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## SMART HELMET

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### ABSTRACT

Currently, accidents are a serious problem for everyone. Accidents are increasing day by day, so efforts are made to avoid them to minimize their consequences. We live in a world where the rules of the road have no importance for people, and they are regularly violated. In addition, its human nature to resist what is imposed on them. Thus, using a different perspective, we provide safety with luxurious and intelligent features using a smart helmet. Smart Helmet is an AVR series microcontroller-based project. It is a helmet with some smart features to improve driving experience and to make drive safer. This smart helmet has three main features, and each feature has its own purpose like the purpose of first feature is to encourage or force rider to wear helmet, similarly the purpose of second feature is to prevent rider to drink and drive, and third feature is to save lives as many as possible when accidents by complete covering of head through helmet door controlling using servo motor. Two modules one on the helmet and bike each will work in synchronization, to ensure that the biker is wearing the helmet. The ALCHO-LOCK function is used to prevent drink and drive scenarios Vibration sensor detects accidents which is designed to automatically send accident location to authorized person using GPS module. This system having smoke sensor, vibration sensor when the smoke is detected automatically helmet having front door which is provide safety for driver when he is falling. The microcontroller gets the information regarding the alcohol through the alcohol sensor which is interfaced to the ignition of the vehicle receives the data and controls the vehicle using DC motor. By this way we can take the prevention steps before occurring the major accidents and we can avoid the human losses and financial losses.

**Keywords:** Smart helmet, Avoiding accidents, Safety.

### 1. INTRODUCTION

The objective of the smart helmet is to provide a means and apparatus for detecting and reporting accidents. Sensors, Wi-Fi enabled processor, and cloud computing infrastructures are utilised for building the system. The accident detection system communicates the accelerometer values to the processor which continuously monitors for erratic variations. When an accident occurs, the related details are sent to the emergency contacts by utilizing a cloud-based service. The vehicle location is obtained by making use of the global positioning system. The system promises a reliable and quick delivery of information relating to the accident in real time and is appropriately named Konnect. Thus, by making use of the ubiquitous connectivity, which is a salient feature for the smart cities, a smart helmet for accident detection is built.

Now a day's every system is automated to face new challenges. In the present days Automated systems have less manual operations, flexibility, reliability and accurate. Due to this demand every field prefers automated control systems. Especially in the field of electronics automated systems are giving good performance. The project "Alcohol detector" itself indicates that whenever there is any alcoholic content has been detected using alcoholic sensor then the system automatically controls the

motor of the vehicle. In this project we are using the alcoholic sensor that finds the alcoholic content and fed as input to the microcontroller. This project is designed around a microcontroller which forms the control unit of the project. The microcontroller gets the information regarding the alcohol through the alcohol sensor which is interfaced to the ignition of the vehicle receives the data and controls the vehicle using DC motor. By this way we can take the prevention steps before occur the major accidents and we can avoid the human losses and financial losses. An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result. The project "smart helmet" using ARDUINO microcontroller is an exclusive project which is used to detect the alcohol and it gives message alert to the predefined number. A traffic accident is defined as any vehicle accident occurring on public highway roads .The thought of developing this project comes to do some good things towards the society. Two wheeler accidents are increasing day by day and lead to loss of many lives. The main aim of our project is to build a safety system which is integrated with the smart helmet and intelligent bike to reduce the probability of two-wheeler accidents. If any accident occurs no persons at place where to give information to the ambulance or parents. This is a situation we observe our day to day life, a thought of finding some solution to resolve this problem come up with this idea of giving the information about accident as soon as possible and in time. Smart helmet focusing on three major applications which are helpful in our day to day life. At first and most one is the ignition of the bike will not on if we are not wearing the helmet. Secondly alcoholic driving is not possible by using this smart helmet. If the rider is alcoholic, the bike will not start. Third application is accident detection. If person met with an accident, no one is there to help him and simply leaving or ignoring the person, In such situation informing to ambulance or family members through mobile to rescue him for an extent.

