SMART HELMET AN INTELLIGENT BIKE SYSTEM

Yogita Chandrawanshi[1], Smita Khuspare[2], Prof.H.P.Chavan[3]

[1,2]UG Student [3]Assistant Professor
[123]Department of Electronic and Telecommunication Engineering,
[123]Government College of Engineering Chandrapur, Maharashtra, India

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ABSTRACT--An accident is a specific, unexpected, unusual and unintended external action which occurs in a particular time and place, with no apparent and deliberate cause but with marked effects. Carelessness of the driver is the major factor of such accidents. In order to overcome this we introduces an intelligent system, Smart Helmet, which automatically checks whether the person is wearing the helmet and has non- alcoholic breath while driving. Here we have a transmitter at the helmet and the receiver at the bike. There is a switch used to sure the wearing of helmet on the head. The on condition of the switch ensures the placing of the helmet in proper manner. An alcohol sensor is placed near to the mouth of the driver in the helmet to detect the presence of alcohol. The data to be transferred is coded with RF encoder and transmitted through radio frequency transmitter. The receiver at the bike receives the data and decodes it through RF decoder. The engine should not on if any of the two conditions is violated. MCU controls the function of relay and thus the ignition, it control the engine through a relay and a relay interfacing circuit. A RF Module as wireless link which able to communicate between transmitter and receiver. If rider getting drunk it gets automatically ignition switch is locked, and send message automatically to their register number with their current location. So when accident occurs, it will send message by GSM to register numbers with their current location by GPS module. It can use to receive call while driving. The distinctive utility of project is fall detection, if the bike rider fall from bike it will send message automatically.

Keywords :- RF module, GSM-GPS module, MQ-3 alcohol sensor, Microcontroller,Ulterasonic Sensor, Accelerometer.

1.INTRODUCTION

In recent times helmets have been made compulsory in Maharashtra State. Traffic accidents in India have increased year by year. As per Section129 of Motor Vehicles Act, 1988 makes it required for every single riding a two-wheeler to wear protective headgear following to standards of the BIS (Bureau of Indian Standards).In India drunken drive case is a criminal offence of The Motor Vehicle act 1939. Which states that the bike rider will get punish. In existence bike rider easily get escaped from law. These are the three main issues which motivates us for developing this project. The first step is to identify the helmet is wear or not. If helmet is wear then ignition will start otherwise it will remains off till helmet is not wear. For these we use FSR sensor. The second step is alcohol detection. Alcohol sensor is use as breath analyzer which detect the presence of alcohol in rider breathe if it is exceeds permissible range ignition cannot start. It will send the message to register number. MQ-3 sensor is used for these. When these two conditions are satisfied then ignition will start. The third main issue is accident and late medical help. If the rider met accident with him he cannot receive medical help instantly, its big reason for deaths. Around every second people die due to late medical help or the accident place is unmanned. In fall detection, we place accelerometer at the bike unit. Due to these mechanism we detect the accident occurs or not. The aim of this project is to make a protection system in a helmet for a good safety of bike rider. The smart helmet that we made is fixed with sensors which act as to detect wear helmet or not. There are two different microcontroller is used in this project. Each unit has used a separate microcontroller, for bike unit we use for helmet unit and bike unit same microcontroller belongs to the avr family . Signal transmission between the helmet unit and bike unit is using a RF concept.

The Benefits of this System are :-

➢ Need to prevent false positives from being triggered.
➢ Detection of the accident forces accurately.
➢ Delay in notification reaching the emergency contacts.
➢ Detection of accident in remote area can be easily detected and medical services provided in short time.
➢ Simply avoiding drunken drive by using alcohol detector. it will reduces the probability of accident.

➢ Operates on solar as well as battery supply. If helmet was stolen then we can start the bike by the password.

➢ Less power consuming safety system.

➢ It can be used in real time safety system.

➢ We can implement the whole circuit into small module later.

➢ This safety system technology can further used in car and also by replacing the helmet with seat belt.

