SMART HELMET

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ABSTRACT

Presently, we are living in a world where bike accidents have been a common breaking news of our daily life. The purpose of this project is to avoid bike accidents. A smart helmet is a special idea which makes motorcycle driving safe than before. The impact when a motorcycle involves in high speed accident without wearing a helmet is very dangerous with this reason this project is specially developed as to improve the safety of the motorcycle's rider. This is implemented using GSM technology. The working of this smart helmet is very simple sensors are placed in different places of the helmet where the probability of hitting is more which are connected to ARDUINO UNO board. The GSM module which is interfaced to the controller sends the data. When the data exceed minimum stress limit then GSM module automatically sends message to family members.

Our task is to design a helmet that could autonomously detects accidents, alcohol and eye blink. Also aims at minimizing road accidents. It is the helmet that work with the help of RF transmitter and RF receiver circuit and the ARUINO UNO Board.

KEYWORDS: *ARDUINO UNO, GSM, GPS, ZIGBEE, ALCOHOL SENSOR, EYE BLINK SENSOR, VIBRATION SENSOR, LIMIT SWITCH.*

1. INTRODUCTION

In today's era, especially in the young generation, the craze of motorbikes is really remarkable. The middle-class families prefer to buy motorbikes rather than four wheelers, because of their low prices. As the bikes in our country are increasing, the road mishaps are also increasing day by day, due to which many deaths occur, most of which are caused due to most common negligence of not wearing a helmet. According to a survey of India, there are around 790 accidents occurring due to bike crashes per year. If accidents are one issue, lack of proper treatment is another reason for deaths. In India out of the 790 deaths occurring annually, nearly half of the people die due to lack of proper treatment in proper time. The many reasons for this are late arrival of an ambulance, no person at the place of accident to give information to the ambulance or parents, etc.

This is a situation we observe in our day to day life, a thought of finding some solution to resolve this problem comes up with this idea of giving information about the accident as soon as possible because of TIME………!!!!!!!!! matters a lot. If everything is done in time, at least, we can save half the lives that are lost due to bike accidents.

In recent times people prefer motorcycles over car as it is much cheaper to run, easier to repair or easier to park, and flexible in traffic. In India more than 37 million people are using two wheelers also high compared

to four wheelers. Nearly 600 people lost their lives in road accidents in last year one third of all those who died in road accidents could have survived had they worn a helmet. Studies shows that usage of a helmet can save accident death by 30 to 40 percent. The death rate has increased to 2.5 times and more for the riders who are not wearing a helmet. According to statistics serious head injuries can happen even in low speed. 90 percent of head injuries cases are due to road traffic accidents or not wearing helmet, about 72 percent are youngsters in the age group of 18 to4o years. At least three young men using two wheelers die every ten minutes in India due to head injury. For a young Indian chance of being killed or disabled by road traffic injury is higher than HIV, heart attack, cancer. The three main issues which motivate us for developing this project. Identifying weather the helmet is wear or not is the first step. If helmet is put on, ignition will start otherwise it will remains off till helmet is not wear. For this we use limit switch. The second step is alcohol detection. Alcohol sensor is uses as breath analyzer which detect the presence of alcohol in rider breath if it is exceeds ignition cannot start. It will send the message to register number. MQ3 sensor is used for this condition. Third main issue is accident and late medical help. For this we can use the GPS when accident occurs it will send message by GSM to register number with their current location by GPS module. The aim of this project is to make protection system in a helmet for a good of safety of bike rider.

2. LITERATURE SURVEY

There was an article published in International Research Journal of Engineering and Technology (IRJET) regarding a similar product with not much difference, but we have tried to see that our product differs from the one published. The aim of implementing the product might be the same but the way it works differs. We feel our product is more efficient because of the different features included when compared to the one existing. It's an advantage of having more than one function.

Their conclusion was:

In this project we have successfully designed a smart helmet band using GSM and GPS technology. The project made compulsory of wear helmet to start the ignition of vehicle and while riding if any sudden change in velocity occurs then accelerometer will monitor the change and a short message with the location of rider will be send to the predefined number using GSM module. This is a situation where we found some solution to the problem of increased death ratio.

3. SYSTEM DESCRIPTION

The system is explained with the help of an architecture and module description.

3.1 HARDWARE REQUIREMENTS

3.1.1 ARDUINO UNO

Arduino Uno is an open-source microcontroller which is easy to use to develop devices that can communicate with other devices to improve the day-to-day activities of people. Arduino provides microcontroller kits which are inexpensive. It consists of 6 analog inputs, 14 digital input/output pins, a USB connection, a power jack, a 16MHz resonator, a 2kB RAM and a reset button.

The ATmega328P microcontroller provides us with UART TTL serial communication which is possible by using the digital pin 0 and pin 1 which are Rx and Tx respectively.

Figure 1: Arduino Uno

3.1.2 GSM MODEM

GSM is an abbreviation for Global System for Mobile communication originally from Group Special Mobile. GSM operates a number of different carrier frequencies), with 2G GSM networks operating in the 900 MHz or 1800 MHz bands.

