

A WIRELESS INTELLIGENT CAR DOOR LOCKING SYSTEM AND MONITORING TRAFFIC SIGNALS

Joshua Santhosh S¹, Arjunsurendran E², Karthik K³, Kesavan E⁴

^{1,2,3}Student, Electronics and Instrumentation Engineering, RMK Engineering College, Thiruvallur, Tamil Nadu, India

⁴Assistant Professor, Electronics and Instrumentation Engineering, RMK Engineering College, Thiruvallur, Tamil Nadu, India

Abstract - Security is the most fundamental factor in programming just as the web condition. In current time programming and Hardware security, it is the most significant thing to make sure about your consistent just as physical resources. In many cases substantial setups like service, smart homes, smart car etc. having some IoT base support enhance the drastic supervision, the benefit of such systems to evaluate the current scenario over the internet. In this paper, we propose a programmed vehicle locking framework and checking traffic signals utilizing IoT. Essentially in this work proposed a savvy locking framework to the vehicle entryway and screens the traffic signals. Usage has done on in web condition just as easy to use portable applications. This framework is essentially advantageous in Real-world conditions just as helpful for the brilliant Security resource Management applications. In due course, internet dependency is required for the system to communicate with IoT model with cloud database.

Keywords: Wireless, Car Door, Auto-Locking, Smart Sensors Protection, Safety, RF Module, IoT.

1. INTRODUCTION

In contemporary era, road accidents are expanding radically, half of the road mishaps are happening due to abusing Traffic Signals and opening of vehicle's entryway without cognizance. Even though road accidents cannot be reduced 100%, but we can decrease that with appropriate prudent techniques. By utilizing Intelligent Door locking framework and programmed self-observing traffic framework road.

Our proposed framework consequently cautions the driver and safeguards him/her from forthcoming threats which may cause road accidents. Our project means to shield the driver or traveler from forthcoming vehicles

while they open the entryway and consequently control the vehicle regarding accidents can be controlled.

Traffic Signals, if they damage an admonition, message will be sent to separate traffic Department to take care of the punishment.

Our venture has two primary interfaces

- Intelligent Door Locking System.
- Automatic Responding to Traffic Signals and Control.

In this proposed framework, a gadget (IR sensor) is set in the back of the vehicle (posterior) at the point of 45 degrees. It generally faculties whether any vehicle coming towards it is at a fast speed. At the point when a vehicle moving towards it, for example when a vehicle drawing nearer close to the open length of the entryway, the entryways of that vehicle "naturally bolt itself" with the goal that travelers or drivers can't open the entryway unwittingly.[1]

In this manner, our proposed technique spares the valuable life. It has a crisis button empowered in it; during the hour of crisis one can open the vehicle entryway with the precautionary measure. [2]

In this proposed framework, the RF module is utilized. During the red traffic signal, the RF Transmitter in Traffic Signals emanates a specific recurrence which is gotten by an RF collector in the vehicles. During that time the motor will stop naturally by reacting to Red Signal. During the Green Traffic Signal, the RF Transmitter produces another specific recurrence with the goal that the motor resume to turn ON when the RF collector gets it.

If the driver presses the crisis catch and drives the vehicle by abusing the Traffic Signal, a message will be sent to individual specialists through the IoT gadget which is empowered inside it.

2. METHODOLOGY

In our paper, we have suggested two strategies which are significant for the individuals to advance wellbeing for the travelers.

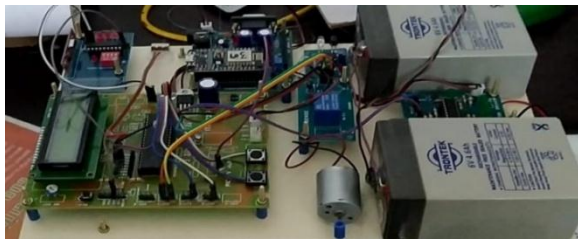


Figure 1 – Internal lock mechanism

2.1. AUTOMATIC LOCK OF CAR DOORS

During the condition of an emergency, the vehicles may stop and as an afterthought traveler inside the vehicle are opening the doors. Because of this absence of awareness, mishaps are likely to happen. A component called as inner lock system is there which is required to keep away from such sort of mishaps. I will make the passenger progressively cognizant while opening the vehicle doors. [3]