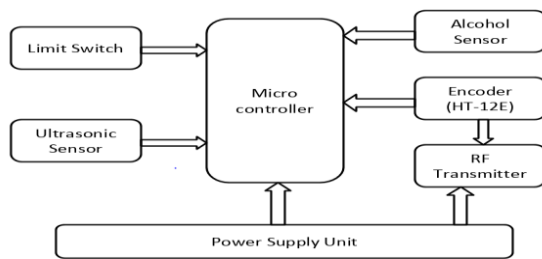## 2. BLOCK DIAGRAM OVERVIEW

TRANSMITTER SECTION
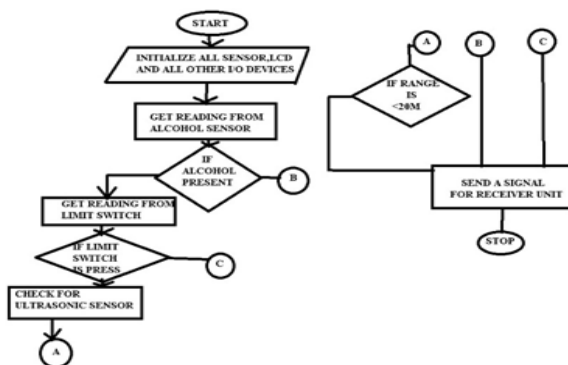

Figure 1 :- Helmet Unit

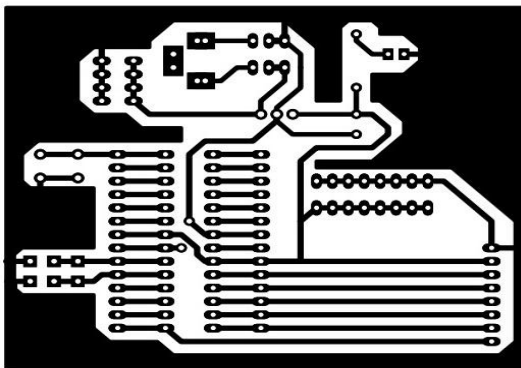**Figure 2 :- Flow Chart Of Helmet Unit**

Figure 3 :- Layout of Helmet Unit

This project describes the planning of an efficient security system for a motorbike, so as to avoid accidents and different malpractices. Vehicle accidents because of the utilization of alcohol ar increased today and also the sporting of the helmet reduces the severity of the accidents. In our project we tend to mix these 2 aims in a very single embedded system. This section consists of associate alcohol sensing element, helmet sensing switch, MCU, encoder and an RF transmitter. Both the switch and also the alcohol sensing element are fitted within the helmet. MCU reads information from the sensors, finds if the driver has non-alcoholic breath and helmet sensor switch is in closed position and gives corresponding digital output to an encoder only if the two conditions are satisfied. It encodes one amongst the active inputs to a coded binary output. The coded binary output is transmitted by the rf transmitter from the encoder. Here we use the popular ASK modulation technique. In this RF system, the digital knowledge is delineating as variations within the amplitude of radio radiation. This kind of modulation is understood as Amplitude Shift Keying (ASK).
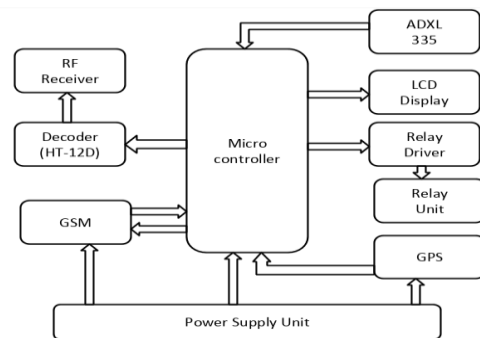
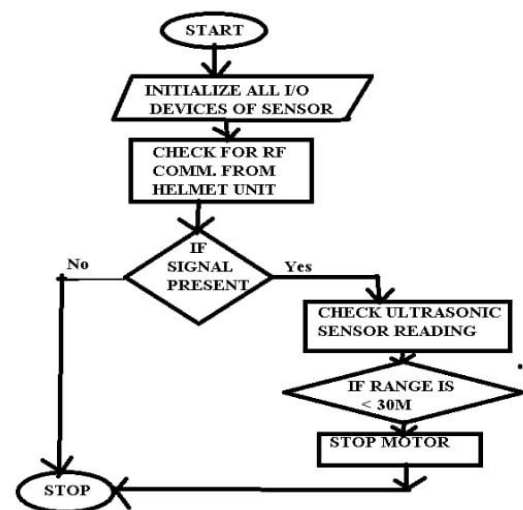**RECEIVER SECTION**

Figure 4 :- Vehicle Unit

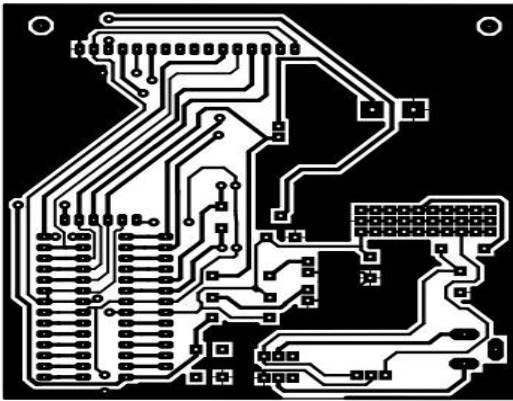**Figure 5 :- Flow Chart of Vehicle Unit**

Figure 6 :- Layout of Vehicle Unit

The receiver section is placed on the bike; it consists of Associate in Nursing RF receiver, RF decoder,MCU, audio and visual indications. RF receiver receives the coded binary data transmitted by the RF transmitter and given to the RF decoder. RF decoder decodes the input and provides four bit digital information to the MCU given that the address little bit of encoder and decoder matches. MCU operate the engine of the vehicle once it receives digital knowledge from the transmitter section, it operates the engine through a relay circuit however it cannot operate the relay directly, and therefore a relay interface is additionally used here. The system is provided by the motorized vehicle department to avoid abnormal circumstances. The following are the transient explanations of the working rule of the assorted major blocks or sections employed in the system.

