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# Intelligent Helmet system and Accident control for motor cycles

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**Abstract** *Here, intelligent helmet system and accident control for motor cycles has been proposed 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.*

***Key Words***: **Helmet, alcohol sensor, non alcoholic breathing, transmitter, receiver, RF decoder**

## 1.INTRODUCTION

In less developed countries, road traffic accidents were the most significant cause of injuries, ranking eleventh among the most important causes of lost years of healthy life. In Indian road system, widening of the road is not an alternative solution to avoid traffic in such a cities. The problems with state drunk driving control systems can be solved in many ways. The most effective will follow several principles: They will invest authority and responsibility in people and organizations at all levels, local to national, because drunken driving control requires action at all levels. They will operate in the public eye, using the media to report on problems and solutions, because ultimate decisions on priorities and resources to control drunk driving must have public support. They will not promise instant solutions based on a single action but rather will take steady steps towards long-term improvement. And they will establish mechanisms for identifying and solving problems rather than attempting to apply one-size fits-all methods. Hence Road Safety becomes a major issue of concern. Therefore it becomes necessary to implement such a technique which is not easy to bypass the basic rule of wearing helmet and to control the speed of the motor bike while crossing the schools , colleges and hospitals etc. Here we designed a system which checks the conditions before turned ON the engine of the bike. Our system includes an Rf receiver, Rf transmitter and a helmet sensing switch. A switch is used to detect whether the biker is wearing helmet.

Hence Road Safety becomes a major issue of concern. Therefore it becomes necessary to implement such a technique which is not easy to bypass the basic rule of wearing helmet and to avoid drunken driving. Here we designed a system which checks the two conditions before turned ON the engine of the bike. Our system includes an alcohol sensor and a helmet sensing switch. A switch is used to detect whether the biker is wearing helmet. Alcohol sensor is used to detect the biker is drunk, the output is fed to the MCU. Both the switch and the alcohol sensor are fitted in the helmet. If any of the two conditions are violated the engine will not turned ON.

### 1.1 Related work

This paper reveals the use of a microcontroller to optimize timing plans according to traffic conditions in real-time. The control system is designed to be able to optimize the traffic flow using several kinds of strategies, which are green time split and time slot, green time extension, and offset optimization strategy and the transfer of data related to local conditions to a network control base. This provides diversity in control and shows how several control strategies can be used and switched over to provide best control. The solution is cost-effective too employing minimum number of sensors [1]. In this paper an automatic vehicle speed control system for automobile is discussed. The objective is to develop a model that reduces accidents on the road and preserve the lives of human beings especially children and the old people. The system consists of Radio Frequency (RF) transmitter and receiver to set the limit speed. The speed of the automobile is continuously monitored and it is given to the embedded system. The system cuts off the fuel supply when the speed is above the set speed and the automobile speed reduced. The driver has to adjust the speed within the set speed so that the automobile is continuous to run [2]. Nowadays people are driving very fast; accidents are occurring frequently, we lost our valuable life by making small mistake while driving (school zone, hills area, and highways). So in order to avoid such kind of accidents and to alert the drivers and to control their vehicle speed in such kind of places the highway department have placed the signboards. But sometimes it may to possible to view that kind of signboards and there is a chance for accident. So to intimate the driver about the zones and the speed limit automatically, is done by means of using RF technology. The main objective is to design a Smart Display controller meant for vehicle's speed control and monitors the zones, which

can run on an embedded system. Smart Display & Control (SDC) can be custom designed to fit into a vehicle's dashboard, and displays information on the vehicle. The project is composed of two separate units: zone status transmitter unit and receiver (speed display and control) unit. Once the information is received from the zones, the vehicle's embedded unit automatically alerts the driver, to reduce the speed according to the zone, it waits for few seconds, and otherwise vehicle's SDC unit automatically reduces the speed [3]. In the Existing system, the sensors are used such as IR sensor, load sensor, vibration sensor and gas sensor, mems. The gas sensor detects the measure of liquor consists in the breath of a person wearing the helmet. The Alcohol recognition sensors connected with the helmet in distinguish the Alcohol detection. MEMS based handle bar control of the vehicle. The Vibration sensor is used to detect any accident. Load checking to recognize the load of the vehicle and alongside the sensor to locate the quantity of individuals travelling in the bike. Here they have used an Alcohol Sensor, Accelerometer, Microcontroller, Communication modules and a buzzer for alert purpose. Here we designed a system which checks the two conditions before turned ON the engine of the bike. This system includes an alcohol sensor and a helmet sensing switch. A switch is used to detect whether the biker is wearing helmet. Alcohol sensor is used to detect the biker is drunk, the output is fed to the MCU. Both the switch and the alcohol sensor are fitted in the helmet. If any of the two conditions are violated the engine will not turned ON. Alcohol sensor MQ3 is used here for detecting the alcohol concentration present in the driver's breath. Sensor provides an analog resistive output based on the alcohol concentration. MCU is the microcontroller unit, which controls all the functions of other blocks in this system. MCU takes or read data from the sensors and controls all the functions of the whole system by manipulating these data. Alcohol sensor is connected to the MCU through an interfacing circuit and the helmet sensing switch is directly connected to the MCU. MCU receives data from these sensors and it gives a digital data corresponding to the output of sensors to the encoder only if the two conditions are satisfied.

