

Skull Helmet and Perceptive Bike Frame for Refuge of Citizens

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Abstract— More than one lakh people were dying in road accidents every year, that is more than the number of people dead in all our wars put together.. Even though there have been continuous awareness from the government authorities regarding helmets and seat belts a majority of the drivers do not heed them. In order to put an end to this mishap we have developed the skull helmet for bikes, a way to stop starting of vehicles without wearing helmet or even if the driver is boozed. In addition, it has a great feature of detecting accidents and informs specific people via SMS with location and speed of the bike before the accident occurs with the help of GPS, GSM based tracking system, thus aiding ambulance to reach the correct location. We have implemented all the sensors within the helmet, which will send the information to the module connected with the bike engine wirelessly. A display is provided to monitor the status. This perceptive bike helmet system has two units, one on the helmet and another one on the bike. Vibration sensor, Blink sensor ,third eye concept , Lily pad arduino and alcohol sensor are attached with the helmet module and Speed sensor, Co sensor ,Gray box ,GPS and GSM are connected with the module on the bike that will display information on lcd . These two modules communicate wirelessly using RF transmitter and receiver with encoder and decoder, PIC16F877A is used as CPU. This is one of the most advanced electronics projects for engineering students.

Keywords— Lily pad Arduino, Alcohol Sensor, Vibration Sensor, Gray Box, Co Sensor, Speed Sensor, Third Eye.

1. INTRODUCTION

A Road Traffic Accident (RTA) can be defined as, 'An incident that occurs on a way or street open to public traffic; resulting in one or more persons being injured or killed, where one or more moving vehicle is involved. Thus RTA is a crashing between vehicles; between vehicles and stroller; between vehicles and animals; or between vehicles and natural or artificial obstacles.' Road traffic accidents are a human tragedy. They involve high human agonize and socio economic costs in terms of premature deaths, injuries, loss of productivity, etc. [1]According to statistics serious head injuries can

happen even in low speeds. Ninety five percent of head injury cases are due to road accidents, about 82 percent are youngsters in the age group of 18 to 40. At least two young men using two wheelers die every five minutes in India due to head injury. During 2013, a total of 8,98,885 road accidents were reported by all States/UTs .The proportion of fatal accidents in the total road accidents has consistently increased since 2002 from 18.1 to 24.4% in 2011. The severity of road accidents measured in terms of persons killed per 100 accidents has also increased from 20.8 in 2002 to 28.6 in 2011. For a young Indian chance of being killed or disabled by road traffic injury is higher are provided. than Human Immunodeficiency Virus, heart stroke or breast cancer. Head injuries have acquired the status of a public health problem. These scenarios grabbed my interest over this paper in order to ensure safe bike riding.

With large number of high powered bikes being launched in India, teaching riders about the need to follow traffic rules, riding within the speed limits as well as wearing proper riding gear is the need of the hour. With great power comes great sound. A great line, which is right , especially when you are driving a very robust vehicle on public roads. With more and more powerful cars and bikes being launched in India, the number of high speed crashes are also on the ascend. But this does not mean that we should stop such vehicles. In fact, it is up to us to use them sensibly. Most of the time, people blame quality of the vehicles for accidents. But the truth is, the driver / rider is at fault most of the time. If not you, then the person you crash with. Most of the time it is our error. Read on to find out about some of the recent high-powered crashes reported..

2. OBJECTIVE OF THE PROJECT

To design the circuit that can improve the safety of rider/driver.

To develop a Skull protective helmet for complete rider. To study and understand the concept of RF Transmitter and RF Receiver circuit in implementing the project.

3. BLOCK DESCRIPTION

3A. skull unit

Robotic Helmet[2] unit includes Lily Pad Arduino, alcohol sensor, push button switch, blink sensor shown in fig1. GPS receiver is used to receive the location of the rider through GPS satellites. In helmet unit, the pushbutton switch is placed on inside upper part of the helmet where actually head was touched with sensor surface. And alcohol sensor MQ3 is placed on in front of rider's mouth. It can sense easily. Solar panels are mounted on upper side of helmet which is in direct sunlight. And the battery and regular circuits were fitted inside the helmet. Secondary controller and RF transmitter circuit was also placed inside the helmet, antenna are located outside the helmet. IR sensor measures the eye blink. The IR transmitter is used to transmit the infrared rays in our eye.

