D. SUCTION MECHANISM

Suction is a force that a partial vacuum exerts upon a solid, liquid or gas. The increased volume of the chest cavity decreases the pressure inside creating an imbalance with an ambient air pressure, resulting in suction. A pneumatic suction was used in this project, in order to lift small objects and drop it at the desired location.

E. BUTTON KEYS

The movement control of the robotic arm is done by interfacing 6 button keys. Their functions are : Forward, Backward, Left, Right, Pick-up and Drop.

V SOFTWARE USED

Keil software is used to simulate the working of the logic. The software package comes with inbuilt support to the ARM controller which makes it convenient to test the controller for various functionalities. Once the code is tested for redundancies it is burned onto the ARM controller by using FLASH MAGIC software which is a burning tool for multipurpose microcontrollers.

VI CONCLUSION

Various research operations have been performed in the field of robotic arms. One such attempt is this i.e to lift objects with the help of suction for better grip of the object irregular of its shape and size. Thus in future, modifications can be made on this arm to make it possible to serve for other applications too. The conformability of the adopted materials, the continuum-like arm design, and the attachment properties of the suction cups allow the robot to show enhanced manipulation capabilities in different media-such as air, water, oil, and constrained environments.

ACKNOWLEDGEMENT

We take this opportunity to express our profound gratitude and deep regards to our guide Professor Ujwal Harode for his exemplary guidance,monitoring and constant encouragement throughout the course of this project. We would also like to thank our HOD Dr. Rajendrakumar Khade for providing valuable guidance and encouragement. The help and guidance given by them from time to time shall carry us a long way in the journey of life which we are about to embark on. We would also like to thank all the laboratory maintenance staff for providing us assistance in various hardware and software problems encountered during the course of our project.

REFERENCES

1. Interactive Pick and Place Robot Control using Image Processing Method by Mr. Raskar D. S.1, Prof. Mrs. Belagali.
2. Automatic Material Handling System Using Pick & Place Robotic Arm & Image Processing by Mr. Deepak L Rajnori, A.S Bhide.
3. Design and Fabrication of Pick and Place Robot to Be Used in Library Anusha Ronanki. Vol. 4, Issue 6, June 2015 .
4. Design Analysis of a Remote Controlled "Pick and Place" Robotic Vehicle B.O. Omijeh, RUhunmwangho and MEhikhamenle. Volume 10, Issue 5 (May 2014) .

Microstrip Patch Antenna

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Abstract: In this project the main aim is to present design techniques, fabrication and measurement result of rectangular patch and circular patch antenna for 5.6GHz using HFSS Software and compare the results of these two antenna with the simulated result. This study will be useful to realize low cost and measure antenna gain, radiation pattern, efficiency and polarization of both the antennas.

INTRODUCTION

The definition of antenna by IEEE "an antenna as a part of a transmitting or receiving system that is designed to radiate or to receive electromagnetic waves". Over the years the study of microstrip patch antenna has progressed immensely and on comparison with conventional antennas they have more benefits and advantages. The microstrip patch antenna are smaller in size, lighter weight and have low cost and they are also very easy to fabricate onto the PCB(Printed Circuit Board). The idea of the patch antenna was first developed during the 1950s but it was only realized after once the printed circuit boards was developed which is during the 1970s. A patch antenna is a narrowband, wide-beam antenna which is fabricated by etching the antennas pattern onto conducting metal layer such as copper, gold or silver bonded to an insulating dielectric substrate, such as printed circuit board with a metal layer bonded to the opposite side of the substrate which forms the ground plane.

In this paper,the development of rectangular patch and circular patch microstrip antenna based on antenna theory is presented[1]. The rectangular and circular microstrip patch antenna are designed at an operation frequency of 5.6GHz. The substrate used is FR4 which has a dielectric constant of 4.4 is used because they have better efficiency, larger bandwidth, low cost and easy availability.The bandwidth and gain of the microstrip antenna depend on its size and the bandwidth narrowed and drops in efficiency as the size decreases. In order to improve the antenna gain, the inset feed line method is applied. The advantages of this technique is the realization of microstrip patch antenna with a higher gain, small in size and low cost.

I. MICROSTRIP PATCH ANTENNA

The microstrip antenna is a relatively modern invention. The structure of the microstrip patch antenna consist of a dielectric substrate with a specified thickness d, a ground plane made up completely of metal on one side and the metal patch of the required design on other side. The antenna can be excited using various methods and one of the most common method is inset feed line method as it is easy to implement and fabricate and also know the behavior of the antenna. This method consist of a feed line which is smaller in width as compared to the patch and the patch has an inset cut/gap to match the impedance of the feed line[4]&[5].

ANTENNA DESIGN

Selection of substrate is one of the most important parameter while designing a microstrip patch antenna and proper selection of the substrates width, length, height and dielectric constant will help in designing a good antenna [3]. We have used FR4 material as the substrate which has dielectric constant of 4.4 and thickness(h) of 1.6mm. We have used the equations (1) & (2) in order to determine the width and length of rectangular patch antenna. For rectangular patch antenna the width and height of the patch are 16.30mm and 12.20mm respectively. For circular patch antenna we have used equation (3) to determine the radius of the circular patch and it is 7.48mm.We have used inset feeding technique. Using equations (1)-(8) we can design microstrip patch antennas in HFSS software. The following steps are practised to design microstrip patch antenna.