## 2. LITERATURE SURVEY

The Global status report on road safety 2015, reflecting information from 180 countries, indicates that close to 1.25 million people die every year as a result of road accidents . Close to one fourth of the people involved in accidents are motorcyclists. The main cause of death in two-wheeler drivers is over speeding and careless driving. Numerous lives could have been saved if emergency medical service could get accident information and reach in time to the scene. Up to 75% of all deaths occur within the first one hour of impact. Thus, in this crucial phase of time, if proper aid reaches the victims, mortality rates can be reduced. This project aims to build an Internet of Things (IoT) application that leverages on ubiquitous connectivity, sensing and data analytics that are the basis of IoT applications. The IoT is comprised of smart machines interacting and communicating with other machines, objects, environments and infrastructures. The huge volumes of data thus generated, is processed into useful actions that can "command and control" things, to make our lives much easier and safer. IoT applications introduce numerous benefits like the capability to remotely monitor, manage and control devices, and to get new insights and useful information from massive streams of real-time data. The foundation however lies on the intelligence of the embedded processor. In order to realise the full potential of the cloud computing and the ubiquitous sensing, a combined framework of both is important. Thus, IoT application-specific framework should be able to provide support for the following: 1) Reading data streams from sensors directly 2) Transparent and scalable processing of the data 3) When events of interest are detected, the predetermined set of actions has to be triggered

by utilizing the various cloud computing applications. IoT and accident management are two areas in which fast progress is being made. White et al. focused on using the smart phone for accident detection and notification Zhao outlines the implications of location awareness on cellular devices, and utilizing this for smarter accident monitoring systems in cars. However, cars are usually designed to reduce the force on the driver. Thus, the force experienced by a smartphone may not be proportional to the force experienced by in-vehicle sensors that are mounted inside the car. This may result in inaccurate detection of an accident. Moreover, power consumed by the GPS receiver in a smartphone is high, rendering the battery life to be reduced at a fast rate. Numerous papers have dealt with the transmission of accident information. There have been many advances in the development of communication between vehicles (V2V technologies), also known as vehicular ad hoc networks (VANETs). The 802.11p working group approved the IEEE 802.11p standard, providing a viable solution for inter-vehicular security applications. The U.S. Department of Transportation (DOT) has developed projects to improve traffic safety through the use of vehicular communication, based on testing the effectiveness and safety benefits of the wireless connected vehicle technology in real world, multimodal driving conditions. These experiments only include V2V communications. The monitoring system proposed by Jung et. al. includes non-intrusive active electrodes installed on the seats of the vehicle. The data collected is sent through a wireless PAN and data is processed to identify if the driver is stressed or not. However it can be seen that these approaches are too limited because of the very short communication range. However, most of the existing technology has been designed for 4-wheeled vehicles and are limited in perspective in terms of its reach and cost. As the network of such systems expands, maintenance also becomes expensive. Thus, there is a need for an intelligent vehicular safety system that ensures affordable safety and can be availed by all. Thus, we present a simple design and implementation of a low cost and secure Internet-based smart helmet.

This is a report about a smart helmet which makes motorcycle driving safer than before. The aim of this project is to give information at accident to ambulance N family members. This is implemented using Arduino. This smart helmet was implemented by placing vibrations sensors in different places of helmet where the probability of hitting is more which are connected to arguing board. When the date exceeds minimum stress limit then the GSM module sends message to family members automatically. The hardware used in this system is Arduino board, Bluetooth module, vibration sensor and mobile phone.

### **Smart Helmet for Indian Bike Rider:**

This paper presents the smart helmet that makes sure that the rider cannot start the bike without wearing it. This helmet replaces the cable connections for wirelessly switching on a bike, so that the bike would not start without both the key and the helmet. A LED indicator is used to demonstrate the working of the model. The system is a simple telemetry system, which is activated with the help of a pressure that is applied to the inner side of the helmet when the rider wears it. The framework model uses a DPDT electromechanical relay and hence there is some time lag in wearing the helmet and switching on of the circuit.

### **Smart Helmet Using GSM & GPS Technology for Accident Detection and Reporting System:**

A smart helmet is an innovative concept which makes motorcycle driving safer than before. It uses the GPS and GSM as its core technologies. The mechanism of this smart helmet is very simple, vibration sensors are placed in different sections of helmet where the chances 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 provide it to the microcontroller board, then 6 controller extract GPS data using the

