

Smart Helmet Using GPS, GSM and Bluetooth System with Voice Command

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Abstract-

A smart helmet is a special idea which makes motorcycle driving safer than before. This is implemented using GSM and GPS technology. The working of this smart helmet is very simple, vibration sensors are placed in different places of helmet where the probability of hitting is more which are connected to microcontroller board. So when the rider crashes and the helmet hit the ground, these sensors sense and give to using the GPS module that is interfaced to it. When the data exceeds minimum stress limit then GSM module automatically sends message to ambulance or family members.

Keywords- LF Module, LDR, Alcohol Sensor, Vibration sensor, AT Mega38P, Position Sensor, GPS and GSM.

I. INTRODUCTION

The World Health Organization states that 1.2 million people lose their lives annually due to road traffic injuries. More than half of the deaths caused affect the two wheelers in the form of head injuries. Most of these deaths are preventable by the compulsory use of helmets. Studies have shown that wearing a helmet can reduce the fatalities by 70%. Global initiatives have been taken to make helmets a high priority for public health. Many awareness drives have been launched, laws have been enforced in the public interests but still we find people violating the rules and driving very casually without wearing helmet. This system is designed in such a way that the vehicle will not start unless the rider wears a helmet and passes the alcohol test, thereby also solving the problem of drunken driving. The helmet has an additional feature of accident indication and reporting through GPS - GSM technology which sends message to the hospitals and family member at the time of accident. This project is designed for people's safety and is in the best interest of the society.

II. METHODOLOGY

We learnt about the concept of aviation helmets and decided to create a civil motorcycling helmet on that model, which would show not target

detection for pilots, but navigational information – to turn right or left and so on.” The android-based lightweight helmet contains GPS and voice control. Its heads-up translucent display system allows riders to access navigational information without looking away from the road.” This is a prototype of the visor. The image is received from here to the visor and is reflected to the human eye. This is also the optics. The Pico projector (mobile projector) is located here and the electronics are behind it. Live map was developed with a quarter of a million dollar grant by the Russian Ministry of science.

The final version will be unveiled in the US in May, and go on sale in August, costing 2,000 dollars each. The Momentum Lite is our entry level helmet option, for those not seeking all of bells and whistles outside of a quality Bluetooth helmet. The Lite option offers 4 intercom connections at a working distance of 1.6 km (1 mile) in the same sophisticated shell design as the Momentum Light comes with the entire tech pre-installed and ready to ride straight out the box. The same basic feature set seen in our 10 series headset is still available with the Momentum Lite, such as connected to your smartphone to take and receive phone calls, listen to music and GPS navigation, or the built-in FM radio.

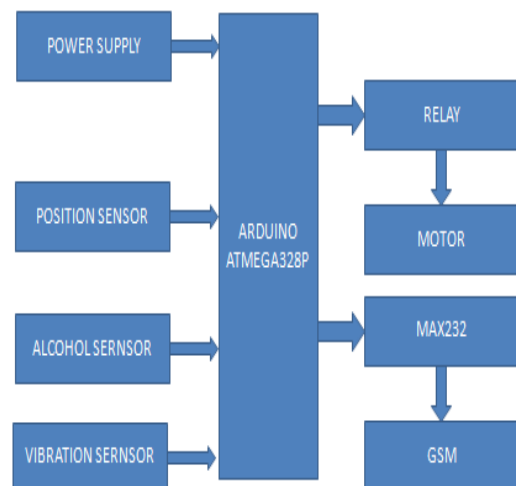


Figure.1. Functional Block Diagram

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. The government should allow subsidy so that it is under every individual's reach. The two wheeler manufactures should incorporate these helmets as an integral part of the vehicle .There can be security system for this helmet sensor, alarm system etc. An additional system to check the speed of the vehicle can be added to this helmet .To avoid the basic complain of suffocation problem, ,helmet can be modified with ventilation holes.

