

Smart Two-Wheeler

Ana Epsiba F¹, Aman Kumar Singh², Kshitiz Gurung³, Rakesh MD⁴, Saleem S Tevaramani⁵

Student, Dept. of Electronics and Communication, KS Institute of Technology, Bangalore, Karnataka^{1,2,3,4}

Assistant Professor, Dept. of Electronics and Communication, KS Institute of Technology, Bangalore, Karnataka⁵

Abstract: “In this growing population, the demand of motor vehicles is increasing rapidly. Hence, the number of deaths and injuries are also in tip. As travelling and driving are an integral part of life the accidents can be avoided by a few safety implementations. This study mainly focuses on developing a safety measures related to two-wheeler motor vehicles. Mainly the model consists of two modules the helmet and the engine module. The helmet module has inbuilt alcohol sensor, relay switch. These sensors communicate wirelessly with the two-wheeler's module through radio frequency transmitter. GPS and GSM system are kept closer to the engine. The engine module receives the information from helmet module through radio frequency receiver. The spark plug is shorted to ground with the help of relay, which is connected to the controller. The relay senses and releases the spark plug from ground unless the signal comes from the controller. The helmet is designed in such a way that it doesn't allow the engine to start unless the rider wears a helmet and also checks whether the rider is drunk or not. Theft has also increased in the developing countries in the recent years. Being light and easy to hide, a stolen two-wheeler is often difficult to search. It has therefore, become a pressing need to develop a low cost, easy to use solution to track them using GPS. As people are careless about their vehicle maintenance, they ought to be reminded about the servicing dates for the good health of vehicle also deals with the monitoring of vehicle's tire pressure on the daily basis. Here, we are using finger-print sensor for the owner to turn on the engine of the vehicle and for other person the physical keypad box is used where the input OTP has to be provided. If at all accident occurs, impact sensor senses the impact force and if found above the limitation then it sends SMS using GSM module to the nearby hospital and the close ones of the respected rider. And it also sends the location, where the accident took place using GPS.”

Keywords: alcohol sensor, relay switch, fingerprint sensor, 4*4 keypad, GPS, GSM

I. INTRODUCTION

Road accidents are getting increased day by day in our country due to carelessness of people on the road. Especially two-wheeler accidents are more common in our country. This happens because most of the people don't wear helmet. Even though our government keep on try to spread awareness through various advertisements in theatre, newspaper and in public places but our people still doesn't care and are not following the rules. In order to prevent the accidents as well as theft, a smart two-wheeler have to be developed which aims at the security and safety of the two-wheeler riders against road accidents. Two-wheeler theft has increased in the developing countries in the recent years. Being light and easy to hide, a stolen two-wheelers are often difficult to search. Therefore, presently it become a pressing need to develop a low cost, easy to use solution to track those using GPS. We have a lot of drink and drive cases and many accidents caused by them, to avoid such situations is mandatory now. As people are careless about their vehicle maintenance, they ought to be reminded about the servicing dates. Considering the above constraints, we have come up with smart two-wheeler which helps us overcome the stated problems.

II. LITERATURE SURVEY

Priyanka Berade, Kranti Patil, Pradnya Tawate and Prof. Ghewari.M.U. [1] proposed “Intelligent Accident Identification and Prevention System Using GPS and GSM Modem”. This paper detects the accident, the PIC will send signal to GPS and it tracks the location and sends signal to the GSM module which sends signal to the coded number. According to our research and this paper, the PIC microcontroller is very fast and easy to execute program compared to other microcontrollers. Since, at the emergencies such as accidents, the speed is of utmost need, we use PIC microcontroller. After the accident detection, the location has to be detected and for that we will be using GPS (Global Positioning System) which is a satellite navigation system. Then, the detected location has to be sent to the coded number and that is done by the GSM module that we will be implementing. For displaying any message to the rider, there is the implementation of the LCD as stated in this paper.

