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# Helmet Alert System Using GSM Module

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**ABSTRACT:** Helmet alert system is one through which we can identify whether the rider is wearing the helmet or not. If the rider is not wearing the helmet then the vehicle number which is stored in the circuit is transmitted to the nearby station along with the location through GSM module and GPS module.

**KEYWORDS:** IR sensors, Microcontroller, RF Transmitter receiver, GPS & GSM module.

## I. INTRODUCTION

The statistics of road accident deaths available shows us that, 24.9% fatalities were of motorcyclists, of which 21% were not wearing helmets. One of the reasons behind the fatalities of two-wheeler riders, is lack of awareness in wearing helmets, which is the most efficient safety mechanism. By wearing helmets we can reduce the chances of serious head injuries by 80% and fatalities by 50%. Two-wheeler riders results nearly 45% as victims in road accidents. As per the Motor Vehicles Act, the first-time offenders are warned with a fine of Rs 100 and second-time offenders will be fined with Rs 300, followed by suspension of driving licence. Based on our research, the worst-affected age group is 15-44 years, who are met with motorcycle accidents involving both riders and pillion riders. Motor cyclists injuries fall into two categories – Major injuries and Minor tissue injuries.

While bike riders share some common injuries with other riders, there are some unique injuries to motorcycle accident victim. Hard injuries include second and third degree burns from motorcycle engine and silencer. Since motorcycle engines are fully exposed there is more possibility of getting injured. The normal temperature of a running motorcycle engine is about 475-503 Kelvin. When a motorcyclist meets with an accident and is thrown away from the bike, the only thing between the rider's body and the engine block is one's clothes and footwear. The influence in many motorcycle crashes is sometimes severe enough to induce some shock to one or more organ of a motorcyclist. The crash can cause severe damage to the brain or some bones may also get fractured. If the motorcyclist wears the proper kind of helmet, then at least his head is protected from the impact of being thrown from the bike.

Mr. K.K.Kapila, Chairman of International Road Federation states that “The UN General Assembly has adopted 2011-2020 as the Decade of Action for Road Safety and set a goal for reducing fatalities from road accidents by 50 percent and also have taken several measures by taking mandatory actions to wear helmets, during the period recognizing the severe impact of road accidents on global health.” Every year around 1.2 million people die and 50 million get affected in road accidents globally losing about 1.2 trillion US Dollars in these accidents.

By 2030, traffic injuries are predicted to become the fifth major cause of death in the world. In order to avoid these kind of situation concerted actions must be taken. With the increasing urbanization and vehicular traffic, the issue of road safety also keep growing in terms of concerns and solutions. The concern becomes more relevant in view of the fact that number of people killed in road accidents is highest in India. More than 4.97 lakh road accidents in 2011 are reported to have claimed over 1.42 lakh lives. These statistics shows us roughly about one road accident per minute and one road accident death every four minutes in India.

Though the numbers have decreased in the year 2012, over 4.90 lakh accidents claiming 1.38 lakh lives is large in number to digest. The main causal factor's reveals that drivers' fault accounts for 78.7 per cent (3,85,934 accidents) of total road accidents in India as per the analysis. Some reasons behind these faults are intake of alcohol/drugs, mobile addiction, overloading/overcrowding of vehicles, exceeding the speed limit and tiredness and negligence towards



wearing the helmet. Since drivers are held responsible for about 80% road accidents, it is necessary to make them well informed and realize that they are the destroyers on roads when they breach the laws/rules.

Road Safety is being emphasized at social Level. The focus is altering from ad-hoc Road Safety Activities to Sustainable Programs. An organized state capacity evaluation of the prevailing road safety directorate system has been recommended while formulating long term goals, interim targets, strategies and programs. This includes a high-level multi-sectoral strategic examination of wide range of activities and involves senior management from the key governmental agencies - Transport, Police department, Health ministry and Education ministry, who may not all be actively engaged as yet– as well as all other stakeholders who are able and should contribute to the development of road safety results.

## **II. LITERATURE REVIEW**

An automatic system which detects whether the two wheeler rider is wearing the helmet or not and if they are not wearing the helmet then it cautions the rider to wear the helmet<sup>1</sup>. Traffic images captured by cameras were used. The algorithms LBP, HAAR, HOG and SURF were used as descriptors for feature extraction of images. These descriptors are such that used to classify whether it is a two wheeler or a four wheeler, then based on the classification the two wheelers are segregated and scan the vehicle numbers of those who are not wearing helmet<sup>4</sup>.

Motorcyclist will be alarmed when the speed limit is exceeded. A Force Sensing Resistor (FSR) sensor and BLDC motor, both are used for detection of the rider's head and detection of motorcycle's speed respectively<sup>4</sup>.

## **III. PROCESS DESCRIPTION**

The Helmet circuit consists of IR sensors and RF transmitter, which are powered by a 9V battery. The 9V battery supply is regulated to 5V by voltage regulator (IC7805) and distributed to the IR sensor and RF transmitter. The output of the IR sensors is connected to the RF transmitter. The RF transmitter transmits the signal as soon as the IR sensor is sensed. The bike circuit holds the microcontroller, GSM & GPS Modules, RF receiver, LCD display are made to run through the battery source (12V, 3Ah) present in the bike. The GSM module runs with the 12V power supply, whereas other components does not require 12V power supply. Hence the 12V power supply from the battery is regulated using the voltage regulator (IC7812) and then sent to the components based on their requirement. The microcontroller is programmed to send the vehicle number along with the location of the bike through GPS and GSM module. It is programmed by using arduino software and loaded into the microcontroller. The microcontroller holds the program code which contains the AT commands which are necessary to instruct the GSM module to send message to the preferred destination or to another GSM.