The Alcohol sensor MQ-3 contains a coil coated with Al₂O₃, SnO₂ .When human drunk alcohol, then ethanol gas will spread in air. That ethanol air will react with aluminum oxide, tin oxide and produce extra electrons. Due to this ,the current will be increased in that coil. The coil output will pass to controller .If the controller receives low current, then allow valve signal received by control unit. It will send a disable signal to ECU. It will apply brake to wheels. If the human not wear helmet at initial stage, then high voltage will pass into controller via LDR. The controller at control unit will get high valve signal. Here we use a key process ignition process. We fix a relay near vehicle battery positive terminal .It will stop battery supply. The vehicle will not be allowed to start based on ignition process.

III. HARDWARE DESCRIPTION

The following hardware are used in proposed model of this project. They are ATmega328P, position sensor (transmitter and receiver), Alcohol sensor, Low frequency module (transmitter and receiver), Vehicle battery (Relay), vibration sensor, GPS and GSM.

A. Cost Of Equipment

Sl. No.	Name of the Equipment along with make & model	Imported/Indigenous	Estimated Costs (in Foreign Currency also for imported equipment)* (Rs.)
1.	Bluetooth	Indian made	500
2.	GPS voice	Indian made	550
3.	GSM	Indian made	800
4.	Alcohol sensor	Indian made	200
5.	General PCB	Indian made	100
6.	RF transmitter and receiver	Indian made	800
7.	helmet	Indian made	2,500
8.	Vibration sensor	Indian made	100
9.	Android Application	Indian made	1,000
TOTAL COST (Rs.)			6,550

TOTAL BUDGETARY BILL: Rs. 7,000



Figure.2. Unified Learning Kit

B. Specifications

S.NO	COMPONENTS REQUIRED
1	PIC16F877A
2	IC HT12E
3	IC HT12D
4	IC 7805 x2
5	RF Transmitter and Receiver
6	Transistor (BC548)
7	Resistor (1K x3, 10K x2, 33K, 330, 750K)
8	Capacitor (0.1uF x3, 22pf x2, 10uF,)
9	Relay 12V/10A
10	GSM Module (SIM900)
11	GPS Module
12	Vibration sensor (Accident sensor)
13	Alcohol sensor
14	9V Battery
15	12V battery or use bike battery
16	General PCB
17	Push button (Push to OFF type) as helmet sensor

C. Circuit Diagram

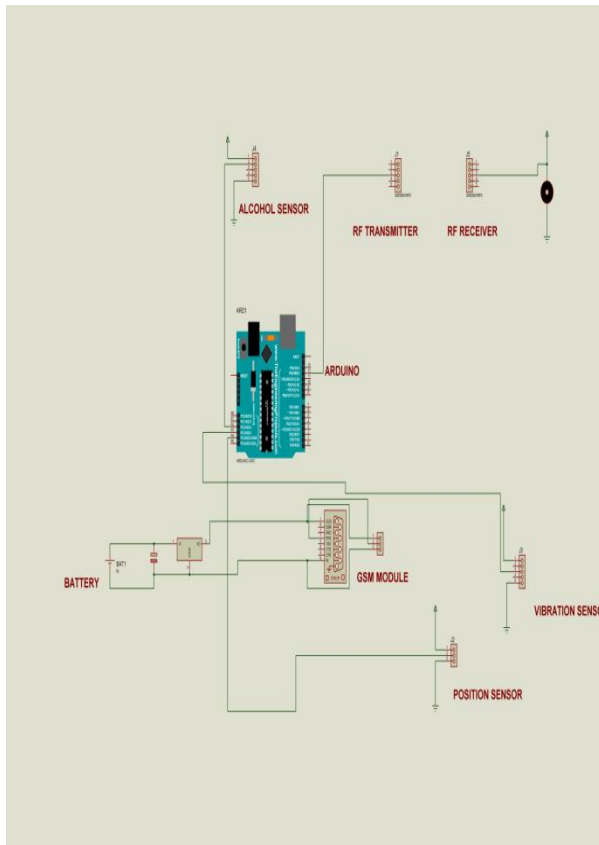


Figure.3. Circuit Diagram of Proposed system

D. Following table gives idea of SMART HELMET- Command used to send message using GSM,GPS AND BLUETOOTH.

Table -1:

COMMAND	DESCRIPTION
AT	Make sure the module is working properly.
AT+CMGF=1	SMS Configuration.