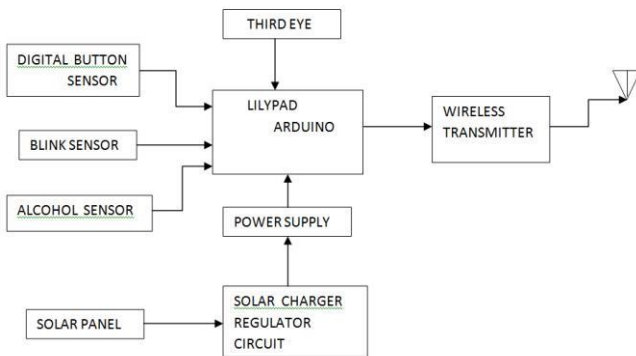


Fig.1. Block diagram of the helmet unit

3B. BIKE UNIT

The bike unit is mounted on handle of the bike. Vibration sensor was fixed on bike, for the fall detection. Gray box was placed on bike used as anti-theft protection. CO sensor was also used shown in fig2. Our main controller is positioning in to storage case of bike. And decoder circuit is also placed on in handle of bike. Microcontroller PIC16F877A controls everything.

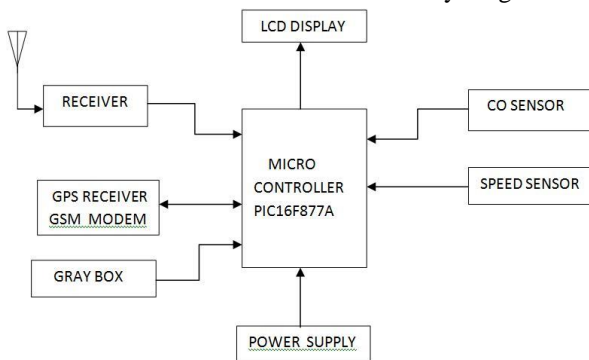


Fig2. Block diagram of bike unit in which pic controller is used which controls the sensors.

4. FLOW CHART AND REPRESENTATION

The initial step of project is it initializes all the port fig3 and next step is Accident Detection using vibration sensor if No crash then it will go to third step. Third step is listening to RF Module Continuously for Data and Interprets Data using if conditions. Fourth step is check whether helmet is wear or not. If Helmet not wore then display Message "Caution: Please wear the helmet". Next step is check the condition of drunk if rider is drunk display message "You are alcoholic" and then send the message to stored number with Location.. The sixth step, if accident detected, stop everything and send message location. The

seventh step, if rider closes his/her eyes the IR sensor senses it and gives a buzzer.

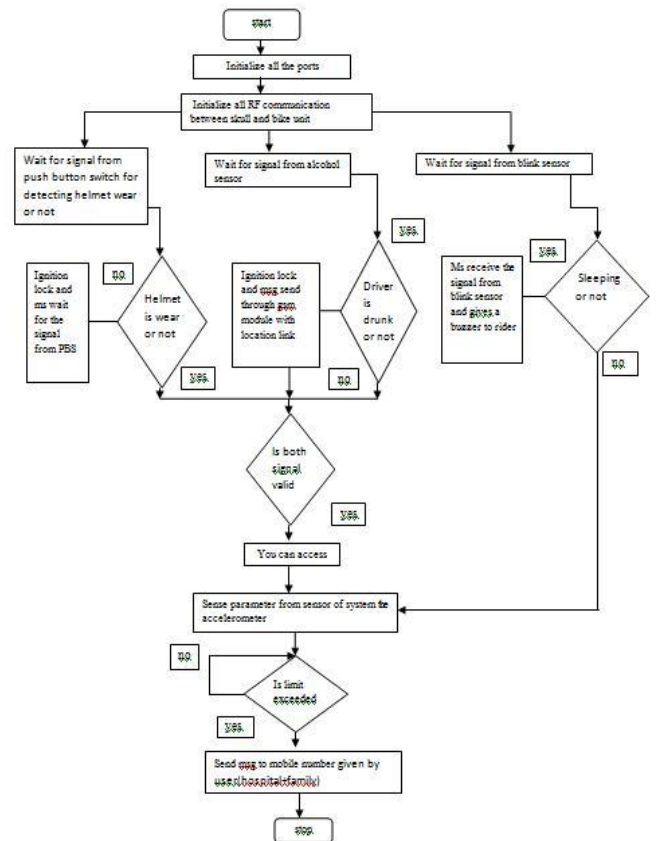


Fig3.It shows how the process is going in module.

