IOT BASED SAFETY CONTROL AND BIKE ANALYZER

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Abstract - Two wheelers are widely used than other form of vehicles due to its low cost and simplicity. Most of the time rider doesn't like to wear helmet which could result in fatal accidents. Drunken driving and Drowsy driving are the major factors for such road accidents. Statics show that 35% of the accidents are caused by two wheelers and in that 60% of the two wheeler accidents are caused due to lack of consciousness, drunken driving and not wearing helmet. The primary concern of all riders is safety. This project aims for avoidance of accidents and develop helmet detection system. The proposed system is an intelligent/safety helmet. A module affixed in the helmet, such that, the module will sync with the module affixed on bike and will also ensure that biker has worn Helmet and accident avoidance detection module will be installed on the bike.

Key Words: IoT, Bike Analyzer, Relay, LCD, Thing Speak, GPS

1.INTRODUCTION:

The project aims to provide total safety for bike riders. Recently helmets have been made compulsory, but still people drive without helmets. Bangalore City has approx. 50 lakh two-wheeler riders, which includes 5000-6000 accidents every year out of which 700-800 are fatal. In the last few years, there has been rapid increase in number of road accidents. Due to rise in road accidents, it has now become necessary to generate a system to limit accidental deaths. With respect to vehicle safety, India meets only two out of the seven vehicle safety standards by the World Health Organization (WHO). Two wheelers account for 25% of total

road crash deaths. Nearly 75% motorcycle riders involved in accidents continued to wear helmets, crash records show. The main cause of these fatalities is people riding two wheelers under the influence of alcohol and violation of traffic rules which later on results in serious accidents. "The likelihood of survival of fatalities wearing helmets is high as compared to those not wearing helmets".

In this project there are two modules namely helmet and vehicle module**, helmet will have control over the vehicle start and stop.**

In Helmet the sensor module is built using sensors like alcohol sensor, accelerometer sensor, touch sensor and eye blink sensor, all the above sensors are connected to RF transmitter via Comparator. Sensor module will be placed in the helmet to detect weather a person has worn helmet or not. Once the person wears the helmet its signals get transmitted. The module in the bike allows the rider to start the vehicle once the module receives signals from helmet unit. The status of helmet worn is uploaded to cloud/server via GPRS. In case of alcohol consumption the vehicle remains off though helmet is worn and status is uploaded to cloud/server. In case of drowsy while driving the vehicle units get alerted via sensor in helmet and stops vehicle automatically and status is uploaded to cloud. The rash driving detection is done using accelerometer sensor and rash driving status is

uploaded to cloud/server for further action. The server is maintained by company authorities looking at database and the rider status is tracked and required measures are taken. In case the helmet is lost, OTP is used to turn on the bike for use.

2.LITERATURE SURVEY:

1. Wu Xinye, "Research on vehicular control and safety" (ICAAC), International conference Sept-2018:

The objective of 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 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 smart cities, a smart helmet for accident detection is built.

2. Rasli Mohd. "Prevention of accident on roadway for two wheelers" (INDICON), IEEE conference Dec-2018:

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 have no importance for people and they are regularly violated. In addition, it is 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. Two modules, one on helmet and one on bike will work in synchronization to ensure that the biker is wearing a helmet. A radio frequency module is responsible for the wireless communication between the helmet and bike circuit. The Piezo electric buzzer is used to detect speeding and this feature is extended by limiting the speed of the user. The Alco-Lock function is used to prevent drink and drive scenarios, Accelerometer detect accidents which is extended by employing GSM module in the circuit, which is designed to automatically send one message to one personal contact and one concerned authority that the person has been into accident and a fog sensor for increase in visibility in case of fog or smog are also used.
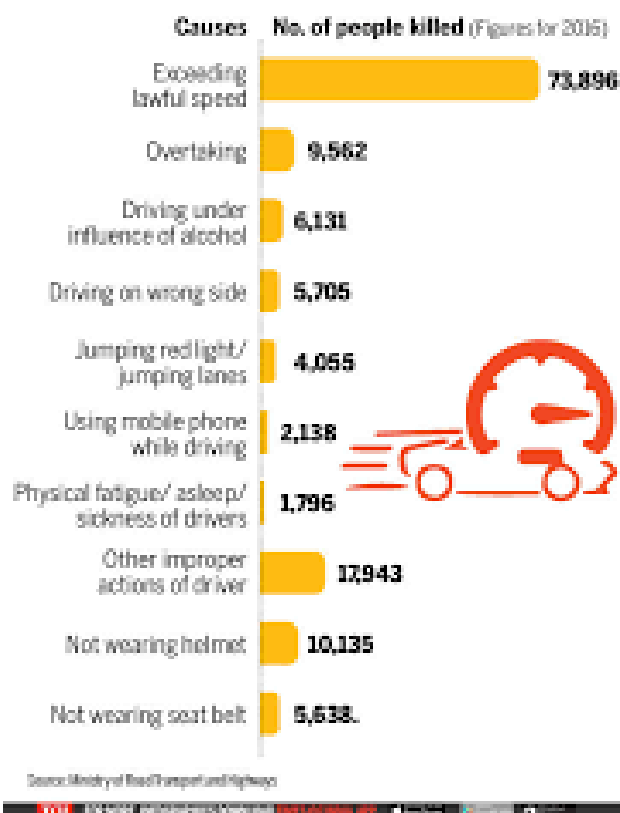

Fig   2.1   Effect   of   Over   Speeding

3.METHODOLOGY:

The ESP 32 is connected with the vibration sensor. When the rider falls down the vibration sensor sends a low voltage to the micro controller port D4. The micro controller takes message from the memory and forwards to the required person. The RF is used for start the two wheeler. Firstly it checks whether the driver is drunk or not, if drunk the two wheeler will not start. The small voltage of ignition of the two wheeler is grounded in normal condition. If the rider has worn the helmet, the presser switch is pressed and the RF transmitter radiates the FM modulated signal. The RF receiver is connected with the two wheeler which will receive the radiated signal and will activate the relay. The relay will remove the ignition wire from the ground and will connect with the starting switch, now the two wheeler will start.