When the vehicle is turned ON it switches the bike circuit to active state. In active state the RF receiver interfaced with a microcontroller waits for 10 seconds until it receives the signal from the RF transmitter. The 10 second delay is meant for the rider to wear the helmet. When the signal from the RF transmitter is obtained then the microcontroller takes the action of displaying a HAPPY JOURNEY statement in the LCD display. If not, the microcontroller fetches the location of the bike from the GPS module and the vehicle number already stored in the microcontroller and sends to the control station through GSM module. The location to which the message has to be sent is also fed to the microcontroller. The programming involves the interface of GPS and GSM module with the microcontroller (ATMEGA328). The program to send message is given using the AT commands within the microcontroller and the code to fetch the GPS location is also fed into the microcontroller.

#### IV. BLOCK DIAGRAM

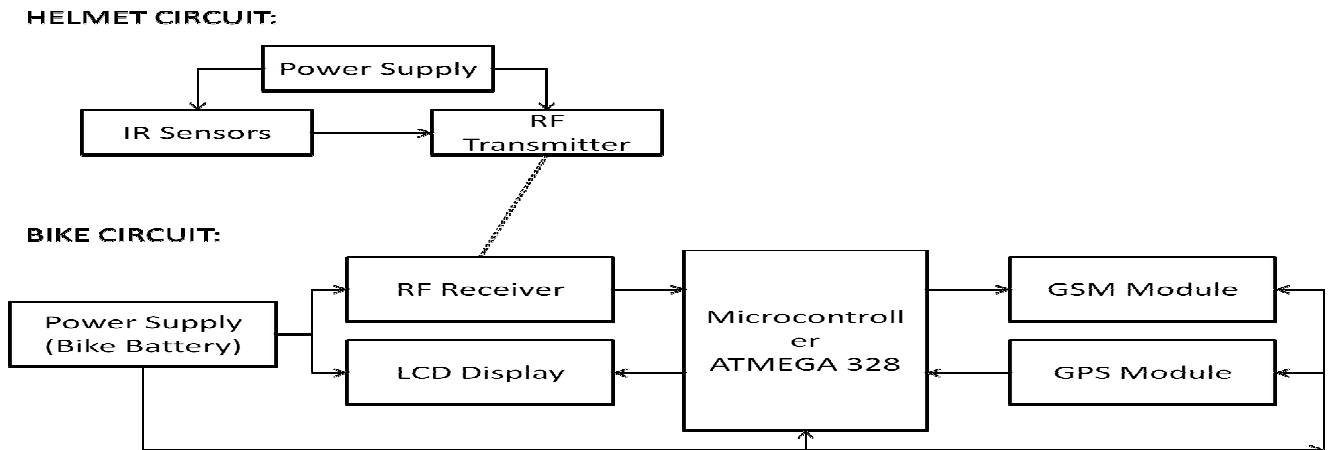


Fig 1 Block diagram of Helmet alert system

#### V. EXPERIMENTAL SETUP



Fig 2 Experimental setup showing the working of alert system

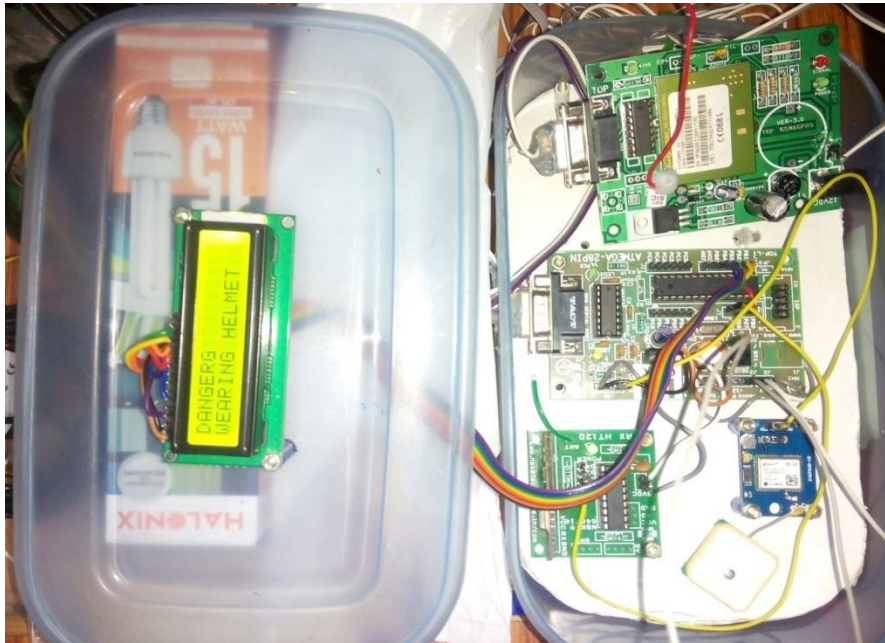


Fig 3 Device indicating the rider to wear helmet

## VI. RESULTS AND CONCLUSION

The implementation of this work will prevent road accidents and saves many lives. This system also provides the rider a protection to their vehicle against theft. Along with the IR sensor, the alcoholic sensor can also be interfaced, so that the rider who is drunk can also be identified easily. The results displayed here consist of the minor part of a major project. The main future work is to design it in a compact manner. In case of positive response, the system will be able to locate and identify the rider who is not wearing the helmet. After the complete review of the scientific literature, it can be concluded that the design of this system is viable.

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