Mr. K elaiyaraja, k.raj kumar, m. sheik Mohamed [2] proposed "Smart Human Two-wheeler Safety System". Our objective of safe riding and following traffic rules are depicted in this paper. As every year in India as lot of deaths occur due to road accidents, drivers on two-wheeler contribute significantly. It is very essential for the riders to wear

protective guards like helmets. Hence, in this the IR sensors are implemented to detect the skin in front of the helmet to know if the rider has equipped the helmet. There is also an alcohol sensor present to detect if the rider is drunk or not. The sensors are connected to the PIC controller. PIC microcontroller is of low cost and easy reprogramming and it is very fast and reliable to drive all the sensors connected to it. Hence, this system makes it compulsory for the rider to wear a helmet before riding and if the person is drunk, it sends message to the family members.

P.Kaliuga Lakshmi, C.Thangamani, Research scholar, Assistant Professor, P.K.R Arts College for Women, Gobichettipalayam [3] proposed "An efficient vehicle accident detection using sensor technology". It focuses on one of our objectives that is the accident detection. This system overcomes the problem of lack of automated accident detection. The accident detection helps to provide security to the rider. The GSM (Global System for Mobile communication) technology is used to transmit message, pictures, voice message etc. GSM uses TDMA (Time Division Multiple Access) which is one of the digital wireless telephone technologies. It consists highly efficient communication through the mobile which would be controlled from anywhere else. It is highly economic and less expensive. By the help of this, message will be easily sent to the corresponding people like the family of the rider and the nearby hospital. GPS is used in the vehicle for tracking. This technology uses 24 satellites continuous orbiting the earth. GPS is used to search, locate and to send signal to the GSM module which in turn sends the messages to the corresponding people.

Vinay R.G. Dubey, SGSITS Indore, Vikas Jain, SGSITS Indore, Sandesh Agrawal, SGSITS Indore, Avirup Das, SGSITS Indore [4] proposed "Automated Security and Rider Safety for two-wheelers". This paper relates to our accident prevention objective and it reports a technique for reducing road accidents that result in a large number of casualties in India. The designed system focuses on the security of a two-wheeler is involved in an accident or if it is stolen, the rider can be provided immediate medical assistance and the vehicle's location can be easily traced. A password encrypted vehicle locking and unlocking feature inside the two-wheeler helps to reduce risk and enhance security. This system also minimizes the risk of accidents caused by drunk drivers. It helps to ensure that the riders abide by the traffic rules and regulation, making it easier for law enforcing authorities to maintain it easier for law enforcing authorities to maintain the traffic decorum efficiently. This paper uses the Texas Instruments (TI) MSP430G2553 microcontroller, a GPS-GS module, RoyalTek's REB-1315LPXGPS module and Simcom's SIM900A respectively. RF-trans receiver module, pressure pads, MQ303a based gas sensor and an IR sensor. The helmet consists of an alcohol sensor and infrared sensor (IR) which detects the pressure of the rider's head inside the helmet and detects whether the rider is drunk. If the output from the helmet module is negative, the microcontroller, using radio frequency (RF) communication, switches the vehicle ignition system OFF and if the module's output is positive, the microcontroller switches the ignition system ON.

Muhamad Asyraf Mat Hussin, Norliza Zaini. Faculty of Electrical Engineering Universiti Teknologi MARA (UiTM) Shah Alam Selangor, Malaysia [5] proposed "Android Based Motorcycle Safety Notification System". This paper focuses on the security system of our project. Motorcycle maintenance is more than just fixing the motorcycle when broken. Regular checking on the condition of the motorcycle and performing general maintenance is a must to keep the vehicle in a good condition. The more regular the maintenance is done on the motorcycle, the safer it can be used. Since breakdown while riding can lead to a great damage to the rider, as most people own a smartphone, it would be perfect for riders to be able to view their motorcycle's condition records on their phones.

The various sensors used in the project to keep the motorcycle's condition in check are carbon dioxide sensor, accelerometer sensor, temperature sensor and a voltmeter which are driven by a microcontroller. The distance traveled will keep on being counted which the motorcycle is moving and when the limit is set for each service is marked, it sends a notification to the rider to get the regular maintenance done for the motorcycle.