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A. MICROCONTROLLER

The AT mega AVR is a low-power, high-performance 8-bit microcontroller with 8Kilo bytes of In System Programmable Flash memory. The device is factory-made exploitation Atmel's high-density non-volatile memory technology and is compatible with the industry-commonplace AVR instruction set and pin out. Microcontroller is the brain of the complete system. It is truly chargeable for all the method being dead. It will monitor all the peripheral devices or parts connected within the system. In short we will say that the whole intelligence of the project resides within the package code embedded within the Microcontroller. The controller here user will be of AVR family. This unit requires +5VDC for it proper operation. Microcontroller is the CPU of our project.

B. GSM SIM300/900

➤ High Quality Product (Not hobby grade)
➤ Quad-Band GSM/GPRS
➤ Built in RS232 Level Converter (MAX3232)
➤ Configurable baud rate
➤ SMA Connector with GSM L Type Antenna.
➤ Built in SIM Card holder.
➤ Built in Network Status LED
➤ Audio interface Connector

C. GPS

➤ Fast TTFF at low single level
➤ Support 32-channel GPS
➤ Up to 5HZ update rate
➤ Automotive navigation
➤ Marine navigation
➤ Build in micro battery to reserve system data for rapid satellite acquisition
➤ LED indicator for GPS fix or not fix

D. RELAY

Relays are used throughout the automobile. Relays which comes in assorted sizes, ratings, and applications are used as a remote control device.

E. RF MODULE

An RF module is a device which is used to transmit and receive radio frequency signal. In embedded system it's usually fascinating to speak with another device wirelessly. This wireless communication is also accomplished through optical communication or through frequency (RF) communication. For many applications the medium of selection is RF since it doesn't need line of sight. RF communications incorporate a transmitter and receiver. They are of various types and ranges. Some can transmit up to 500 feet. RF modules square measure wide utilized in electronic style because of the problem of planning radio electronic equipment. Good electronic radio style is notoriously complicated thanks to the sensitivity of radio circuits and also the accuracy of parts and layouts needed to realize operation on a particular frequency.

F.**ULTRASONIC SENSOR**

Ultrasonic sensing is one amongst the most effective ways that to sense proximity and discover levels with high responsibility. An unbearable sensing element is AN instrument that measures the space to object victimisation unbearable sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back info regarding AN object's proximity. High-frequency sound waves mirror from boundaries to supply distinct echo patterns.

F.   MQ-3 ALCOHOL SENSOR

MQ-3 gas sensing element is correct for distinguishing the alcohol content from breath. It can be positioned just front of the face. The sensor is responds to various gases. The driver is drunk or not is detected by helmet unit.MQ-3 sensor has potentiometer to adjusting different concentration of gasses. We calibrate the detector for zero.4mg/L of Alcohol concentration in air and use value of resistance is 200 KΩ. MQ-3 has supports for both analogy and digital. MQ-3 has a 4 pin namely GND, VCC, About, Doubt. Here we tend to use digital output of this sensing element that is provides output in terms of high or low. It decided by our helmet unit weather rider is drunk.

G.   ACCELEROMETER

ADLX345 The ADXL345 is tinny, tri axial measuring device with resolution of thirteen bit. The output of measuring instrument is digital and use sixteen bit 2's complement knowledge. It is access to connect via Serial Peripheral Interface (SPI 3-4 wire) or 12C interface. ADLX 345 is used for both measurement of static and dynamic acceleration. In this project we have a tendency to use measuring instrument measures the static acceleration of gravity. Free-fall sensing notices if the bike is falling. And Bike unit take call that accident is happens or not. In this project we tend to interfaced ADXL345 by victimisation 12C digital interface technique. The CS connected to high to VDD I/O, the ADXL345 is requiring 2- wire connection. The tokenish operational voltage of this device cannot bigger than VDD I/O that's zero.3 V. For the proper working condition, we use two external pull up resister. The value of pull up resister is 3.3 kilo ohm.

3. CONCLUSION

The outcomes of the project have showed that the bike ignition can begin if the helmet is worn. So,it'll mechanically decrease the impact from accident and it canavoid bike from being taken. AVR microcontroller isgood in controlling all the system and the sensors. Executing the wireless system that frequency Module to send signal from helmet unit to the bike unit. Due to this wireless affiliation is healthier than wired link.

In future We can implement various bioelectric sensors on the helmet to measure various activity. We can use tiny camera for the recording the drivers activity. It will be used for passing message from the one vehicle to a different vehicle by exploitation wireless transmitter. We have used solar battery for helmet power offer by victimization same power offer we are able to charge our mobile.

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