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An Approach to Arduino Based ‘SMART HELMET’ Having Accident Detection, Alcohol Detection and GSM Technology

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ABSTRACT: A smart helmet is a type of protective head gear used by the rider which makes bike riding safer than before. Most of the countries are enforcing their citizen to wear helmet while riding the bike and not to ride the bike after consuming alcohol, but still rules are being violated. In order to overcome this problem SMART HELMET is developed. The main purpose of this is to provide safety to the rider. It consists of intelligent system embedded into the helmet and vehicle. Helmet unit ensure that rider is wearing helmet and not under the influence of alcohol throughout the ride. It communicates with vehicle unit to switch off ignition system of bike if above condition is not met. Helmet unit check and intimate accident through sms.

KEYWORDS: Smart Helmet, GSM, GPS, Sensors, Accidents Prevention, Alcohol, Message.

I. INTRODUCTION

As we know that the day by day two wheeler accidents are increasing in the world, either by the negligence of the people by not following proper rules and regulations while driving, or by driving while being drunk, no proper knowledge of driving, speedy ride and many other reasons.

According to a survey of India, two wheeler accounts for 25% of accidents related deaths, around 1214 road crashes occur everyday in India leading to 415 deaths per day due to accidents, highest in the world.

It may be the fault of the rider but at the end it is the person who will get hurt. If accident is one issue, then shortage of proper treatment in time is another, which leads to many deaths. The reason may be late arrival of ambulance at the accident spot, no one available at the accident site to help the injured or contact his relations. This is the situation we are facing everyday and alleged to find some solution to resolve this problem, we came up with this concept of giving the knowledge about accident as soon as possible and that too in time, as in any case time matters tons.

So, considering three main things for avoiding accident causes like-

- a) Wearing the helmet compulsory
- b) Avoid drink and drive
- c) If a person had been with an accident, nobody is there to assist him. In such situation, informing the ambulance or relations through mobile.

The idea of work is to offer information about whether the rider is wearing helmet or not, which will be detected by the switch used in the helmet. It is compulsory to wear the helmet without which the ignition switch cannot turn ON.



The second step is alcohol detection. Alcohol sensor is used which detects the presence of alcohol in rider's breath. If it detects the alcohol, the ignition cannot start and a message will be sent to the LCD used in the model that 'alcohol detected'. MQ3 sensor is used for this.

The third issue is accident and delay in proper medical help in time. If the rider met with an accident, it will give information about the location where he has met with accident using GSM module to mobile number of relations. GSM Module has SIM card slot to put SIM and send SMS. So, an ambulance will come with knowing the situation of accident. In fall detection, we place an accelerometer in bike unit by which accidents can be detected.

During literature survey number of papers are studied and out of that, some papers have been drawn that are discussed below:

Dhivya.Pet.al, proposed a smart helmet system which detects that the person is wearing helmet or not and also the system detect the person is drunk or not. Use of the alcoholic sensor to check whether the driver is drunk. With the help of LDR sensor, the head light is automatically dimmed and dipped. In this system there is a switch ensures the placing of the helmet in proper manner known as relay. PIC 16F877 microcontroller is used which offers different kind of the memory like EPROM, EEPROM, flash memory etc.

AyushGarget.al, proposed a helmet without which 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. To make driving more safe GSM and GPS technology is used. 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.

Anshu Singh Gautamet.al proposed that a GSM Based Smart-Helmet can be introduced as an intelligent system, which checks whether the person is wearing the helmet and has a nonalcoholic breath before driving. If any of these conditions are not met, the bike does not start and a message is sent to the concerned person. A transmitter on Smart-Helmet generates a signal on the basis of two mentioned conditions with the help of a switch and an alcohol sensor(MQ 6) and then sends it to the receiver on the bike through the RF transmitter. Now, the receiver decodes the signal and the microcontroller, according to decoded signal, takes the required action. In case alcohol is detected the GSM module attached to the receiving unit sends message to a registered mobile number.