This inner lock instrument comprises of a pic micro controller, power supply, electromagnetic hand-off IR Door Sensor. At first, the code to be executed into it is operated by the controller. [4] The IR door sensor and the door lock engine will build up an association. The controller will offer gracefully to the IR entryway sensor ceaselessly, the IR entryway sensor will create a sign as indicated by the range that it gets from the vehicles. At the point when the vehicles passing the interstate are excessively close, the IR sensor will get short proximity and produce a sign. And then the sign is straightforwardly sent to the controller. [5]

The controller will check the circles of the code and provide order to an electronic attractive transfer. The hand-off will make the entryway to set closed until the passing vehicle makes some good ways from our vehicle. After some gap made by the passing vehicle, the IR door

sensor will get an open range and no sign will be sent to the smaller scale controller. The electromagnetic hand-off will likewise get open since no order from the controller, the association for the engine won't get shut and the entryway lock engine stays stable.

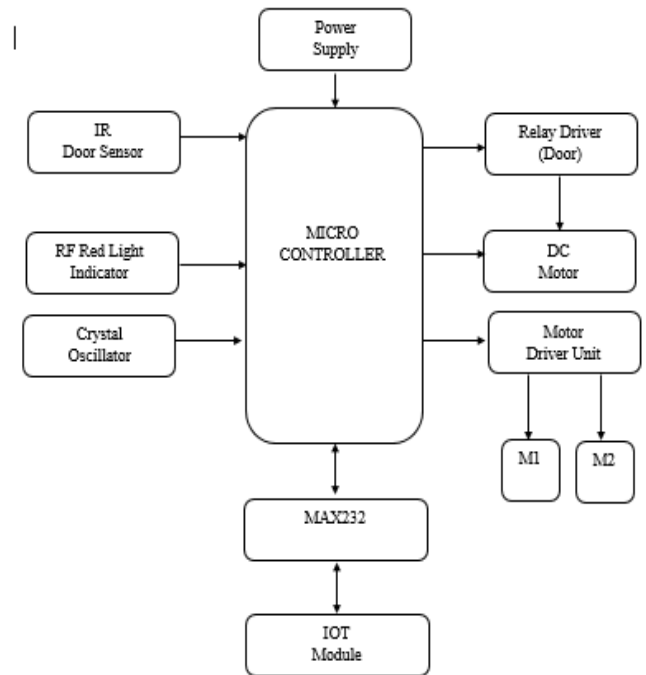


Figure 2 – Proposed block diagram

2.2. DETECTION OF RED-LIGHT VIOLATION

Traffic signal infringement is additionally a significant reason for street mishaps. So this piece of the undertaking will continue watching the vehicle whether the vehicle is obeying traffic signals or not. On the off chance that any petty criminal offense occurred, at that point, the vehicle information including the vehicle number and the vehicle proprietor name will be sent to an online server, at the hour of protection reestablishment or permit restoration from the vehicle. [6]

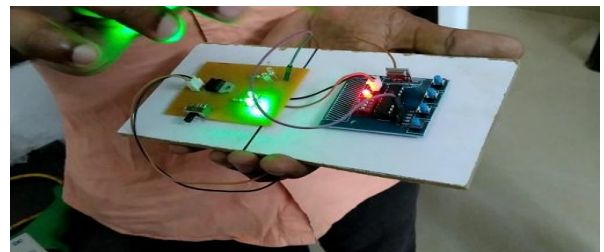


Figure 3. Green Light (No data Transmitted)

This arrangement comprises of a similar pic microcontroller, RF transmitter (433MHz), RF receiver (433MHz), little traffic signal arrangement, IOT module (ESP8266), the traffic signal arrangement will consistently transmit the information as indicated by the hues. At the point when the sign shading is green, no information is transmitted and all the vehicles upon the street side will have the option to move uninhibitedly. However, when the sign shading changes to red, an alternate methodology will be followed. The sign arrangement will send information

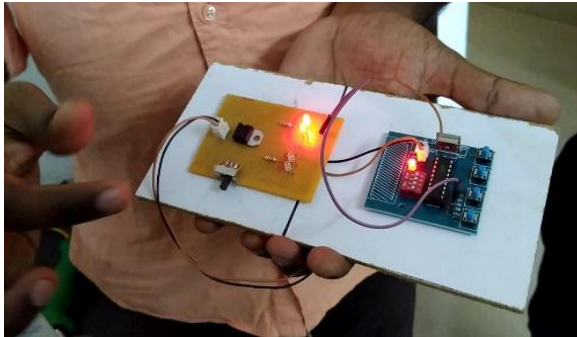


Figure 4. Red Light (data Transmitted)