5 COMPONENTS USED

5A.LILY PAD ARDUINO (Atmega328)

The Lily Pad Arduino is a microcontroller board designed for wearables and e-textiles. The board is based on the ATmega328P.

Micro controllers : ATmega328

Operating voltage : 2.7-5.7 V

Digital I/O pins : 14

Flash memory : 16 KB

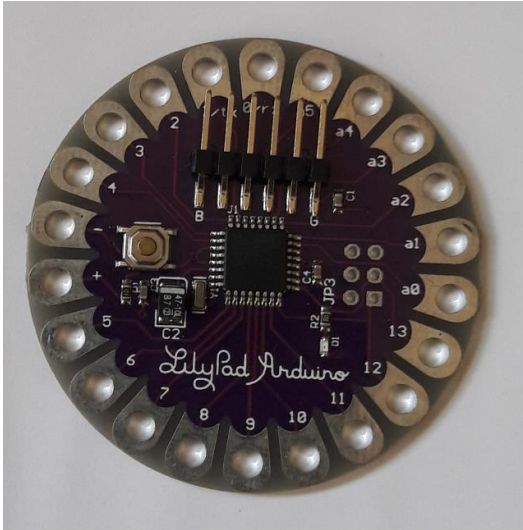


Fig4:it is lilypad aurdino ,ATMEGA328p

5B.Eye Blink Sensor

Blink sensor is IR based . The variation across the eye will vary as per eye blink . [3]If the eye is closed means the output is '1' otherwise output is '0' . This is to know the rider is attentive or not.. This output is given to logical circuit and indicate the buzzer.

5C.Alcohol Sensor

Alcohol Sensor detects ethanol content and send signal to Arduino.. It is MQ3 fig5 semiconductor alcohol sensor. It has good sensitivity and fast response to alcohol. It is suitable for making Breathalyzer. TTL output valid signal is low(0).This Grove implements all the necessary circuitry for MQ3 like power conditioning and heater power supply. This sensor outputs a voltage inversely proportional to the alcohol amount in air.

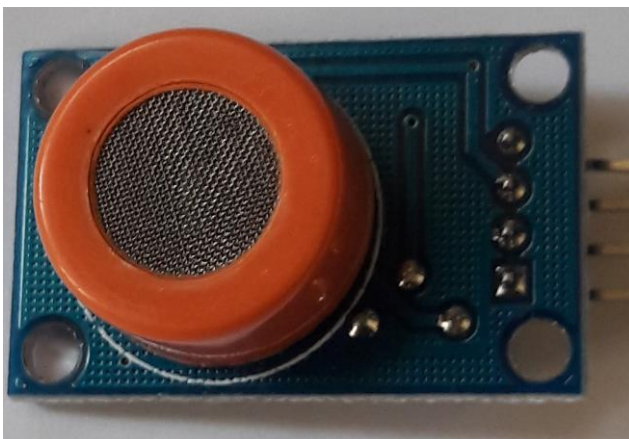


Fig5:MQ3 alcohol sensor

5D.Piezo Vibration Sensor

The vibration sensor with desirable range frequency is fixed in the vehicle. It operates at the frequency of 315MHZ in case of fig6 vehicle collide with another vehicle or to any other obstacle the vibration sensor finds whether the frequency generated due to vibration is within the limit or not. If it is greater it reports as accident and

activates the auto-dialer. Mean while the relay opens and turn OFF ignition , then send message to relatives.



Fig6: Piezo vibration sensor detects mechanical vibrations

5E.Third Eye

The main difficulty with motorcycles is that the mirrors just do not[6] work very well.You have got a very small reflected image and, because of the position of the mirrors, mostly you are seeing your elbows.we fix a small mirror into motorcycle helmets. An adjustable arm lets riders place it just below or above their eye, in their peripheral vision. A back-facing mirror is placed for vivid vision .Once looking at the display gives the rider a wide view of the road rear of him. Although the screen is just next to the user's face, optics make the eye into focusing at a more comfortable distance of around 2.5m. The screen is next to the user's face, but the optics allow the eye to focus at a ease distance.

5F.Gsm Modem Sim 900

GSM is digital mobile telephony system Manufactured for global market,[4] SIM900 fig7 has LTE band equal to 8.It works on frequencies of EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz SIM900 provides GPRS multi-slot class10 capability and support the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. GSM controls via AT commands. It uses a variation of time division multiple access (TDMA).With [5] a small configuration of 40mm x 33mm x 2.85 mm, SIM900 can fit almost all the space requirement in your application, such as Smart phone, PDA phone and other mobile device.