Bindu Sebastianlet.al presented that helmet with GSM and GPS technology can be used to make driving easy . 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 the microcontroller board(Atmega 328), 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.For connecting the GPS and GSM modum interface circuit known as RS232 is needed.

III. METHODOLOGY

This system ensures that the safety of the rider is secured as it necessary to wear the Helmet. The motorcycle will start only if the rider has put on his helmet. And one more condition in which the bike will not start is when the biker is drunk. This system also has the alcohol sensor which detects the presence of alcohol in rider's breath. If it detects the alcohol the bike will not start. We are using MQ-3 sensor here .

The system has following functions:

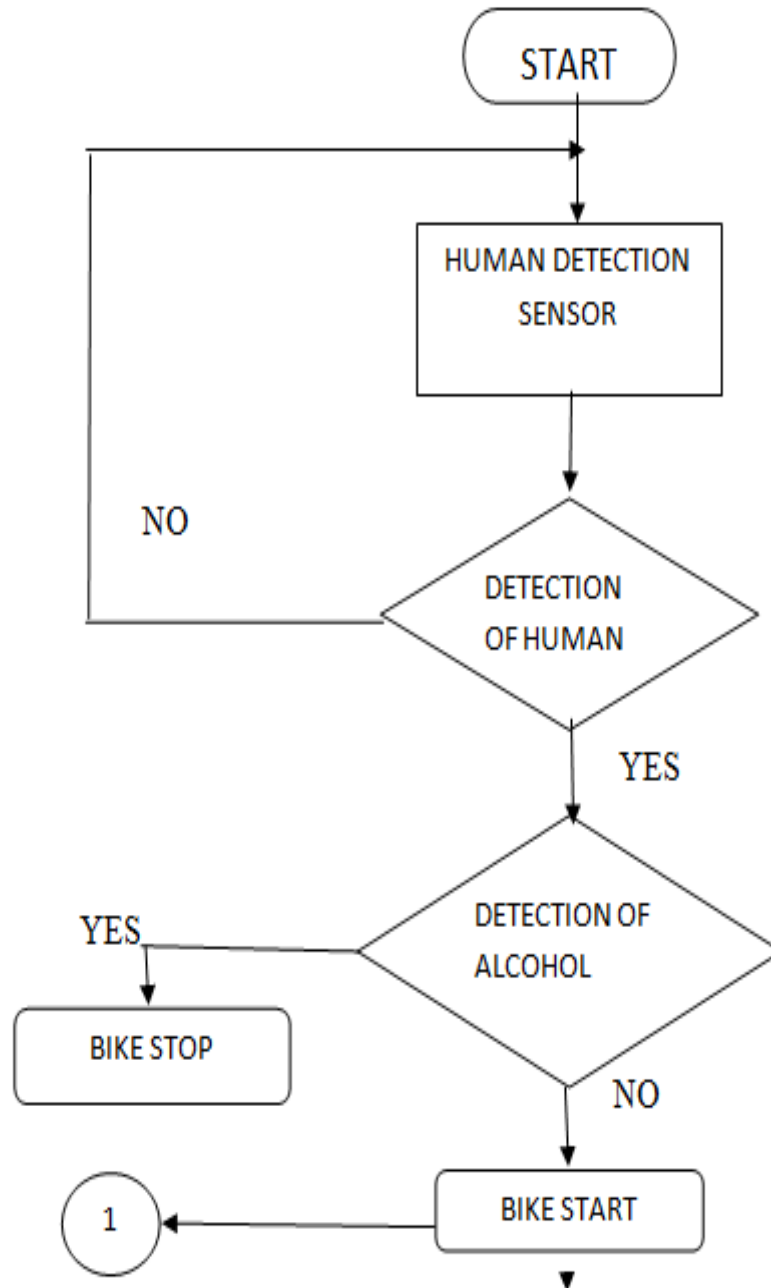
It will secure the rider if he has worn the helmet. If not, the bike will not start.