STEP 1: Calculation of Patch

The width and length of rectangular patch antenna [2] is calculated by (1) & (2)

$$W = \frac{c}{2 f_o \sqrt{(\varepsilon_r + 1)/2}} \quad (1)$$

$$L = L_{eff} - 2\Delta L \quad (2)$$

Where c is free space velocity of light,

$$L_{eff} = \frac{c}{2 f_o \sqrt{\varepsilon_{reff}}}$$ and

$$\frac{\Delta L}{h} = 0.421h \frac{(\varepsilon_{reff} + 0.3)(\frac{W}{h} + 0.264)}{(\varepsilon_{reff} - 0.258)(\frac{W}{h} + 0.8)}$$

The radius of circular patch antenna is calculated by (3)

$$a = \frac{F}{\{1 + \frac{2h}{\pi \varepsilon_{reff}}[\ln(\frac{\pi F}{2h}) + 1.7726]\}} \quad (3)$$

STEP 2: Calculation of Substrate

The width and length of substrate of rectangular patch antenna is calculated [2] by (4) & (5)

$$W_g = W + 6h$$
$$L_g = L + 6h$$

The width and length of substrate for circular patch antenna [2] is calculated by (6)

$$W = L = 2 \times 2a \quad (6)$$

STEP 3: Calculation of effective dielectric constant

$$\varepsilon_{reff} = \frac{\varepsilon_r + 1}{2} + \frac{\varepsilon_r - 1}{2}[1 + 12\frac{h}{w}]^{-1/2} \quad (7)$$

Where ε_r is the dielectric constant of substrate.