GSM (Global System for Mobile Communication) is a public service available at no cost to the user. Nowadays mobile hand set is not new to the user. Everywhere user can be seen using mobile phones and they are very much conversant with mobile hand set. There is no extra cost of communication equipments. Using GSM technology, a motor can be controlled and monitored from every corner of the world. The GSM Modem is used to collect the information from microcontroller. GSM is use to send the data to mobile phone. Application after displaying the data extracted from sensor nodes; stores it and send it to locations via internet and GSM (global system for mobile communication) services.

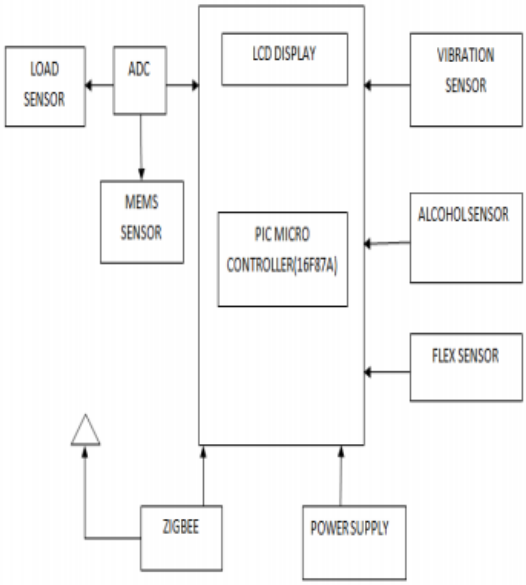


**FIG.1 BLOCK DIAGRAM**

## 2. PROPOSED WORK

In proposed system, here designed a system which checks the conditions before turned ON the engine of the bike. A switch is used to detect whether the biker is wearing helmet or not. The proposed system continuously monitors for the drunken drive and if it is detected, vehicle is stopped immediately thereby avoiding the possible accident. MQ-3 gas sensor (alcohol sensor) is suitable for detecting alcohol content from the breath. Firstly the Limit switch in transmitter checks whether the rider has worn the helmet or not. If yes, then it will send a signal to the receiver and it will provide ignition. A RF Module as wireless link which able to communicate between transmitter and receiver. The accident detected by using vibration sensor. The accident is identified by the probability of vibration experienced by the helmet. Here vibration is detected by placing a vibration sensor on the helmet and gives to microcontroller. Here can track the vehicle live location by using GPS.

### MQ-3 GAS SENSOR

The MQ3 gas sensor is alcohol sensor which is used to detect the alcohol concentration in the breath. This sensor provides an analog resistive output based on alcohol concentration. It has potentiometer to adjusting different concentration of gasses. We calibrate the detector for 0.4mg/L of Alcohol concentration in air and use value of resistance is 200 KΩ. MQ-3 has supports for both analog and digital. MQ-3 has a 4 pin namely GND, VCC, Aout, Dout. Here we use digital output of this sensor which is gives output in terms of high or low.

**Fig.**2 MQ-3 gas sensor

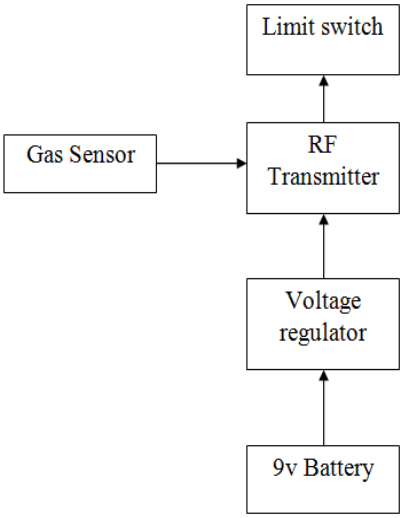


**Fig.4** Helmet part

**VIBRATION SENSOR**

Vibration sensor designs feature sensing crystals attached between a center post and a seismic mass. Under acceleration, the mass causes a shear stress to be applied to the sensing crystals. This stress results in a proportional electrical output by the piezoelectric material. The purpose is when the biker meet with an accident the vibrator sensor in the bike receives the signal.