Figure 2: GSM Modem

The structure of a GSM network has a number of discrete sections. They are:
(a) The Base Station Subsystem
(b) The Network and Switching Subsystem. This is sometimes also just called the core network
(c) The GPRS Core, The Operations support system (OSS) for maintenance of the network.

3.1.3 LIMIT SWITCH

A small limit switch should be placed in the helmet to detect whether the person has put on the helmet or not. If the helmet is put on his head, the push button will be pressed and will provide a logic signal to the controller, by which the controller sends this information to the bike through Zigbee communication. And pressing the start button on the bike, the vehicle will be started, else the bike will not start until the helmet is not put on the head.

3.1.4 ALCOHOL SENSOR

MQ135 is a sensor that has good sensitivity characteristics to a wide range of gases. This device is designed to operate with a stabilized 5V heater supply and a circuit voltage depends on the design. The most suitable application for the MQ135 is the detection of carbon gases, which makes it an excellent Sensor for gas leak detectors. The same gas sensor is used over the vehicle for checking the exhaust gas emission levels. If the vehicle emits more than the limit value, automatically vehicle will be stopped.

Figure 3: Alcohol Sensor

3.1.5 EYE BLINK SENSOR

The basic function of the detector circuit is by radiating energy into space through IR LED and detecting the echo signal reflected from an object. The reflected energy that is returned to the IR sensor indicates the presence of a object which is within the range. A portion of the transmitted energy is intercepted by the target and re-radiated in many directions. The radiation bouncing back towards the system is collected by the LED called the receiving LED causes to produce a high signal at the 8th pin of LM567 IC. The output of the receiver is fed to the Microcontroller.

Figure 4: Eye Blink Sensor

3.1.6 VIBRATION SENSOR

Vibration sensor is used originally as vibration switch because of its high sensitivity; it is sensitive to environment vibration, and generally used to detect the ambient vibration strength. When module gets external vibrations or shocks, it gives a high level output and when it is in ideal level without any sudden shocks and vibrations, the module gives a low level output.

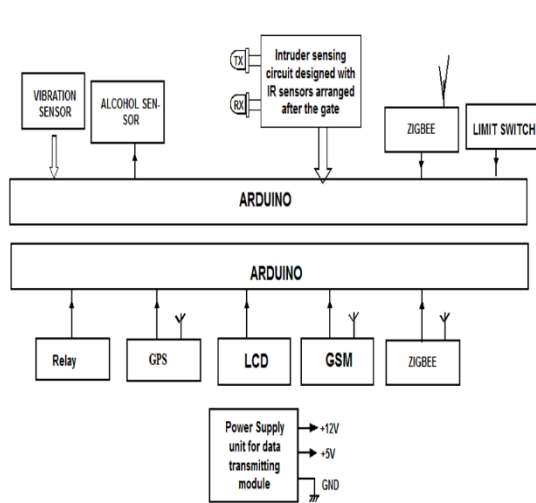Figure 5: Vibration Sensor

3.2 ARCHITECTURE OF THE DEVICE

Figure 6: Architecture diagram

4. WORKING OF THE SYSTEM

• We first switch on the power supply of the model

• We see a display on the LCD.

• The next step is to wear the helmet where the limit switch is pressed and the vehicle will be started

• The system checks whether he is drunk or not and, the person is drowsy or not and also the limit switch is pressed or not.

• If any of the upper cases are not satisfied then the vehicle doesn't start.

• If all the cases are satisfied then the vehicle gets started.

• If alcohol is sensed, the LED shows an indication of alcohol – Yes.

• If the person driving the vehicle closes his eyes for long time, the LED shows an indication of Eyes – closed.

• If in case there is any accident, a message is sent to the number mention in the Arduino program through GSM modem and GPS.

• The latitude and longitude values are also displayed on LED and those values are sent in the message.

5. RESULTS

Figure 7: Initial Stage

Figure 8: When Helmet is put ON

Figure 9: When Eyes are closed

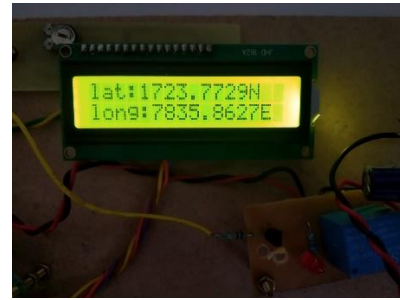

Figure 10: When Alcohol is detected

Figure 10: GPS detects the location

6. CONCLUSION

Intelligent Helmet ensures the safety of the rider, by making it necessary to wear helmet, and ensures that the rider hasn't consumed any alcohol. If any of these prime safety rules are violated, the system will prevent the biker from starting the bike. As the system also consists of GPS and GSM, it also helps in handling or preventing deaths by sending a SMS of location of the rider to ambulance and police station. This ensures that the victims get proper and prompt medical attention, if met with an accident.

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