GPS module that is integrated to it. When the data goes below the minimum stress limit then GSM module automatically sends alerting message to ambulance or family members. The hardware used in this system is alcohol sensor, GSM, GPS, microcontroller, pressure sensor and vibration sensor. Alcohol Detection Using Smart Helmet System: The system automatically checks whether the person is wearing the helmet and has non-alcoholic breath while driving. There is a transmitter at the helmet and a receiver at the bike. There is a switch used to ensure the wearing of helmet on the head. The data to be transferred is coded with RF encoder and transmitted through radio frequency transmitter. The receiver at the bike collects the data and decodes it through RF decoder. MCU controls the function of relay and thus the ignition; it controls the engine through a relay and a relay interfacing circuit. SMART HELMET is a system which aims to make all motorcyclists in Malaysia aware and compulsory to wear helmet whether the travel distance is in 100-meter radius or long distance. The system will use IEEE technology which will connect from the transmitter at helmet to the receiver at motorcycle. Many types of switches being used such as temperature heat switch, clipped switch, and signal as a switch to make sure the motorcyclist not cheating to their self. If the system identified that the riders or user not wearing their helmet properly (clipped), the signal won't be send to the receiver at motorcycle which will cause the motorcycle cannot start and being ride by motorcyclist. The scope of the study will be using others studies and statistics from Malaysia government agencies in term of Road Safety; fatal motorcyclist accident causes and focus on the helmet wearing attitude and behavior.

### 3. PROPOSED SYSTEM

It is a well-known fact that younger generation prefers bikes and motor cycle. Additionally, over speeding and drink and drive have become common issues now-a-days. There are thousands of people who are losing their lives due to the road accidents. The main reason for this is due to the delay in the emergency which should be provided to the victims. Smart helmet using IoT will detect the accidents and report them to emergency contacts and near hospitals. This helmet consists of multiple applications where used in alcohol detection, send notification whether rider wearing helmet or not and it also gives warning alarm to wear helmet and engine gets locked until the rider wears helmet and it also used accident detection. Here accident detection systems communicate with accelerometer values to the processor which continuously monitors for erratic variations. Mainly this system will provide quick and reliable information which relates to the accident and send information in the form of messages to the emergency contacts.

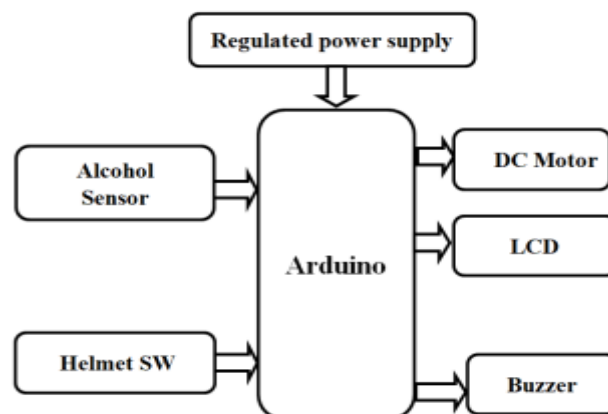


Fig. 1: Proposed system.

The project “Smart Helmet” itself indicates that whenever there is any alcoholic content has been detected using alcoholic sensor then the system automatically controls the motor of the 9 vehicle. In this project we are using the alcoholic sensor that finds the alcoholic content and fed as input to the microcontroller. This project is designed around a microcontroller which forms the control unit of the project.

This system having smoke sensor, vibration sensor when the smoke is detected automatically helmet having front door which is provide safety for driver when he is falling. The microcontroller gets the information regarding the alcohol through the alcohol sensor which is interfaced to the ignition of the vehicle receives the data and controls the vehicle using DC motor.