STEP 4: Calculation of inset feed line position

$$y_o = \frac{L}{\pi}\cos^{-1}[\frac{50}{R}]^{1/2} \quad (8)$$

II. RECTANGULAR PATCH ANTENNA RESULTS

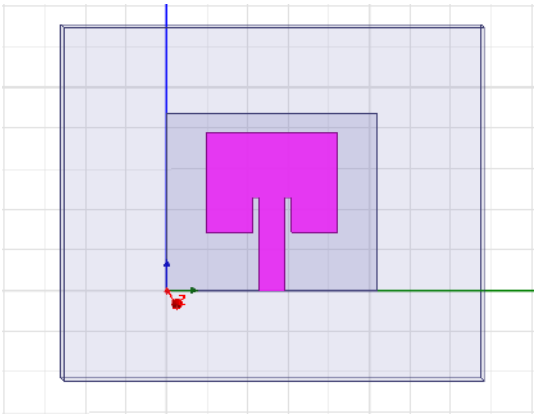

Fig 1: Design of rectangular patch antenna in HFSS software

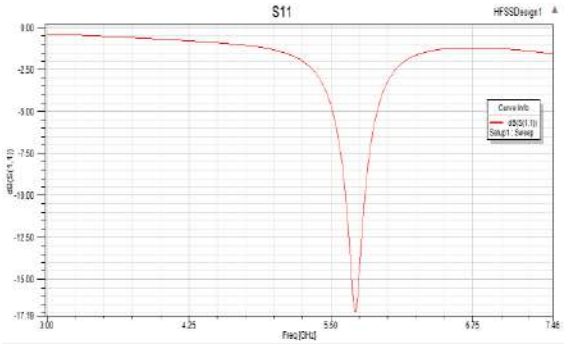

Fig 2: Plot of S11

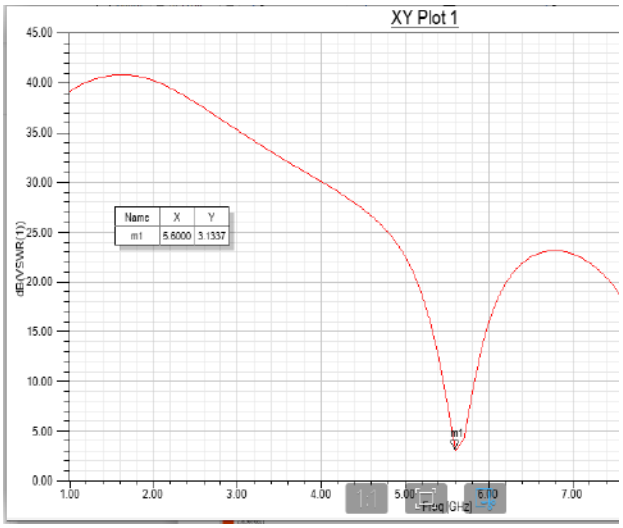

Fig 3: Plot of VSWR

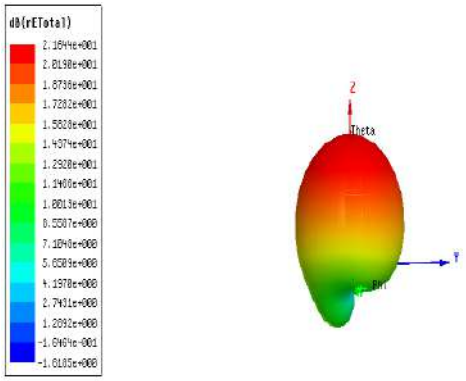

Fig 4: 3D Polar Plot

III. CIRCULAR PATCH ANTENNA RESULT

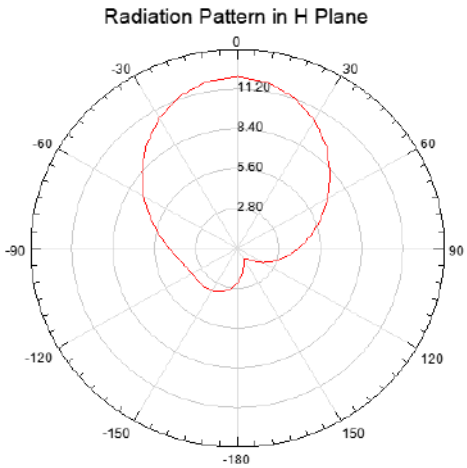

Fig 5: Radiation Pattern in H plane

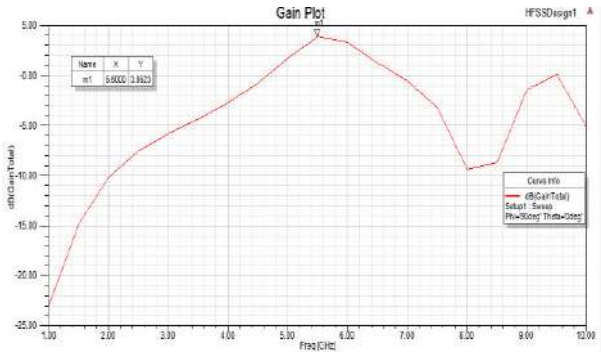

Fig 6: Gain Plot

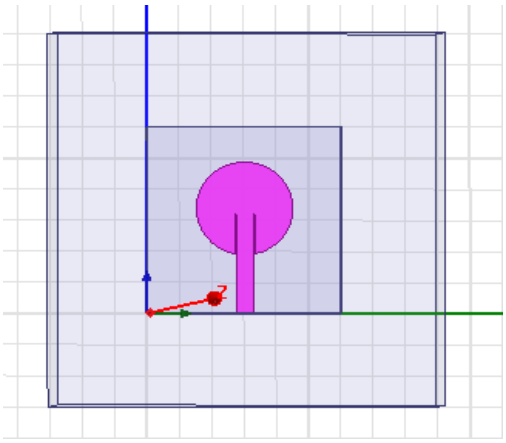

Fig 7: Design Circular Patch Antenna in HFSS Software

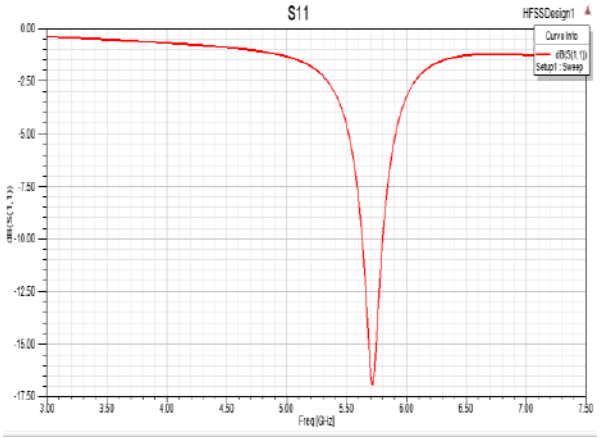

Fig 8: Plot of S11

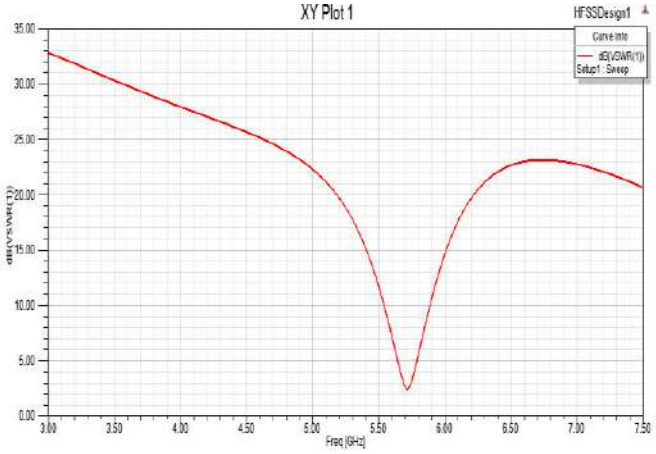

Fig 9: Plot of VSWR

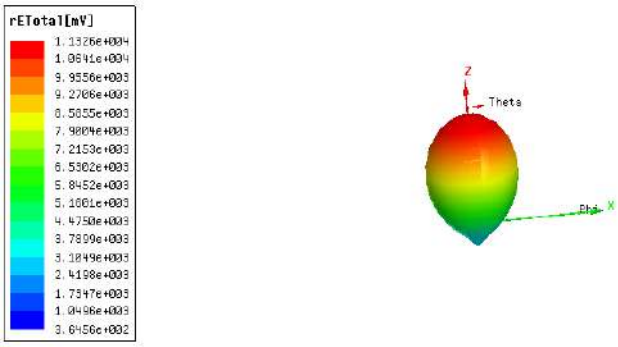

Fig 10 : 3D Polar Plot

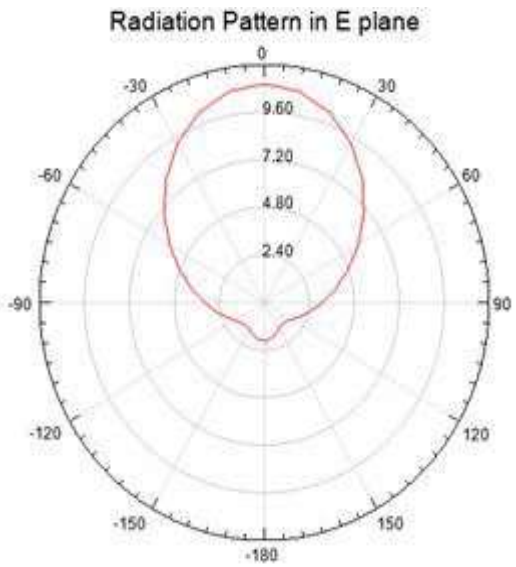

Fig 11: Radiation Pattern in E Plane

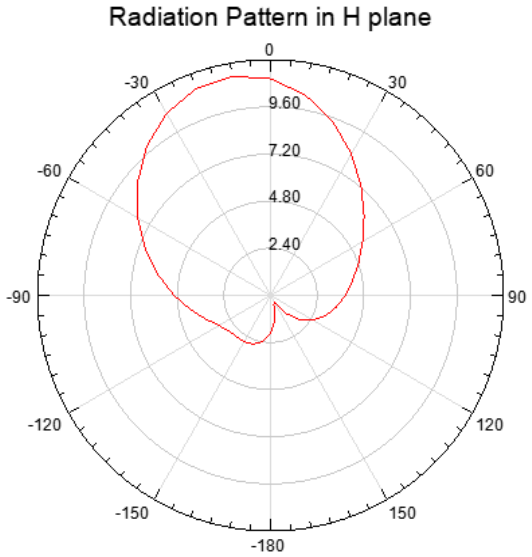

Fig 12: Radiation Pattern in H Plane

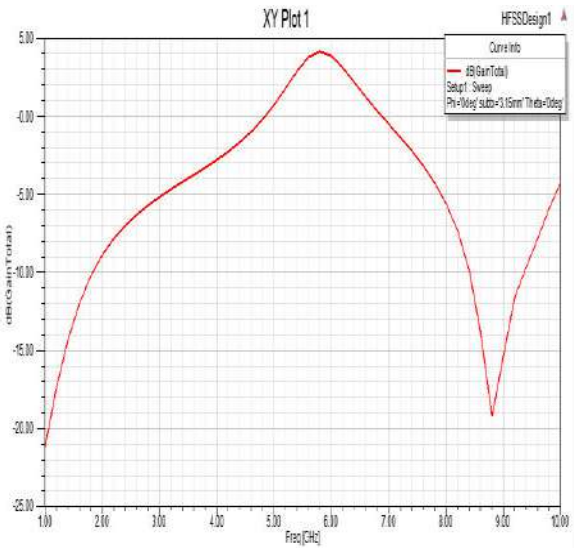

Fig 13: Gain plot

IV. CONCLUSION

In this paper, the microstrip antenna parameters of rectangular and circular microstrip patch antennas are calculated at 5.6GHz with inset feeding technique. The software used for simulation of these antennas is HFSS and parameters such as return loss, VSWR, gain and radiation pattern are determined from the simulation.

REFERENCES

[1] M.A. Othman, M. Sinnappa, M.Z.A. Abd Aziz, W.Y. Sam, Mohd Nor Hussein, Nornikman Hassan, Hamzah Asyrani Sulaiman, Mohd Muzafar Ismail, Mohamad Harris Misran, Maizatul Alice Meor Said., 5.8 GHz Rectangular Microstrip Inset Feed Patch Antenna. Aust. J. Basic & Appl. Sci., 8(4): 604-611, 2014

[2] C. A. Balanis, Antenna Theory, Analysis and Design, John Wiley & Sons, New York, 1997.

[3] Inset Feed Microstrip Patch Antenna[Online], Available:https://ijcsmc.com/docs/papers/February2016/V5I2201662.pdf

[4] David M Pozar (2005),Electrical Engineering Handbook,"Microstrip patch antenna"

[5] Dr. Prakash Kuravatti(2018), "Comparison of Different Parameters of the Edge Feed and the Inset Feed Patch Antenna"