Fig7:GSM modem sim 900

5G.LCD DISPLAY

LCD (Liquid Crystal Display) fig8 screen is an electronic display module and matches a wide range of applications. A 16x2 LCD display is very primary module and is very commonly used in [8]different devices and circuits. These modules are preferred over seven segments and other multi segment Light Emitting Diodes. Like light-emitting diode (LED) and gas-plasma technologies, LCDs allow show to be much thinner than cathode ray tube (CRT) technology. The LCDs are very cheap and easily programmable have no limitation of displaying alphabetical,special & alphanumeric characters. A 16x2 LCD means it can display 16 characters per row and there are 2 such rows.

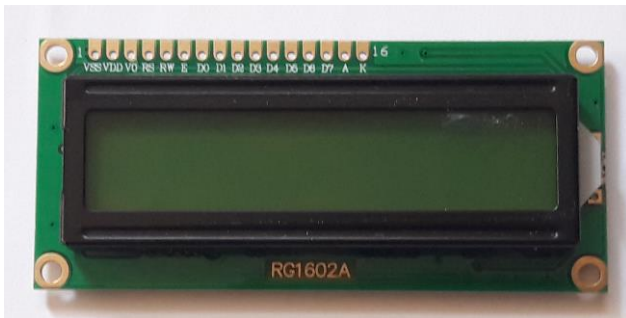


Fig8:Liquid crystal display which shows information

5H. Gray BOX

It is a device [7]which protects fig9 you and your vehicle*.This device will be mounted on your vehicle* and will perform some tasks automatically to save you and your vehicle*.Gray BOX contains a SIM card so you can communicate with it via text message(SMS only).

Tasks performed by this device are

Accident detection

Theft protection

Stopping theft execution

Communication with user

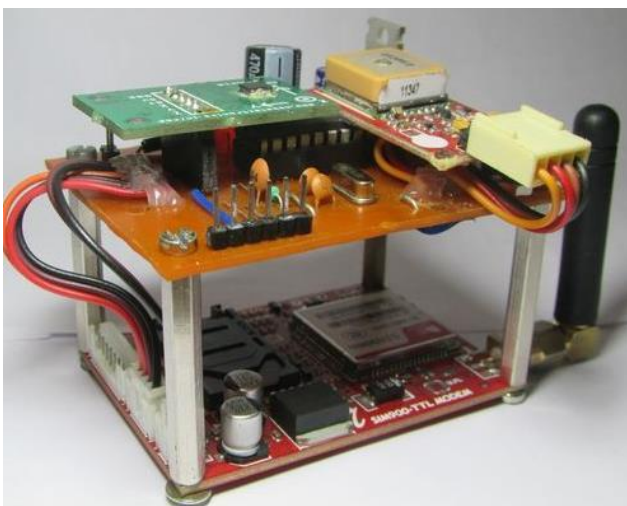


Fig9:This device detects accident, provide communication

6. ADVANTAGES, APPLICATION AND FUTURE SCOPE

6 A. ADVANTAGES

1. Works on solar power as well as battery supply.
2. Strictly prohibiting drunken drive by using alcohol detector. it will reduces the probability of accident .
3. Number of cases of violated traffic rules can be diminished .

6B.APPLICATIONS

1. Useful for youngsters.
2. Useful for motorcyclists.
3. This emerging technology can further be enhanced in car and also by replacing the helmet with seat belt.
4. It can be used in on time safety system.
5. We can implement the complete circuit into micro module later.

6C.FUTURE SCOPE:

1. We can implement various bioelectric sensors on the helmet to measure various activity.
2. We can provide optical communication between the vehicles.
3. It can be used for passing message from the one vehicle to another vehicle by using wireless transmitter.
4. Power supply can also be used to charge our mobile.
5. Helmet itself can be used for indications i.e. left, right, break.

7. RESULT

Skull helmet for safe rider is designed with radio frequency link. , as user wear the helmet a RF signal encoded from transmitter and these RF signal get sensed and synchronized with the help of address matching by the receiver section placed in the ignition switch of the bike and bike get started and bike get stopped when helmet keep out from head. This means bike work properly till helmet keep on head.

8. CONCLUSION

Helmet for road hazard warning is designed with wireless bike authentication. The scope of this project is to encourage people to wear helmet and to prevent mishaps which is achieved. Thus road accidents can be decreased to some extent and safety of bike riders is ensured.

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