The RF transmitter will be associated with an encoder circuit. The information will be encoded to purchase the encoder and transmitted to the vehicles which are drawing nearer towards the traffic signal.[7]

The passenger will get the information from the transmitter and disentangles the information utilizing the decoder. The decoded data will be sent to the controller which is as of now taking care of with the code. The controller will check the decoded data simultaneously with the circles of the code. On the off chance that the decoded data is STOP, at that point, the vehicle consequently stops (this whole procedure will occur at the hour of the red sign). On the off chance that the driver in the vehicle tries to move the vehicle (during the hour of the red sign), at that point the whole data about the vehicle and the vehicle proprietor name with the sign area and time, will be sent to an online server right away. This part will be finished by the IOT module (ESP866).[8]

3. HARDWARE IMPLEMENTATION

3.1 PIC MICROCONTROLLER



Figure 5. PIC Microcontroller

Conditions that we wind up in today in the field of smaller scale controllers had their beginnings in the improvement of innovation of incorporated circuits. This improvement has made it conceivable to store a huge number of transistors into one chip. That was essential for the creation of chip, and the principal PCs were made by adding outer peripherals, for example, memory, input-yield lines, clocks, and others. Further expanding of the volume of the bundle brought about the formation of incorporated circuits. These coordinated circuits contained both processors and peripherals. That is how the principal chip containing a microcomputer, or what might later be known as a miniaturized scale controller happened.

3.2 MOTOR DRIVER

The L293D is intended to give bidirectional drive flows of up to 600-mA at voltages from 4.5 V to 36 V. gadgets are intended to drive inductive loads, for example, transfers, solenoids, dc, and bipolar venturing engines, as well as other high-current/high-voltage stacks in positive-gracefully applications. All information sources are TTL good.

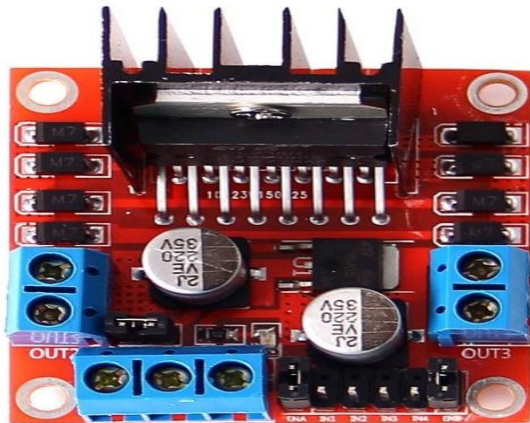


Figure 6. PIC Motor Driver

Each yield is a finished command hierarchy drive circuit, with a Darlington transistor sink and a pseudo-Darlington source. Drivers are empowered two by two, with drivers 1 and 2 empowered by 1,2EN and drivers 3 and 4 empowered by 3,4EN. At the point when the power input is high, the related drivers are empowered, and their yields are dynamic and in stage with their inputs.

At the point when the power input is low, those drivers are handicapped, and their yields are off and in the high-impedance state. With the correct information inputs, each pair of drivers shapes a full-H (or extension) reversible drive reasonable for solenoid or engine applications.

3.3 LCD DISPLAY

The LCD Display offers a straightforward and easy response for remembering a White for Liquid Crystal Display, an extremely clear and high differentiation white printed content upon a blue foundation/backdrop illumination.

The LCD Display is extremely helpful to interface with Other Microcontrollers. An I2C connector is quickly fastened legitimate onto the pins of the presentation. So all you need to join are the I2C pins, which show a fitting library and little coding.

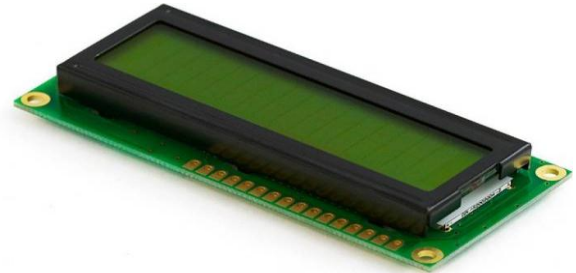


Figure 7. LCD display

3.4 IR TRANSMITTER AND RECEIVER

A photodiode is a kind of an identifier fit for changing over light into either present or voltage, contingent on the method of activity. Numerous diodes intended for use explicitly as a photodiode will likewise utilize a PIN intersection as opposed to the run of the mill PN intersection. Most photodiodes are like a