[6] Microstrip patch antenna and their applications[Online], Available:https://pdfs.semanticscholar.org/eac3/1e83c9408b03b47f6ab34d71ff221cd9d1af.p df

A Vehicle-to-Vehicle Communication Protocol for Cooperative Collision Warning

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***Abstract*— This paper proposes a vehicle-to-vehicle communication protocol for cooperative collision warning. Emerging wireless technologies for vehicle-to-vehicle (V2V) such as DSRC are promising to reduce the road accidents by providing early warnings. One major technical challenge addressed in this paper is delivering emergency signal or warnings in various road situations. Based on a careful analysis of application requirements, we design an effective protocol system, service differentiation mechanisms and methods for emergency warning in fatal situations. Simulation results demonstrate that the proposed protocol achieves low latency in delivering emergency warnings and efficient bandwidth usage in stressful road scenarios.**

I. INTRODUCTION

Traffic accidents have been taking thousands of lives each year, outnumbering any deadly diseases or natural disasters. Studies [18] show that about *60%* roadway collisions could be avoided if the operator of the vehicle was provided warning at least one-half second prior to a collision.

Human drivers suffer from perception limitations on roadway emergency events, resulting in large delay in propagating emergency warnings, as the following simplified example illustrates. In Figure 1, three vehicles, namely A, B and C travel in the same lane. When suddenly brakes abruptly, both vehicles B and C are in danger, and being away from vehicle A does not make vehicle C any safer than B because of the following two reasons:

- Line-of-sight limitation of brake light: In this vehicle C will not get any recognition of vehicle A emergency until vehicle B breaks.
- Large processing/forwarding delay for emergency events: Driver reaction time, i.e., from seeing the brake light of A to stepping on the brake for the driver of vehicle B, typically ranges from 0.7 seconds to 1.5seconds which results in large delay in propagating the emergency warning.