Table -2:

Command	Description	Response
AT	To check the module	OK
AT+CGSPWR=?	GPS power control	OK
AT+CGNSINF	Get current GPS location info	Response <GNS status>,<fix status>,<UTC date & time>,<latitude>,<longitude>,<MSL altitude>,<speed overground> OK

Table -3:Time Requirement

Function	Max. Time Required	Min. Time Required
To pair Transmitter and Receiver via Bluetooth	8 sec	3.4 sec
To fix GPS location	7 min	2 min

Table -4: Response of Device

Action	Response
Sudden removal of helmet	Vehicle will stop immediately
After accident	LED's placed on band will continuously blink

Table -5: Total current consumption

Transmitter Section	50mA
Receiver Section	150mA

Table -6: Range

Device	Range(in meters)
Bluetooth	35-40

IV. BASIC DESIGN DATA TO BE USED

In this system P89V51RD microcontroller is used. When the system is switched on, LED will be ON indicating that power is supplied to the circuit. The RF is used to start the two wheeler firstly it check whether the driver is drunken or not if drunken it will not allow to start two wheeler. The small voltage of ignition of the two wheeler is grounded. In normal condition when the helmet is wearied the pressure sensor is sense pressure and the RF transmitter radiates the FM modulated signal. The RF receiver is connect with the two wheeler which receive the radiated signal and active the relay. The relay is remove the ignitionwire from the ground and connected with the starter switch now the two wheeler will start. When driver met with an accident vibration sensor sends message to microcontroller .The GPS receives the location of the vehicle that met with an accident and gives information back. This information will be sent to a mobilenumbr through a message. This message will be received using GSM modem present in the circuit. The will give the information of longitude and latitude values .Using these values the position of the vehicle can be estimated.

To run the GPS and GSM module, microcontroller is a very user friendly device which can be easily interfaced with any sensor or module and is very compact in size.

Now some of the thoughts in our mind ,how will send the SMS using the GSM module by keeping the GPS location in the SMS which is obtained from the GPS module. But when should all this is done? When accident occurs, how will the microcontroller detect the accident? This can be done by using a vibration sensor which is placed in the helmet.

The vibration sensor is placed in the helmet such that it detects vibrations of the helmet. When the rider crashes, the helmet hits the ground and the vibration sensor detects the vibrations that are created when the helmet hits the ground and then the microcontroller detect the accident occurrence and it will send an SMS containing information about the accident and location of accident using GSM and GPS modules. Alcohol modules. Alcohol sensor sense the alcoholic content whether the rider drunken or not, if he drunken bike will not start showing as alcohol detected on LCD display. Use of pressure sensor, gives the whether the rider wear the helmet or not. If he is not wears the helmet again bike will not start and intimate to rider to wear the helmet.

If either any one condition will not satisfy in the sense, a person can't able to start their vehicle .

V. PROPOSED SYSTEM

The paper deals with the idea of constructing a system that ensure safe riding of a rider. Here the helmet sensing, vibration sensor and alcohol sensor are used .The sensor are programmed in such a way

that monitor all the sensors . The engine won't start if the helmet sensing system does not sense a helmet and or if the rider consumed alcohol which is detected by the alcohol sensor.The vibration sensor is used to detect the accident if occurred,,and in this , if an accident occurred, a SMS with the location coordinates is sent to the doctor or family members or ambulance.

VI. CONCLUSION AND FUTURE WORK

By this product we can save the human beings life and avoid the accidents .The cost and power is reduced.Nowadays,most cases of accidents area unit by motor bikes. The severities of those accidents are increased because of the absence of helmet or by the usage of alcoholic drinks.In our project we have a tendency to develop an electronic intelligent helmet system that efficiently checks the wearing of helmet and drunken driving.By implementing this system a safe two wheeler journey is possible which would decrease the head injuries throughout accidents rate due to drunken driving.A GSM modem is used in this system that will send a message to the predefined numbers that are programmed using microcontroller in case of any accident.We have a tendency to introduce advanced sensor techniques and radio frequency wireless communications are included in thisproject to make it a good one.

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