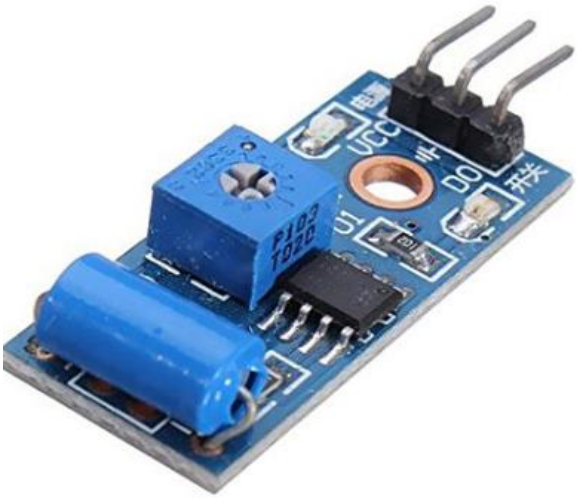

**Fig.3** Vibration sensor

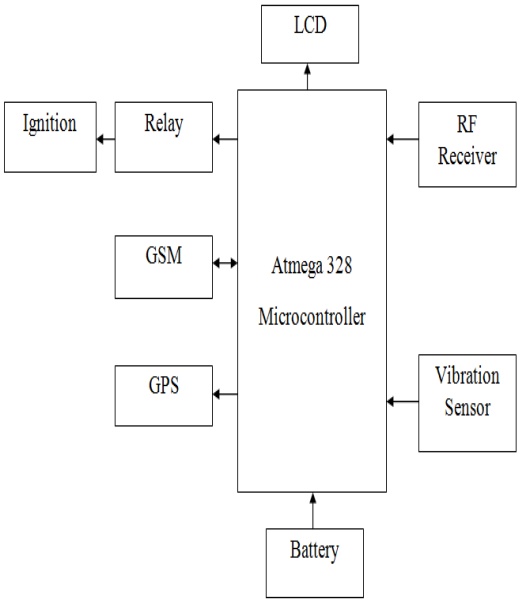


**Fig.5** Bike part

Atmega 328 is a microcontroller board which is used here to read analog data from the rf receiver and convert that data into digital form using mathematical algorithms. The micro-controller board will also control the receivers and sequence of their functioning; in a way that data from RF receiver is continuously read by the controller board and when it identifies speed of the bike based on predefined threshold values, it will control the speed of the motor which is connected with this board.

**RELAY**

A relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current. The heart of a relay is an electromagnet (a coil of wire that becomes a temporary magnet when electricity flows through it) Electromagnetic relays are those relays which are operated by electromagnetic action. Modern electrical protection relays are mainly micro processor based, but still electromagnetic relay holds its place. It will take much longer time to be replaced the all electromagnetic relays by micro processor based static relays. So before going through detail of protection relay system we should review the various types of electromagnetic relays.

**RELAY SWITCH**

A relay is an electromagnetic switch that is used to turn on and it turn off a circuit by a low power signal or several circuits must be controlled by one signal. Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. Here a relay switch is used to detect whether the biker is wearing helmet or not.

**BATTERY**

Single Battery of 9V is used to drive the bike. Battery is used for the purpose of mobility.

**LCD**

A liquid-crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix.

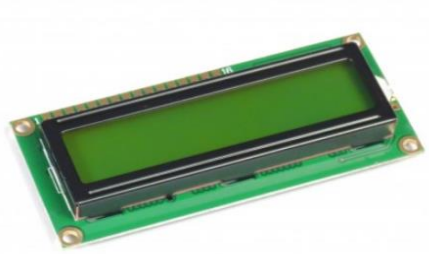

**Fig.6 LCD**

**RF MODULE**

An RF module (radio frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through radio frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter and a receiver. They are of various types and ranges. Some can transmit up to 500 feet. RF modules are widely used in electronic design owing to the difficulty of designing radio circuitry. Good electronic radio design is notoriously complex because of the sensitivity of radio circuits and the accuracy of components and layouts required to achieve operation on a specific frequency. In addition, reliable RF communication circuit requires careful monitoring of the manufacturing process to ensure that the RF performance is not adversely affected. Finally, radio circuits are usually subject to limits on radiated emissions, and require Conformance testing and certification by a standardization organization such as ETSI or the U.S. Federal Communications Commission (FCC). For these reasons, design engineers will often design a circuit for an application which requires radio communication and then "drop in" a pre-made radio module rather than attempt a discrete design, saving time and money on development. RF modules are most often used in medium and low volume products for consumer applications such as garage door openers, wireless alarm or monitoring systems, industrial remote controls, smart sensor applications, and wireless home automation systems.

**POWER UNIT**

Power offer may be a relevance a supply of power. A device or system that provides electrical or alternative sorts of energy to the output load or cluster of hundreds is termed an influence offer unit or PSU. The term is most ordinarily applied to electricity provides, less usually to mechanical ones, and infrequently to others. Power provides for electronic devices is generally divided into linear and shift power provides. The linear offer may be a comparatively easy style that becomes more and more large and significant for prime current devices; voltage regulation in an exceedingly linear offer may end up in low potency. A switched-mode offer of constant rating as a linear offer are smaller, is sometimes a lot of economical, however, are a lot of advanced.

## 3. CONCLUSIONS

The accident prevention and detection part involves in this project, Smart Helmet, which automatically checks whether the person is wearing the helmet. The relay does not ON the engine if these conditions are not satisfied. A

prototype model of controller is built on the speed mixing capability. The signal from sign board of various zones (school zone, college, hospitals etc) is treated individually & generates input signals for driving actuators – bike engine and additional DC motor. They, in turn, jointly control the speed of vehicle wheels. This design successfully utilizes a new idea of hybrid vehicle recently immerged in automotive industry. The system does not require a physical braking subsystem which will reduce the overall cost of a bike.

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