Figure 1. V2V helps to improve road safety

Emerging wireless communication technologies are promising to significantly reduce the delay in propagating emergency warnings. The Dedicated Short-Range Communications (DSRC) is defining short to medium range communication services that support public safety in vehicle-to-vehicle (V2V) communication environment. This will be helpful for the people in emergency roadway situations.

Using V2V communication, in our previous example, Vehicle A can send warning messages once an emergency event happens. If vehicles B and C can receive these messages with little delay, the drivers can be alerted immediately. In such cases, C has a good chance of avoiding the accident via prompt reactions, and B benefits from such warnings when visibility is poor or when the driver is not paying enough attention to the surroundings. Thus, the vehicle-to-vehicle communication enables the *cooperative collision warning* among vehicles B and C.

Even though V2V communication may be beneficial, wireless communication is typically useful. Many factors, for example, channel fading, packet collisions, and communication obstacles, can prevent messages from being correctly delivered in time and in proper direction. In addition, ad hoc networks formed by nearby vehicles are quite different from traditional ad hoc networks due to high mobility of vehicles.

A *Vehicular Collision Warning Communication* (VCWC) protocol is discussed in this paper and also Identifying application requirements for vehicular cooperative collision warning.

The rest of this paper is organized as follows. Application challenges are discussed in Section 2. Section 3 presents the related work. Section 4 describes the proposed Vehicular Collision Warning Communication (VCWC) protocol. Section 5 consists of an acknowledgment, conclusion and references.

II. APPLICATION CHALLENGES

Using V2V communication, when a vehicle on the road acts abnormally, e.g. sudden change in direction, deceleration below certain speed and mechanical failure etc. it becomes an abnormal vehicle (AV). An AV actively generates Emergency Warning Messages (EWMs). which include the geographical location, speed, acceleration and moving direction of the AV, to warn other surrounding vehicles.

2.1. CHALLENGE 1: Delay of requirements after the emergency.

Over a short period immediately after an emergency event, the faster the warning is delivered to the endangered vehicles, the more likely accidents can be avoided. We define *EWM delivery delay* from an AV A to a vehicle V as the elapsed duration from the time the emergency occurs at A to the time the *first* corresponding EWM message is successfully received by. Since a vehicle moving at the speed of 80 miles/hour can cross more than one meter in 30, the EWM delivery delay for each affected vehicle should be in the order of milliseconds.

However, the link qualities in V2V communications can be very bad due to multipath fading and shadowing,

2.2. CHALLENGE 2: Support of multiple co-existing AVs over a longer period

After an emergency event happens, the AV can stay in the abnormal state for a period of time. For example, if a vehicle stops in the middle of a highway due to mechanical failure, it remains hazardous to any approaching vehicles and hence, remains an abnormal vehicle until it is removed off the road.

Furthermore, emergency road situations frequently have chain effects. When a leading vehicle applies an emergency brake, it is probable that vehicles behind it will react by also decelerating suddenly.

2.3. CHALLENGE 3: Differentiation of emergency events

Emergency events from AVs following different lanes/trajectories usually have different impact on surrounding vehicles, hence, should be differentiated from each other. As the example in Figure 3 shows, vehicle A is out of control and its trajectory crosses multiple lanes. In such an abnormal situation, N1 and N3 may both react with emergency braking N1 and N3 it is important for both and to give warnings to their trailing vehicles, respectively. At the same time, since the trajectory of vehicle A does not follow any given lane and it may harm vehicle N5 in the near future, vehicle A needs to give its own emergency warning as well. In this particular example, three different emergency events are associated with three different moving vehicles.

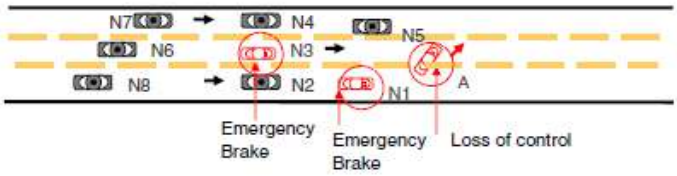
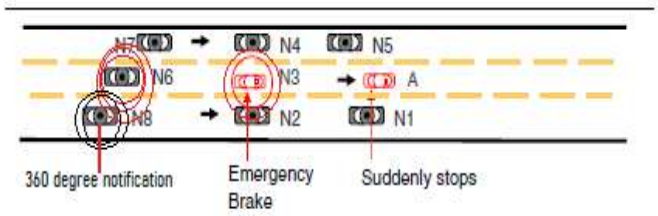


Figure 3. Multiple AVs following different trajectories

2.4. CHALLENGE 4 : One directional transmission can't be done

In the figure below we can see that Vehicle A sudden stops due to emergency situation or any mechanical failure etc. this can make stop vehicle A and hence vehicle N3 decelerate and apply emergency break as its essential. But by using V2V communication technique and device the intimation about the certain condition happened with Vehicle A can reach to the other vehicle around N3 and because of this they get to know about the situation.

But there is problem with the V2V device the it spreads the information in 360 degrees as because of this the cars that travelling in other lane also get the information and this can make stop the cars of other lane to and this can make trouble for us. As we don't have one directional transmission device the cause can happen and its can make trouble for us and situation may be turn into worst.