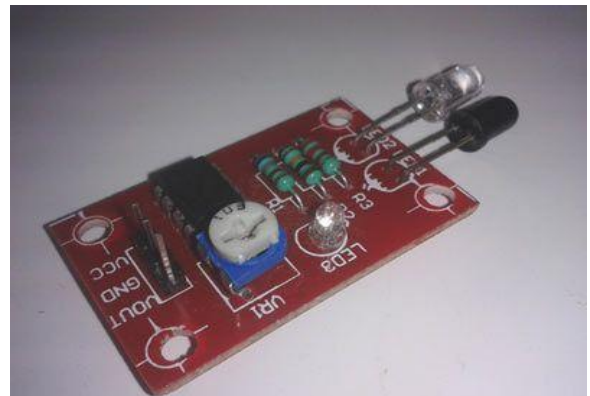


Figure 8. IR Transmitter and Receiver

light discharging diode. They will have two leads, or wires, originating from the base. The shorter finish of the two is the cathode, while the more extended end is the anode. See beneath for a schematic drawing of the anode and cathode side. The current will go from the anode to the cathode, fundamentally following the bolt.

3.5 RF TRANSMITTER AND RECEIVER

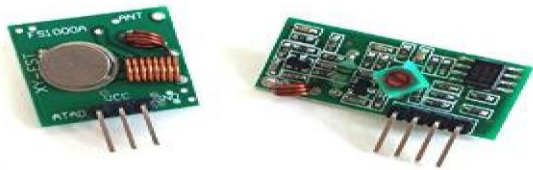


Figure 9. RF Transmitter and Receiver

The TWS-434 and RWS-434 are amazingly little and superb transmitters for applications requiring short-run RF remote controls. The transmitter module is just 1/3 the size of a standard postage stamp, and can without much of a stretch be put inside a little plastic enclosure. TWS-434: The transmitter yield is up to 8mW at 433.92MHz with a scope of roughly 400 feet (open territory) outside. Inside, the range is roughly 200 feet and will experience most walls. The TWS-434 transmitter acknowledges both straight and advanced information sources, can work from 1.5 to 12 Volts-DC and makes constructing a smaller than expected hand-held RF transmitter extremely simple. The TWS-434 is around the size of a standard postage stamp. The beneficiary likewise works at 433.92MHz and has an affectability of 3uV. The RWS-434 beneficiary works from 4.5 to 5.5 volts-DC and has both straight and advanced yields.

For the most extreme range, the suggested reception apparatus ought to be roughly 35cm long. To change over from centimeters to inches - increase by 0.3937. For 35cm, the length in inches will be around $35\text{cm} \times 0.3937 = 13.7795$ inches long. We tried these modules utilizing a 14", strong, 24 measure side interest type wires, and arrived at a scope of more than 400 feet. Your outcomes may change contingent upon your environmental factors.

3.6 RELAY

Relay is an electrically operated switch. Numerous relays utilize an electromagnet to precisely work as a switch, however, other working standards are additionally utilized, for example, strong state relays. Relays are utilized where it is important to control a circuit by a low-power signal (with complete electrical detachment among

control and controlled circuits), or where a few circuits must be constrained by one sign.



Figure 10. Relay Switch

The primary relays were utilized in significant distance broadcast circuits as enhancers. They rehashed the sign rolling in from one circuit and re-transmitted it on another circuit. Relays were utilized widely in phone trades and early PCs to perform coherent operations. That can deal with the high force required to legitimately control an electric engine or different burdens is known as a contractor. Solid-state relays control power circuits with no moving parts, rather utilizing a semiconductor gadget to perform exchanges. Relays with adjusted working qualities and different working curls are utilized to shield electrical circuits from over-burden. In current electric force frameworks these capacities are performed by computerized instruments despite everything called "protective relays".

3.7 GEARED DC MOTOR

Geared DC motors can be characterized as an augmentation of the DC engine. An equipped DC Motor has a rigging assembly connected to the engine. The speed of the engine is included as far as turns of the pole every moment and is named as RPM. The apparatus assembly aides in expanding the torque and lessening the speed. Utilizing the right blend of apparatuses in a rigging engine, its speed can be diminished to an attractive figure.



Figure 11. DC Motor

This idea where riggings decrease the speed of the vehicle yet increment its torque is known as apparatus decrease. This Insight will investigate all the minor and significant subtleties that make the apparatus head and consequently the working of equipped DC engine.

