Development of Smart Helmet Based On IoT Technology for Safety and Accident Detection

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Abstract- An accident is an unintended event and unexpected. The carelessness of driver and avoidance of traffic rules are the major factors for occurrence of accidents which cause harm to humans as well as the environment. Nowadays most of the countries are making it compulsory to wear helmet and avoid drunken driving. But still the rules are being violated. In order to avaid this problem, A GSM ans sensor Based Smart-Helmet can be introduced as an intelligent system, which checks whether the person is has a non- alcoholic breath before driving and wearing the helmet. If any of these conditions are not met, the bikes is not start and a message is sent to the concerned persons. A transmitter on Smart-Helmet generates a signal on the basis is two mentioned conditions with the help of switch and alcohol sensor and then sends it to receiver on 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 numbers.

Keywords-Helmet, Drunk and Drive, Rules violated; GSM, Microcontroller.

I.   INTRODUCTION

In these days the road accidents stand among the main cause of human death. According [1] to the World Health Organization, road traffic injuries caused an estimated 1.30 million deaths worldwide in the year 2011, slightly down from 1.26 million in 2003. That is one person is killed every 30 seconds. Only 28 countries, representing 450 million people (7% of the world's population), the first ever Global Status Report revealed by the World Health Organization (WHO), road accidents have earned in India a dubious distinction. With over 131,000 deaths annually, the country has overtaken China and now has become the worst road traffic accident rate worldwide. The report pointed to speed, drunk and drive and less use of helmet in india these are the major factors for road accidents, , wearing the seat belts and child restraints in vehicles as the main contributing factors to avoid the road accidents.

According to the WHO, this is the second most important cause of death for 8 to 30 year olds. The total number of deaths every year due to road accidents has now passed the 131,000 mark, according to the current report of National Crime Records Bureau (NCRB). The NCRB report further states that drunk and drive is one of the major factor for road accidents. The fatal accidents that occur outside the cities are due to drunk and drive and there is no check on this kind of drunk and drive. Unfortunately, drivers think they are fully armed to drive on the roads when they are fully drunk! Until and unless this country comes up with a new method of checking drunkenness on the road, these fatalities cannot be lessened. Campaigns [6] against drunk and drive have not proved effectively.

According to Indian Motor Vehicle Act [4] mandatory that a legal limit of 30 mg / 100 ml and recommends fines and/or imprisonment for transgression. Implementation is poor, and the little enforcement that takes place is non-random in geographical coverage, non-visible, and non-uniform. There has been very little attention given to the aspect of early detection and brief at the level of primary health care provider, emergency room personnel or the police. Application in the field of electronics the automobile field is very popular now. People usually like motorbikes to buy than 4 wheeler because motorbikes are lower price than 4 wheeler and motorbikes are available in various varieties in the market. Hence road safety becomes a major issue need to be concern. necessary and manditory to implement such technique which is not easy to bypass the basic rule of wearing helmet and to avoid drunken driving.

II.   RELATED WORK

Application in the field of electronics the automobile field is very popular now. People usually like motorbikes to buy than 4 wheeler because motorbikes are lower price than 4 wheeler and motorbikes are available in various varieties in the market. Hence road safety becomes a major issue need to be concern. Therefore it becomes necessary and manditory to implement such 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 the engine of the bike is turned ON. Our system includes an alcohol sensor and a helmet sensing switch. The switch is used to detect whether the biker is wearing helmet. Alcohol sensor is used to detect if the biker is drunk, the output is fed to the MCU. Further if the biker is drunk, a GSM module sends a message to the concerned person regarding his drunken condition. If any of the two conditions are violated the

engine will not turn ON.

III. EXISTING SYSTEM

Most of the people use traditional helmets just to prevent from challan done by traffic control police not for the safety purposes. So, these helmets do not ensures the safety of the driver. The vehicle can be turned on and stolen by bypassing the ignition switch.Testing alcohol content present in blood in each individual rider in big countries like India is almost impossible. . Bike will start unless rider wear the helmet. Bike will start if biker is drunked.

IV. PROPOSED SYSTEM

Today a number of countries has made it mandatory to wear helmet while riding .We describe a helmet which is made smart using latest IOT technologies.Helmet for the comfort of riders provide various functions such as sending SOS messages in case of Emergency, use Navigation services ,GSM technology is used. In this system ESP8266 wifi is used. When the system is switched on, LED will be ON indicating that power is supplied to the circuit.The accelerometer is placed in the helmet such that it detects tilts of the helmet. When the rider crashes, the helmet hits the ground and the accelerometer detects the tilt that are created when the helmet hits the ground and then the microcontroller detect the accident occurrence and it will send information about the accident and location of accident using GPS modules.

Alcohol sensor sense the alcoholic content whether the rider drunken or not, if he drunken bike will not start showing as alcohol detected on android app. Use of pressure sensor, gives the whether the rider wear the helmet or not. If he not wears the helmet again bike will not start and intimate to rider to wear the helmet.