III. VEHICULAR COLLISION WARNING COMMUNICATION PROTOCOL

A vehicle can become an abnormal vehicle (AV) due to its own mechanical failure or due to unexpected road hazards. A vehicle can also become an AV by reacting to other AVs nearby. Once an AV resumes it regular movement, the vehicle is said no longer an AV and it returns back to the normal state. In general, the abnormal behaviour of a vehicle can be detected using various sensors within the vehicle. Exactly how normal and abnormal status of vehicles are detected is beyond the scope of this paper. We assume that a vehicle controller can automatically monitor the vehicle dynamics and activate the collision warning communication module when it enters an abnormal state. A vehicle that receives the EWMs can verify the relevancy to the emergency event based on its relative motion to the AV, and give audio or visual warnings/advice to the driver.

Each message used in VCWC protocol is intended for a group of receivers, and the group of intended receivers hang fast due to high mobility of vehicles, which necessitate the message transmissions using broadcast instead of unicast To ensure reliable delivery of emergency warnings over unreliable wireless channel, EWMs need to be repeatedly transmitted.

IV. CONCLUSION

This paper proposes a Vehicular Collision Warning Communication (VCWC) protocol to improve road safety services. In particular, it defines congestion control policies for emergency warning messages so that a low emergency warning message delivery delay can be achieved and a large number of co-existing abnormal vehicles can be supported.

It also introduces a method to eliminate redundant emergency warning messages, exploiting the natural chain effect of emergency events.

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We sincerely want to appreciate our department and the guide as they give us opportunity to learn about IEEE paper. Our completion of project could not have been accomplished without the support our teachers & department with kind of knowledge they have imparted on us. To our guide **Prof. Swati Patil mam** Thank you for allowing us time for work on this paper.

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REFERENCES

[1] Dedicated Short Range Communications (DSRC) Home http://www.leearmstrong.com/DSRC/DSRCHomeset.htm

[2] L. Briesemeister. *Group Membership and Communication in Highly Mobile Ad Hoc Networks*. PhD thesis, Technical University of Berlin, Germany, Nov 2001.

[3] L. Briesemeister and G. Hommel. Role-Based Multicast in Highly Mobile but Sparsely Connected Ad Hoc Networks. In *First Annual Workshop on Mobile Ad Hoc Networking & Computing (Mobihoc)*, August 2000.

[4] Z. D. Chen, H. Kung, and D. Vlah. Ad Hoc Relay Wireless Networks over Moving Vehicles on Highways. In *Proc. ACM Mobihoc'01*, 2001.

[5] I. Chisalita and N. Shahmehri. A Peer-to-Peer Approach to Vehicular Communication for the Support of Traffic Safety Applications. In *5th IEEE Conference on Intelligent Transportation Systems, Singapore*, pages 336–341, Sep. 2002.

[6] M. Green. "How Long Does It Take to Stop?" Methodological Analysis of Driver Perception-Brake Times *Transportation Human Factors*, 2(3):195–216, 2000

[7] H. Hartenstein, B. Bochow, A. Ebner, M. Lott, M. Radimirsch and D. Vollmer. Position-Aware Ad Hoc Wireless Networks for Inter-Vehicle Communications: the Fleetnet Project. In *Proc. ACM Mobihoc'01*, 2001

[8] L. Kleinrock *Queuing Systems Volume I: Theory*. John Wiley & Sons, 1975.

[9] D. Lee, R. Attias, A. Puri, R. Sengupta, S. Tripakis, and P. Varaiya. A Wireless Token Ring Protocol for Ad-Hoc Networks. In *IEEE Aerospace Conference Proceedings*, March 2002.

[10] M. Lott, R. Halfmann, and M. Meincke. A Frequency Agile Air-Interface for Inter-Vehicle Communication. In *Proc. ICT 2003*, 2003.

[11] M. Lott, R. Halfmann, E. Schulz, and M. Radimirsch. Medium access and radio resource management for ad hoc networks based on UTRA TDD. In *Proc. ACM Mobi- HOC'01*, 2001.

[12] L. B. Michael and M. Nakagawa. Non-Platoon Inter-Vehicle Communication Using Multiple Hops. *IEICE Trans. Commun*, E82-B(10), October 1999.

[12] R. Meier, M.-O. Killijian, R. Cunningham, and V. Cahill. Towards Proximity Group Communication. In *Advanced Topic Workshop, Middleware for Mobile Computing, Heidelberg, Germany*, Nov. 2001.

[13] M. Meincke, M. Lott, and K. Jobmann. Reservation Conflicts in a Novel Air Interface for Ad Hoc Networks based on UTRA TDD. In *IEEE VTC 2003 Fall*, 2003.

Advanced Vehicle Security System with Anti-theft and Accident Notification

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***Abstract*—A System capable of identifying and tracing the geographic location of a remote vehicle. A system consisting of the GPS and GSM module to locate and inform the owner about the status of the vehicle. Specially sending a notification to the owner, the nearby police station and the hospital (in case of accident). This system will notify the police about the theft as well as accident with the location of the vehicle and the contact details of owner. In case of accident, notification and location of accident will be sent to the Hospital so that the ambulance may reach there as soon as possible.**

I. INTRODUCTION

The protection of people is the prime concern in recent times so having GPS car tracking device will make sure their safety and further to this is the anti theft and coincidence notification.This automobile tracking machine can be utilized in finding owners cars as a theft prevention and twist of fate location.Police can comply with the sign emitted by the tracking gadget to discover a stolen or a twist of fate prone automobile. This system, generally is meant to be mounted for the four wheelers but for country like India wherein majority of the people are using wheelers, right here is the cheapest source of an anti-robbery and coincidence tracking device. Other applications include monitoring riding behaviour,including and employee of a transport car.