A DC motor can be either an AC (alternating current flow) or a DC (direct current flow) electric engine. Most apparatus engines have a yield of between around 1,200 to 3,600 cycles for every moment (RPMs). These sorts of motors likewise have two diverse speed determinations: typical speed and the slow down speed torque specifications. Gear engines are fundamentally used to diminish speed in a progression of apparatuses, which thus makes more torque. This is cultivated by a coordinated arrangement of apparatuses or a rigging box being appended to the fundamental engine rotor and shaft through a subsequent decrease shaft. The subsequent shaft is then associated with the arrangement of riggings or gearbox to make what is known as a progression of decrease gears. As a rule, the more extended the train of decrease equips, the lower the yield at the end. A superb case of this guideline would be an electric time clock (the sort that utilizes hour, minutes, and seconds). The simultaneous AC engine that is utilized to control the time clock will normally turn the rotor at around 1500 cycles for every moment. Notwithstanding, a progression of decrease gears is utilized to slow the development of the hands-on clock.

3.8 IOT BOARD

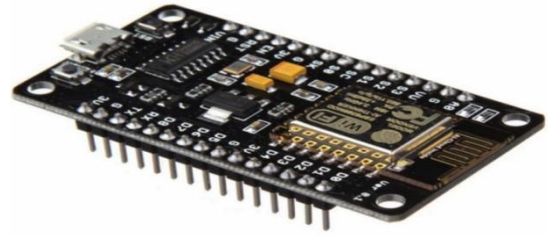


Figure 12. IoT Board

Internet of Things (IoT) is a situation where items, creatures, or individuals are furnished with remarkable identifiers and the capacity to move information over a system without expecting human-to-human or human-to-PC association. IoT board highlighted with SIM900 GPRS modem to enact web association likewise outfitted with a controller to process all information UART information to GPRS based online information. Information might be refreshed to a particular site or an interpersonal organization by which the client can ready to get to the information.

3.9 BATTERY

An electric battery is a gadget comprising of at least two electrochemical cells that convert put away substance vitality into electrical vitality. Every cell has a positive terminal, or cathode, and a negative terminal, or anode.

The terminal stamped as positive is at a higher electrical potential vitality than is the terminal checked as negative. The terminal stamped positive is the wellspring of electrons that will stream and convey vitality to an outside gadget only when it is associated with an outer circuit. At the point when a battery is associated with an outer circuit, electrolytes can move as particles inside, permitting the concoction responses to be finished at the different terminals thus convey vitality to the outside circuit. It is the development of those particles inside the battery which permits current to stream out of the battery to perform work. Although the term battery implies a gadget with various cells, single cells are likewise prominently called batteries.



Figure 13. Battery

4. PROGRAMMING METHODOLOGY

4.1 Embedded C

Embedded C is a far-reaching term given to a programming language written in C, which is related to remarkable equipment design. Embedded C is an expansion to the C language with some additional header documents. These header documents may likewise trade from controller to controller. Embedded C is a compilation of language augmentations for the C programming language. The C Standards Committee to address common troubles that exist between C extensions for one-of-a-kind embedded systems.

5. RESULT

At the point when the IR Sensor gets the data about a drawing nearer of a vehicle, where the separation is near the length of the open entryway of the vehicle, it will naturally bolt the doors.

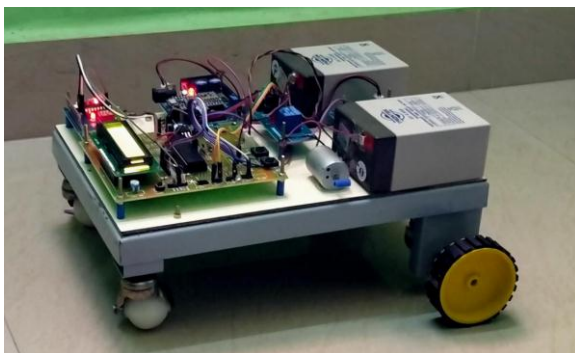


Figure 14. Whole Setup

At whatever points, the vehicle has to deal with a traffic signal, when it shows the Red Light by utilizing the RF signal, the moving vehicle will be naturally stopped. On the off chance that it disregarded the Traffic Signal because of

any pointless causes; the IoT associated gadget will send the area and the time to the signal specialists.