It will also ensure that if the rider biker has consumed alcohol, the bike won't start.



FLOW CHART OF HELMET AND ALCOHL DETECTION:

Helmet and Alcohol Detection:



An accident detection system is installed in the bike, which enables to detect accident and will be able to notify quickly the accident to rider’s family. For this purpose GSM system is used.



FLOW CHART OF ACCIDENT DETECTION:

Accident Detection:

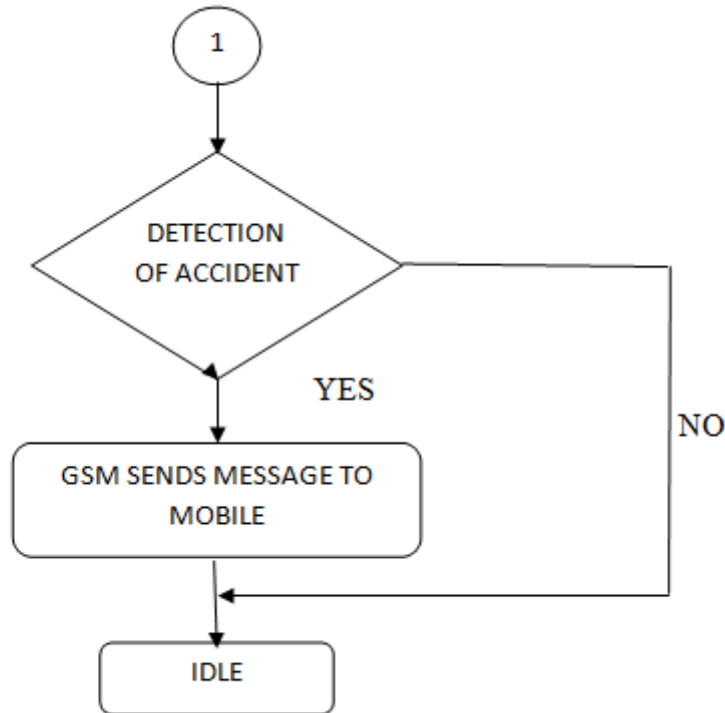


Fig. flow chart of accident detection

This module consists of two parts:
the helmet and the bike.

Data from the helmet will be transmitted wirelessly to the bike.

RF Communication circuit: Helmet unit and Bike unit are connected by wireless link of RF. RF communication circuit contains encoder and decoder circuit. It converts this serial data in to parallel. The decoders are capable to receive data that are spread by an encoder and understand it.

Force Sensing Resistor is placed at inside the helmet where the actual human touch is sensed. It determines by helmet unit that whether helmet is wear or not. This sensor is used as human touch control in various applications. Helmet section consists of -power battery, alcohol sensor, RF transmitter. And bike section consists of -Microcontroller: This is the actual decision-making unit of the entire circuit. According to the data it will receive from the module on bike it will control the output of remaining components.

GSM: This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number.