II. RELATED TECHNOLOGY

A. *GPS Technology:*

The Global Positioning System (GPS) is a Global Navigation System (GNSS). The GPS is using the constellations between 24 and 32 in Medium Earth Orbit satellite, precisely transmitting microwave signals and enabling GPS receivers to determine their location, speed, direction, and time. Using three satellites a GPS calculates distance and uses a triangulation technique to find its two dimension (latitude and longitude) position and at least four satellites to compute its three dimension (latitude, longitude and altitude) position. It originally is used in military services but now is allowed for civilian for free use as a common good. GPS is nowadays used by most of us.
Start-up times Hot start: 1 S, Warm start: 38S, cold start: 42 S Accuracy of Position 100 meters, 2D RMS
Power requirement 3.3~5.5VDC, 50mA
Working Temperature -10 oC to + 60 oC
Command Statements GPGGA,GPGSA,

B. GSM Technology:

A GSM modem accepts a SIM card, and operates over a subscription to a Mobile. GSM (Global system for mobile) uses circuit switching. This method of communication establishes a path t between two devices. After the two devices are connected, digital data is constantly relayed. Three major systems in GSM networks are the Switching
System (SS), The Base Station(BSS) and the Mobile station(MS).

I. The Switching System(SS):
It is the operative Switching system which conducts various operations. Holding five data functions, SS performs each data function differently. Call subscribing and processing related functions are major tasks of SS system .The security end of the system is handled by a small system called Authentication centre (AUC) and Equipment identity register (EIR) which holds crucial information of mobile equipments is another important database.

II. The Base Station System (BSS):
In mobile communication the base station system is very important. Responsibility of BSS is connecting subscribers (MS) to mobile networks. The communication is made in Radio transmission. The Base Station System is divided in two systems. BTS and BSC. BTS (Base Transceiver station) handles communication using radio transmission. Managing and controlling functions BSC (Base station controller) creates physical link between subscriber.

III. Mobile Station (Subscriber):

MS include a cellular unit and subscriber Identity Module (SIM) card. This card equipped with the GSM Modem and gives the user greater non-public mobility. The equipment is identified by a unique number known as the International Mobile Equipment Identity (IMEI). The GSM modem used in this device is SIM 900D.The parameters and specification are given below.

C.Microcontroller:
The microcontroller is the heart of this tool. It acts as an interface between the GSM module and the GPS receiver. A microcontroller is a small pc on a single incorporated circuit containing a processor core, facts memory, A/D converter and programmable input/output peripherals. In this tool the microcontroller is programmed in such a manner that it stimulates the GSM modem in message forwarding when a request is ship through the user. Microcontrollers are much smaller and simplified as a way to include all the features required on a single chip.

III. DESIGN OF TRACKING SYSTEM

Its miles proposed to design an embedded device that's used for tracking and positioning of any automobile by using the use of Global Positioning System (GPS) and Global device for mobile verbal exchange (GSM). In this Device AT89C51 microcontroller is used for interfacing to various hardware peripherals. The current layout is an embedded application, with a view to continuously monitor a transferring Vehicleand file the reput e of the Vehicle on demand. For doing so an AT89C51 microcontroller is interfaced serially to a GSM Modem and GPS Receiver. A GSM modem is used to send the position (Latitude and Longitude) of the automobile from a far flung place. The GPS modem will continuously give the information i.e. The latitude and longitude indicating exact location of the vehicle. The GPS modem gives many parameters as the output, but most effective the NMEA data popping out and dispatched to the cellular at the other give up from where the location of the vehicle is demanded. When the request by user is sent to the wide variety at the modem, the device mechanically sends a return respond to that cellular indicating the place of the vehicle in terms of latitude and longitude. The block diagram of tracking system the use of GPS and GSM era is provided in determine 3. The undertaking is car positioning and navigation device we are able to find the vehicle around the globe with micro controller, GPS receiver, GSM modem. Microcontroller used is AT89C51. The code is written in the inner memory of Microcontroller i.e. ROM.With assist of coaching setit techniques the commands a nd it acts as interface between GSM and GPS with assist of serial verbal exchange of AT89C51. GPS continually transmits the statistics and GSM transmits and get hold of the records.

GPS pin TX is hooked up to microcontroller and GSM pins TX and RX are associated with microcontroller serial ports. Microcontroller communicates with the assist of serial verbal exchange. First it takes the facts from the GPS receiver and then sends the facts to the proprietor in the shape of SMS with help of GSM modem. GPS receiver works on 9600 baud charge is used to acquire the records from space Segment (from Satellites), the GPS values of various Satellites are sent to microcontroller AT89C51, wherein these are processed and forwarded to GSM.
At the time of processing GPS gets only $GPRMC values handiest. From those values microcontroller takes handiest range and longitude values except for time, altitude, call of the satellite, authentication etc. GSM modem with a baud rate 57600. GSM is a Global machine for

mobile verbal exchange in this device it acts as a SMS Receiver and SMS sender. The electricity is supplied to components like GSM, GPS and Microcontroller circuitry using a 12V/3.2A battery. GSM requires 12v, GPS and microcontroller calls for 5v. With the assist of regulators we alter the power between three additives. GSM modem with a baud rate 57600.GSM is a Global system for mobile communication in this device it acts as a SMS Receiver and SMS sender. The power is supplied to components like GSM, GPS and Microcontroller circuitry using a 12V/3.2A battery. GSM requires 12v,GPS and microcontroller requires 5v .with the help of regulators we regulate the power between three components.