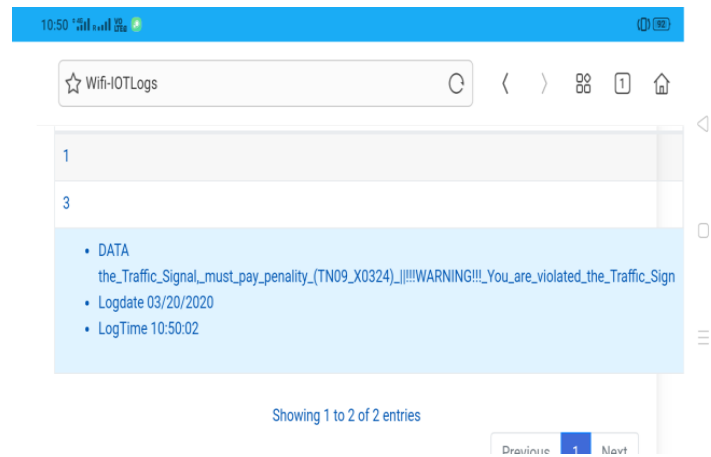


Figure 15. Cautioning Message

6. CONCLUSION

Subsequently, our proposed arrangement enables the traveler to even in drive in troublesome circumstances. So the driver can drive the vehicle with no dread and dithering. Human life will be spared from all sorts of fiasco and mishaps. For the most part, we can maintain a strategic distance from the mishap of obviousness. We can likewise evade the mishap happening because of infringement of Traffic Signal via programmed killing the motor in Red Traffic light and naturally send the message to particular experts all together to ensure the residents.

7. REFERENCES

- [1]. Thanh Nam Pham, Ming-Fong Tsai, Duc Binh Nguyen , Chyi- Ren Dow1 , And Der-Jiunn Deng, A Cloud-Based Smart-parking System Based on Internet-of-Things Technologies, Publication, IEEE Access, September 2015
- [2]. MASAR ALMOSAWI. (2018). IoT Security Applied on a Smart Door Lock Application[Ebook] (p. 13)
- [3]. CIGREF, "Cloud Computing basics – Large companies' perspective", Marcp013.
- [4]. Brown,, Eric Retrieved 23 October 2016."Internet of Things Global Standards Initiative". ITU. Retrieved 26 June 2015

[5]. Chandan G, Ayush Jain, Harsh Jain and Mohana, Real-time object detection and tracking using deep learning and OpenCV, III International Conference on Inventive Research in Computing Applications (ICIRCA 2018).

[6]. Fahim Bin Basheer, Jinu J Alias and Mohammad Favas C, Design of accident detection and alert system for motor cycles, International Conference on Automobile Engineering (IEEE 2013)

[7]. Tiago Moura, Antonio Valente and Vitorphilipe, The traffic sign recognition for autonomous robot, 2014 International Conference on Autonomous Robot System and Competitions (ICARSC 2014).

[8].Q. Jing, A.V. Vasilakos, J. Wan, J. Lu, D.Qiu Security of the Internet of Things: perspectives and challenges Wirel. Netw., 20 (8) (2014), pp.2481-2501

Mr. Kesavan E M.E., is an Assistant Professor, Department of Electronics and Instrumentation Engineering. He acquired his B.E degree in EIE from M Kumarasamy College of Engineering (Autonomous), Karur, M.Tech in Process Dynamics and Control - from Sastra University He has been in the showing calling for as long as 5 years

8. AUTHOR PROFILE

Mr.Arjunsurendran E is pursuing his fourth year of Under graduation in Electronics and Instrumentation Engineering at R.M.K.Engineering College. His zone of Interest incorporates Biomedical Engineering and Industrial Instrumentation. He has introduced 2 papers on national specialized Conference (IEI) on the field of biomedical building and another on IOT.

Mr. Joshua Santhosh S is a fourth year of under graduate in Electronics and Instrumentation Engineering at R.M.K. Engineering College. His zone of Interest incorporates Industrial Automation, Transducer Engineering and Process Control. He has introduced 2 paper in National specialized Conference (IEI) on the subject of Smart Car Door and Honking Alleviator

Mr. Karthik K an undergraduate student in Electronics and Instrumentation Engineering at R.M.K. Engineering College. His field of Interest incorporates Transducer Engineering and Industrial Instrumentation. He has introduced 1 paper in National specialized Conference (IEI) on the subject of Smart Car Door and Honking Alleviator.