IV. RESULT

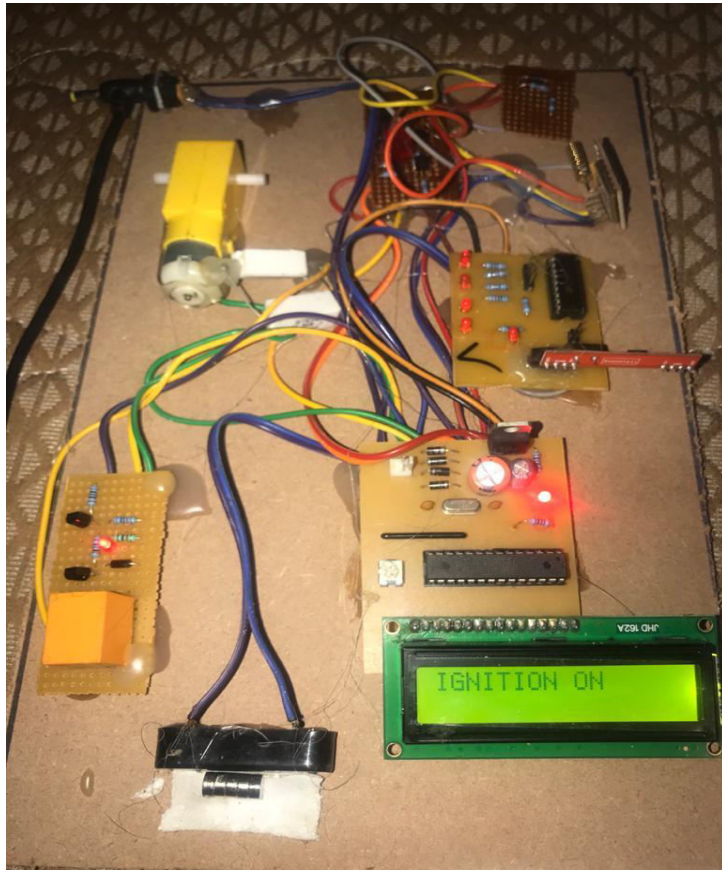


Fig. Ignition on



Fig. Alcohol Detection

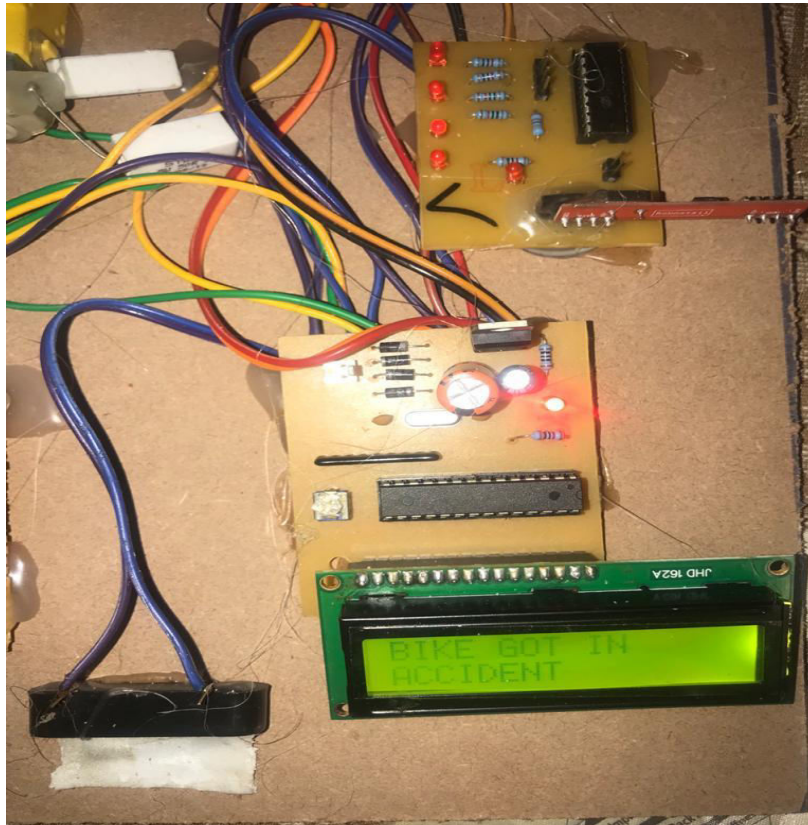


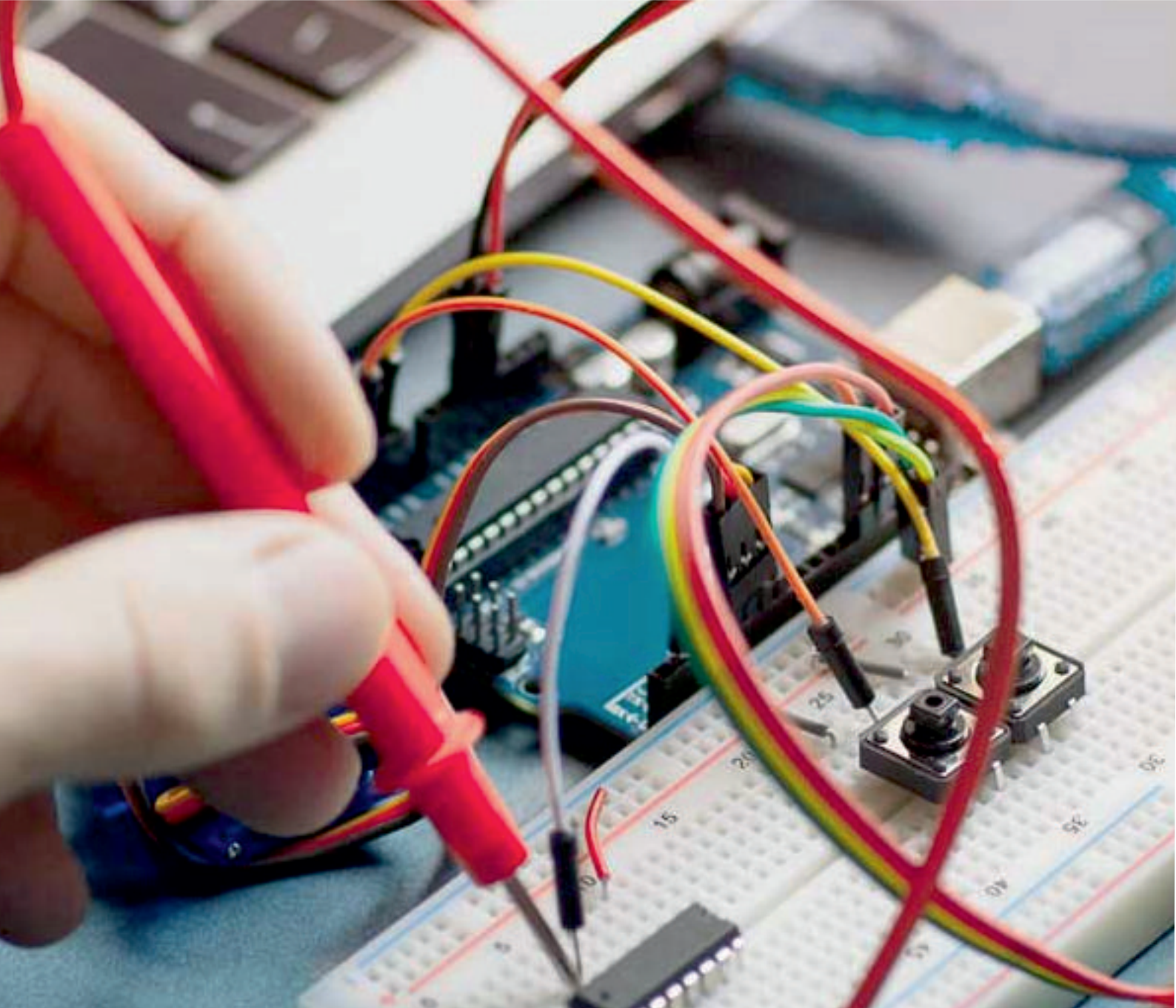
Fig: Accident Detection

V. CONCLUSION

As we know that loss of life due to road accidents is a major cause of concern in our country especially in two wheelers. So, this project has a really good scope as it has various features such as alcohol detector, GSM, GPS and it also provides SMS facilities with the location of bike to the family members and nearest police station after any mishap. Moreover, it does not allow the bike to start if the rider hasn't wore the helmet. It can also help to prevent the damage occurred during any accident. Hence, implementation of this type of project can save a lot of precious lives and hold a great importance in today's scenario.

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