Muhamad Asyraf Mat Hussin, Norliza Zaini. Faculty of Electrical Engineering Universiti Teknologi MARA (UiTM) Shah Alam Selangor, Malaysia [6] proposed "Implementation of vehicle security system using GPS, GSM and biometric". An enhanced system has been proposed in this paper to ensure vehicle safety and track the vehicle in the event of theft. This proposed system includes a fingerprint-based authentication to enable the engines ON in addition to the key mechanism. The owner has to use both the key and the fingerprint to access the vehicle. Even if one input out of the two is not available, the vehicle cannot be turned ON. When an unauthorized person tries to operate the vehicle by an alternate mechanism by bypassing the fingerprint authentication and key, an alert SMS with the location coordinates is sent to the owner which will enable him/her to track the vehicle with the help of GPS and GSM technologies. The user can enroll then fingerprints in the FPS (Fingerprint Sensor) with the help of an Arduino microcontroller. Once they are enrolled, the module becomes ready to use.

S. J. Swathi, Shubham Raj and D. Devaraj [7] proposed "Microcontroller and Sensor Based Smart Biking System for Driver's Safety". This paper describes the proposed methodology to build a safety system which is integrated with the

smart helmet and intelligent bike to reduce the probability of two-wheeler accidents, bike theft and drunk drive cases. This device aims for the safety and security of two-wheeler riders as well as of two wheelers. In this era, more than 1.5 lakhs people were injured because of road accidents. It is noted that 17 deaths happen for every one hour. The major reason is drunken drive. It is reported that the majority of road accidents are happened only because of drunken drive. It has also been observed that other accidents are because of improper usage of helmet. This system is used to reduce the rate of accident and rate of vehicle theft. This proposed methodology is implemented using RFID technology, password authentication and sensors namely gas sensor and proximity sensor. In this proposed methodology proximity sensor is fixed in the helmet so that the rider cannot ride the two-wheeler if he/she doesn't wear the helmet. Gas Sensor is fixed so as to sense whether the rider has consumed the alcohol. If so, the ignition system doesn't get on. The ignition system gets on and the gas sensor checks whether the rider had consumed alcohol or not, if yes, it will be detected by the gas sensor and the ignition system gets off automatically. The bike will start until the rider wears the helmet and if there is no alcoholic content present. When the rider needs to start the vehicle, he/she need to use the password provided to start the vehicle in order to authenticate the owner of the vehicle.