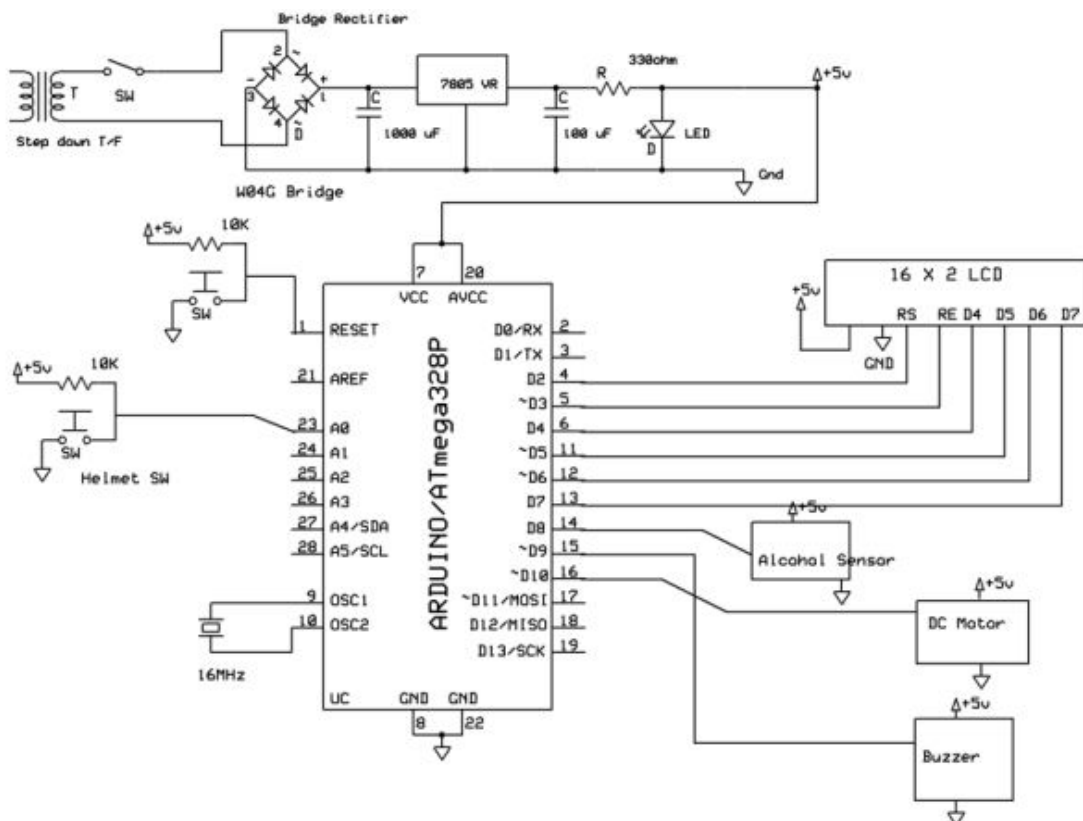


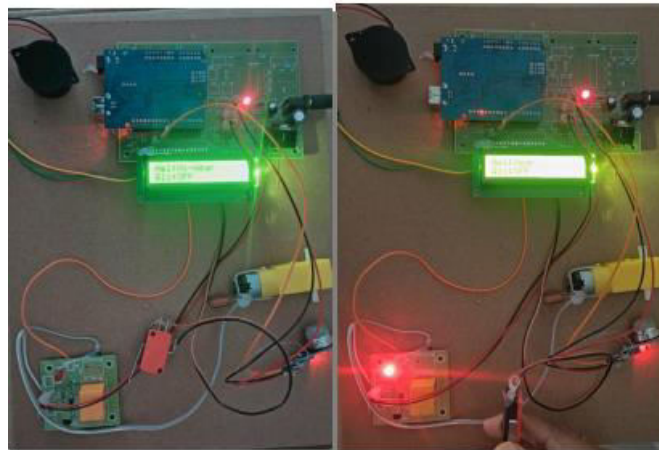
Fig. 2: Circuit diagram.

In this smart helmet the helmet is fixed in combination with three components which are main. The third on is the Button which is present inside the helmet. If the person does not wear helmet, then the bike does not get started easily. And it starts beeping until the person wears the helmet and displays a message that “Helmet Not Wearing”. Once, if the person wears the helmet and his top touches to the button it will stop beeping and displays the message that “Helmet Wearing”.

#### 4. RESULTS

The main purpose of this helmet is to provide safety for the rider. This can be implemented by using advanced features like alcohol detection.

The smart helmet system with advanced alcohol sensing including GSM and GPS Technology is used to authenticate with bike to unlock the ignition of the two-wheeler. The life of a rider on two wheelers can be saved from the road accident with standard protection with safety feature.



## 5. CONCLUSION AND FUTURE SCOPE

We contrasted smart helmet with alcohol, helmet switch. We implemented the protection system for driver by using Arduino micro controller. Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

### Future Scope

Our project "G.S.M based alcohol detection" is mainly intended to design such that to avoid accidents for drunken people using alcohol detection sensor. And it sends S.M.S to the predefined number and it also shows on L.C.D regarding alcohol detection.

The project "Alcohol detector" itself indicates that whenever there is any alcoholic content has been detected using alcoholic sensor .when alcohol detects relay gets turn ON. And this information shows on LCD like alcohol detection occurs and also sends S.M.S to the predefined number using G.S.M technology. In this project we are using the alcoholic sensor that finds the alcoholic content and fed as input to the microcontroller. This project is designed around a microcontroller which forms the control unit of the project.

This project can be extended by using GPRS technology .By using this technology alcohol detection information will displays in predefined websites

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