IV CONCLUSION

In this paper we have proposed an anti-theft system which can be used to track a automobile equipped with the proposed tool in it. It can also be utilized in asset tracking and in stolen car recovery and notify the owner, police and hospital in case of accident. In the destiny we can also combine other related devices in automobile including sensors. We can create a server to look the automobile route and different data on our pc and we will shop the trajectory of it. The sensors hooked up in our car can record the automobile facts to our server and it can shape a smart tracking device.

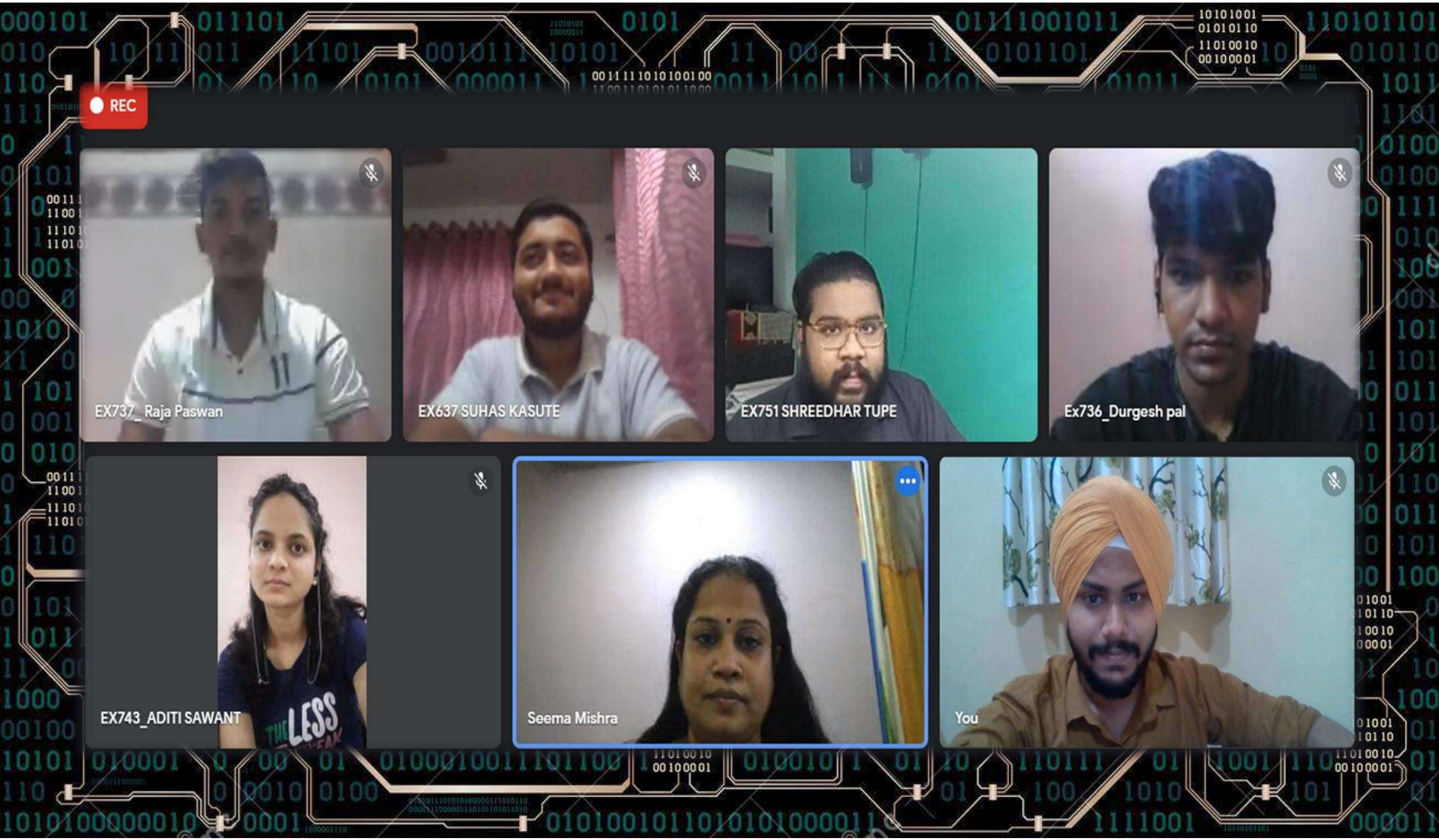
There are numerous reasons why car owners and public automobile operators prefer to have a GPS. You can determine your location, whether or not you are visiting locally or in a foreign land, having a GPS is honestly an advantage. If you believe you studied you're lost, you could use your GPS receiver to recognize your precise location.

Vehicle monitoring systems are typically utilized by fleet operators for fleet management capabilities which includes routing, dispatch, on-board information and security. Other programs include monitoring driving behavior, which includes an enterprise of an employee, or a parent with a youngster driver.

REFERENCES

[1] M.S. Joshi and Deepali V. Mahajan , "Arm 7 Based Theft Control, Accident Detection and Vehicle Positioning System", International Journal of Innovative Technology and Exploring Engineering , vol. 4, no. 2, July 2014.

[2] M. A. Al Rasheed, Ousmane Abdoulaye Oumar, Damanjit Singh, “A real time GSM/GPS based tracking system based on GSM mobile phone", IEEE Journal on Signals and Telecommunication, vol. 3, no. 1, March 2014, pp. 33-39.



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