III. SYSTEM DESIGN AND ARCHITECHTURE

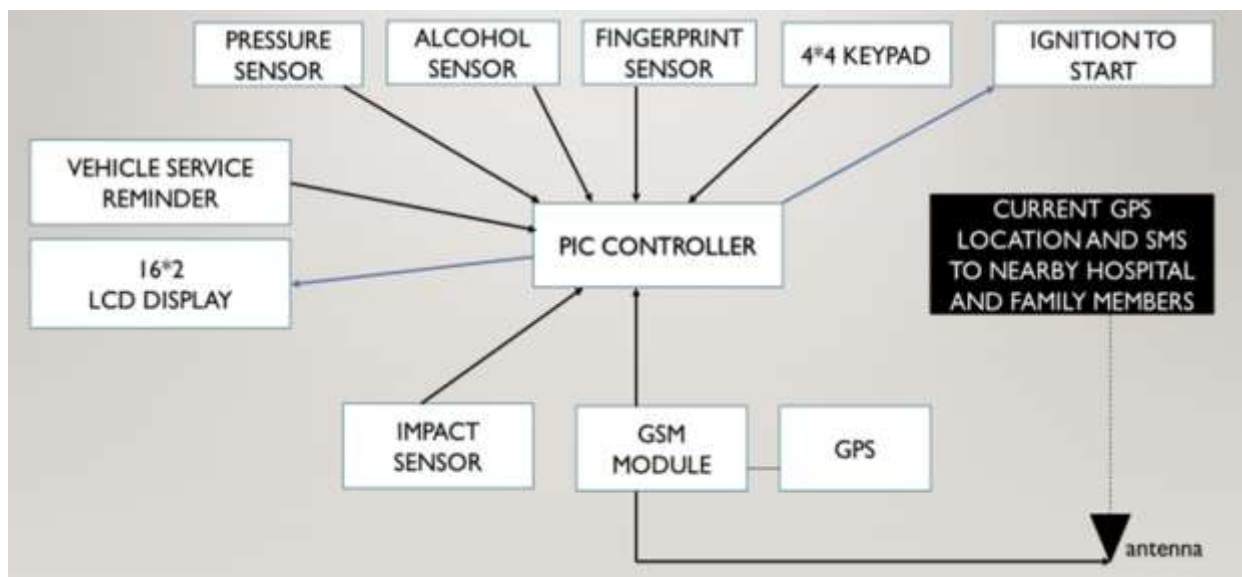


Fig 1: Block Diagram

The block diagram is intelligible enough to understand that the PIC microcontroller drives all the sensors in the system. The sensors that are connected to the PIC microcontroller are the pressure sensor, alcohol sensor, fingerprint sensor, tyre pressure sensor and the impact sensor. The GSM module along with the GPS module is also connected to the PIC microcontroller. The 16*2 LCD display is also driven by the PIC microcontroller. The PIC controller controls the ignition of the engine.

The fingerprint scanner along with 4*4 keypad to enter the OTP is placed beside speedometer. Alcohol sensor is placed inside the helmet facing towards the mouth & pressure sensor place towards the cheeks. Impact sensors are placed underneath the chassis on both sides left and right. When an accident occurs the relay switch detects the signal and it is sent to the GSM module to send a text message to the nearby hospital and the closed ones of the rider. A text message is sent to the rider when it is time for the vehicle to be serviced either based on the time limit or the distance travelled.

IV. ADVANTAGES

1. Provides safety and secure vehicle riding by using the alcohol sensor and accident detection system respectively.
2. Authenticates the access to the vehicle using the fingerprint sensor or the keypad.
3. Tracks the position of the vehicle using the GPS system.
4. Sends the message on as to where the accident has occurred to the nearby hospital and the rider's family and also for receiving OTP, we are using the GSM module.

**V.CONCLUSIONS**

This project is designed using structured modelling and is able to provide the desired results. It can be successfully implemented as a Real Time system with certain modifications. Science is discovering or creating major breakthrough in various fields, and hence technology keeps changing from time to time. Going further, most of the units can be fabricated on a single along with microcontroller thus making the system compact thereby making the existing system more effective. To make the system applicable for real time purposes components with greater range needs to be implemented.

REFERENCES

- [1] Intelligent Accident Identification and Prevention System Using GPS and GSM Modem by Priyanka Berade, Kranti Patil, Pradnya Tawate and Prof. Ghewari.M.U.
- [2] Smart human two-wheeler safety system Mr. K elaiyaraja, k.raj kumar, m. sheik Mohamed.
- [3] An efficient vehicle accident detection using sensor technology P.Kaliuga Lakshmi, C.Thangamani, Research scholar, Assistant Professor, P.K.R Arts College for Women, Gobichettipalayam.
- [4] Automated Security and Rider Safety System for Two Wheelers by Vinay R.G. Dubey, SGSITS Indore, Vikas Jain, SGSITS Indore, Sandesh Agrawal, SGSITS Indore, Avirup Das, SGSITS Indore.
- [5] Android-based Motorcycle Safety Notification System, Muhamad Asyraf Mat Hussin, Norliza Zaini. Faculty of Electrical Engineering Universiti Teknologi MARA (UiTM) Shah Alam Selangor, Malaysia.
- [6] Implementation of Vehicle Security System using GPS, GSM and Biometric Mridhula Ramesh*, Akruthi S, Nandhini K, Meena S, Joseph Gladwin S, and Rajavel R, Department of Electronics and Communication Engineering SSN College of Engineering, Kalavakkam, Chennai, 603110.
- [7] Microcontroller and Sensor Based Smart Biking System for Driver's Safety by S. J. Swathi Student - Department of Computer Science Engineering, Kalasalingam Academy of Research and Education, Virudhunagar, Tamilnadu-626126, Shubham Raj Student - Department of Electrical and Electronics Engineering, Kalasalingam Academy of Research and Education, Virudhunagar, Tamilnadu-626126, D. Devaraj Director Academics / Dean School of Electrical and Electronics Technology, Kalasalingam Academy of Research and Education, Virudhunagar, Tamilnadu-626126