Following are the some components which we are using

A. *Gas Sensor*

It is a low cost semiconductor sensor which can detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. The sensitive material used for this sensor is SnO2, whose conductivity is lower in clean air. It's conductivity increases as the concentration of alcohol gases increases.It has high sensitivity to alcohol and has a good resistance to disturbances due to smoke, vapor and gasoline. MQ3 alcohol sensor module can be easily interfaced with Microcontrollers, Arduino Boards, Raspberry Pi etc.This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breathalyzer.It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

B. *Pressure Sensor*

A Piezoelectric sensor is used to measure the changes in parameters like pressure, temperature, acceleration, and force, by converting them into the electrical charge. This sensor works on the principle of the piezoelectric effect. this sensor most suitable for security systems/ home automation system. The effect in which mechanical energy is converted to an electrical form with applied pressure is called the piezoelectric effect. When a pressure is applied to a polarized crystal, the mechanical deformation created results in an electric charge.

C. *Wifi Module*

Wireless Technology is an alternative to Wired Technology which is commonly used for connecting devices in wireless mode.Wi-Fi (Wireless Fidelity) is a generic term that refers to IEEE 802.11 standard for Wireless Local Area Networks (WLANs)Wi-Fi Networkconnect computers to each other, to the internet and to the wired network.
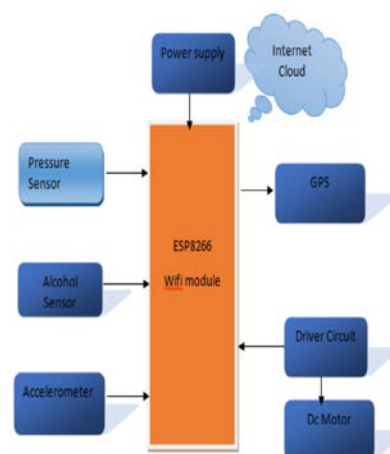

Fig.1 System Design.

Receiver unit:

D. *Dc Motor*

At the most basic level, electric motors exist to convert electrical energy into mechanical energy. This is done by way of two interacting magnetic fields -- one stationary, and another attached to a part that can move. A number of types of electric motors exist, but most BEAMbots use DC motors1 in some form or another. DC motors have the potential for very high torque capabilities (although

this is generally a function of the physical size of the motor), are easy to miniaturize, and can be "throttled" via adjusting their supply voltage. DC motors are also not only the simplest, but the oldest electric motors.

The basic principles of electromagnetic induction were discovered in the early 1800's by Oersted, Gauss, and Faraday. By 1820, Hans Christian Oersted and Andre Marie Ampere had discovered that an electric current produces a magnetic field.

The next 15 years saw a flurry of cross-Atlantic experimentation and innovation, leading finally to a simple DC rotary motor. A number of men were involved in the work, so proper credit for the first DC motor is really a function of just how broadly you choose to define the word "motor." A DC motor is a mechanically commutated electric motor powered from direct current (DC). The stator is stationary in space by definition and therefore so is its current. The current in the rotor is switched by the commutator to also be stationary in space. This is how the relative angle between the stator and rotor magnetic flux is maintained near 90 degrees, which generates the maximum torque.

DC motors have a rotating armature winding but non-rotating armature magnetic field and a static field winding or permanent magnet. Different connections of the field and armature winding provide different inherent speed/torque regulation characteristics. The speed of a DC motor can be controlled by changing the voltage applied to the armature or by changing the field current. The introduction of variable resistance in the armature circuit or field circuit allowed speed control. Modern DC motors are often controlled by power electronics systems called DC drives. The introduction of DC motors to run machinery eliminated the need for local steam or internal combustion engines, and line shaft drive systems. DC motors can operate directly from rechargeable batteries, providing the motive power for the first electric vehicles.

E. *Blynk*

Blynk will work with all popular boards and shields. We wanted to give you full freedom when deciding how to plug Blynk into your existing or new project. You will also enjoy the convenience of Blynk Cloud. Which is, by the way is free and open-source Imagine a prototyping board on your smartphone where you drag and drop buttons, sliders, displays, graphs and other functional widgets. And in a matter of minutes these widgets can control Arduino and get data from it.

V.   CONCLUSION AND FUTURE WORK

Nowadays , most cases of accidents occur by motor bikes. The severities of these accidents are increased because of the absence of helmet or by the usage of alcoholic drinks. This project develops an electronic smart helmet system that efficiently checks the wearing of helmet and drunken driving. The system also efficiently sends message to the police authority in case alcohol is detected which helps in creating a disciplined environment. By implementing this system a safe two wheeler journey is possible which decreases the injuries caused due to drunken driving and absence of helmet. In future the system can be developed in compact size and can be made globally acceptable by all countries. Government can enforce laws to install such systems in all the two wheelers. In case of any accident it might send the messages to the relatives and friends about the location of the accident till the first aid reaches the rider. This system may also be used to know the location of the vehicle for rescuing in case of theft incidents.

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