

## Design of Smart Helmet and Bike Management System

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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. 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 gives to the microcontroller board, then controller extract GPS data 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. This paper presents the smart helmet that ensures that the rider cannot start the bike without wearing it. This helmet uses simple cable replacement for wirelessly switching on a bike, so that the bike would not start without both the key and the helmet. Also, whenever the driver starts ignition, the alcohol sensor measures the content of the alcohol in his breath and automatically switches off the bike if he is drunken

### I. INTRODUCTION

Helmets for riders are extremely important and many lives can be saved by the use of these Helmets in the event of accidents. Motorcyclists have a perception that wearing a helmet causes discomfort and they do not appreciate its importance, especially the youth. And perhaps the most misleading idea is that short trips do not involve any risk. Smart helmet helps to curb ‘riding without helmet’ by ensuring that the rider mandatorily wears the Helmet while driving.



Figure.1.Hemet Model

The system is designed in such a way that if the rider does not wear his/her helmet the bikes ignition is turned off. It also has emergency features which come in need during mishaps. With the implementation of this concept we would like to make commuting safe and reduce the number of motorcycle accidents. The design also has pollution information gathering technology where the sensor records the ‘ppm’ of various greenhouse gases and with respect to the location the information is updated on the cloud. Wearing a helmet reduces the risk and increases the chances of survival. A helmet is lined with polystyrene and, on hard impact absorbs the shock. The government has been working on this situation and has come up with road laws. The domain of safety has wide scope for development and a number of research papers have been published has built a system using encoders, RF transmitters and receivers to improve the safety and use of helmet while commuting on a two wheeler. This was further improvised

by where the safety helmet system included a vibration sensor, GSM and GPS modules that could track the person and send a distress call upon hard impact.

## **II. LITERATURE SURVEY**

### ***Smart Helmet & Intelligent Bike System***

A smart helmet is a type of protective headgear used by the rider which makes bike driving safer than before. The main purpose of this smart helmet to provide safety for rider. This implement by using advance feature like alcohol detection, accident identification, location tracking, use as a hands free device, solar powered, fall detection. This makes not only smart helmet but also feature of smart bike. Its compulsory to wear helmet, without helmet ignition switch cannot ON. 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.

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. 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 Arduino Lily pad and for helmet unit we use ARM7 lpc2148. Signal transmission between the helmet unit and bike unit is using a RF concept.

### ***Design of Smart Helmet System for Bike with Speed Indication to Government***

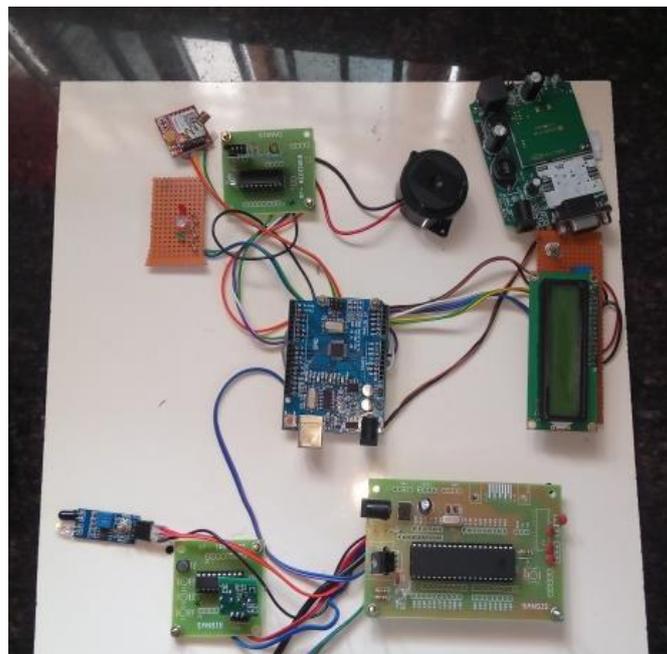
Through this paper we intend to present an improvement in existing bike helmet system with speed indication. System is made more efficient with addition of intelligence in term of artificial vision using micro controller techniques to estimate actual vehicle situation. To achieve this, the system can transmit the information in real time also system is very clever enough to provide information which bike getting high speed then GSM system send a message to government. So this system resemblance for user or rider and government who takes better decision every time for decreasing accident additional the proposed work is an attempt to Helmet. Helmet is a type of protective headgear used by the rider which makes bike driving safer than before. The main purpose of this smart

Helmet to provide safety for rider. It compulsory to wear Helmet without Helmet ignition switch cannot ON. It consists of RF transmitter and RF receiver system. As user wear Helmet RF signal radiate from transmitter and once these RF signal get sensed by the placed in the ignition switch of the bike. Bike will get start. The project is expected to improve safety and reduce accident and restricted the high speed by government especially fatal to the motorcyclist. With the increasing buying power of common man today the number of vehicle we are used but todays era, especially in the young generation, the craze of motorbikes is really remarkable.

The middle class families prefer to buy motorbikes over four wheeler s because of their low prices. As the biker in our country are increasing the road mishaps are also increasing day by day due to which many deaths occur most of them are caused due to most common negligence of not wearing the Helmets and reaching the high speed. This motivates us to think about making a system which ensures safety of biker by making it necessary to wear Helmet as per government guidelines. Presented a system on micro controller based circuitry is used with using GSM (Global System for Mobile Communication) GSM perform two way communication with bike and rider using GSM modem is used for sending SMS as on rider regular cell-phone also the system used siren and stand sensor in case someone try to bike steal the siren is ON even if user used very high speed at that time GSM send the SMS to government to avoid an accident.

### III. PROPOSED METHODOLOGY

The proposed system is a simple telemetry system, which is activated by means of a pressure that is applied to the helmet's interior when the rider wears it. The technology used is ROHS compliant and is absolutely same for long term usage.



Once activated the transmitter sends a control signal to the receiver circuit and activates the relay which is connected to the bike's ignition circuit's power supply. The prototype uses a DPDT electromechanical relay and

hence there is some time lag in wearing the helmet and switching on of the circuit large scale production solid state relays can be put to use which are much faster and have better response. The smart helmet described in this paper is based on one single idea i.e. to make it somehow mandatory to wear it while riding a motorbike by the help of some technology. This helmet in practice acts as a second key to the vehicle and in turn increases security. Moreover as the rider can neither starts nor run the vehicle without wearing the helmet it ensures that the rider has to wear the helmet at all times while riding the vehicle. At the same time, as each helmet is unique to the receiver on board the vehicle so there won't be any interference from usage of similar units even at close range. As an added feature, the transmitter used in the helmet comprises of very long range thus can be used to switch on the vehicle from a remote location (say while alighting the staircases from the apartment).

#### **IV. CONCLUSION**

In this paper, we developed a smart helmet based system which was successfully able to detect whether the rider as worn the helmet or not. It also sets an alarm if he has consumed alcohol beyond permissible levels. Apart from this, the system also monitors atmospheric pollution levels. This helmet can reduce number of road accidents that takes place every day. It ensures the safety of the biker as well as sends the victim's location to family members and nearby police station. Also, death rate can drastically be reduced by implementing this circuit as mandatory while driving and make everyone's life easier and smoother. The project can be enhanced by adding Google Glass Technology. Through this technology, biker can see the upcoming road before reaching that particular place. It can prevent biker from pits and pitiful condition of roads. Also, biker can see navigation on it and can alert him while taking sharp turns. Further, it can implement on cars also. People can use car seat belt to start ignition of car which can enhance the safety of the driver.

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