LCD: 16*2 is used for display the latitude and longitude. 16*2 means 16 characters in 2 lines. LCD is an electronic display module which uses liquid crystal to produce a visible image. The 16*2 LCD display is a very basic module commonly used in circuits. In this LCD character is displayed in a 5*7 pixel matrix. It has 2 registers namely, command and data. The register select is used to switch from one register to other. RS=0 for command register and RS=1 for data register.

Temperature sensor is used to sense the temperature inside the helmet if more than 25 degree, it produces peep sound. Temperature sensors measure the amount of heat energy or even coldness that is generated by an object or system, allowing us to sense or detect any physical change producing either an analogue or digital output. We use a Thermistor in this project. A thermistor is a special type of resistor which changes its physical resistance when exposed to changes in temperature. Most types of thermistors have Negative Temperature Coefficient (NTC), that is their resistance value goes DOWN with an increase.

in temperature, and there are some which have a Positive Temperature Coefficient (PTC), in that their resistance value goes UP with an increase in temperature.

Liquid Sensor used in this project is MQ6. It is fixed in the helmet unit. If the driver is drunk, it will send voltage to the RF transmitter so that it will transmit the modulated signal hence the two wheeler will not start. MQ6 has high sensitivity to LPG, iso-butane, propane. It has fast response, simple drive circuit and long life. The **vibration sensor** used is a piezo crystal based sensor. The **eye blink** sensor helps to detect the drowsy condition of the rider. If the eyes are found to be closed for a longer duration while riding, it immediately generates a warning and sends data to cloud.

Thing Speak is an internet of things (IOT) platform that lets us to collect and store sensor data in the cloud and develop IoT applications. It is an analytics platform service that allows us to aggregate, visualize and analyse live data streams in the cloud in the form of excel sheet. With help of this we can analyse how many times the driver was involved in accident, drink and drive, rash driving, drowsy driving etc. with the exact date, time and location.

GPS is a space-based satellite navigation system. It provides location and time information in all weather conditions, anywhere on or near the Earth. GPS receivers are popularly used for navigation, positioning, time dissemination and other research purposes. The GPS consists of satellites that orbit the earth. These satellites are geosynchronous with an orbital period that is the same as the Earth's rotation period. So they maintain exactly the same position with respect to the earth below them. All the GPS satellites transmit radio signals, which are then captured by a GPS receiver and used to calculate its geographical position. A minimum of four satellites may be required to compute the four

dimensions of X, Y, Z (latitude, longitude and elevation) and time.

GPS receiver converts the received signals into position and estimates time and some other useful information depending on the application and requirements.

GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz,

1800MHz and 1900MHz frequency bands. GSM system was developed as a digital system using TDMA technique for communication purpose. From the below circuit, a GSM modem duly interfaced to the MC through the level shifter IC Max232. The SIM card mounted GSM modem upon receiving digit command by SMS from any cell phone send that data to the MC through serial communication.

Relay is used to connect the starter of the bike so that the A relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current. The heart of a relay is an electromagnet (a coil of wire that becomes a temporary magnet when electricity flows through it). You can think of a relay as a kind of electric lever: switch it on with a tiny current and it switches on ("leverages") another appliance using a much bigger current. Why is that useful? As the name suggests, many sensors are incredibly sensitive pieces of electronic equipment and produce only small electric currents. But often we need them to drive bigger pieces of apparatus that use bigger currents. Relays bridge the gap, making it possible for small currents to activate larger ones.

Fig 3.1: LCD Display

4.RESULT:

The Smart helmet system was tested and the resultant output was studied. Once the system is tested it can be integrated in a helmet and the bike. The first part was to test whether the biker is wearing the helmet. The system does not allow the biker to start vehicle until he has worn the helmet. As soon as the biker wears the system displays a message on the LCD screen saying that HELMET WEARED. Whenever the biker has consumed the alcohol the system does not allow vehicle to start and will send the message ALCOHOL CONSUMED in LCD display.

Fig 4.1 LCD Display

5.COMPARISON:

The existing system has only accident detection system which provides the location and message to the family members/nearest police station/nearest hospital. But this project aims to provide better and safer facilities by making Helmet compulsory for the rider, alcohol sensing, GSM and GPS facility, Speed control, Data analysis with the help of Thing Speak platform which stores the data in the form of excel sheet and help the rider to check his/her driving reports anytime.

6.ADVANTAGES:

This project will help keep the record of driver's location, number of times the speed limit was crossed, drowsy driving cases, date and time of the accident occurred in the Thing Speak cloud. This will compel the driver to wear helmet every time he/she drives the two wheeler.

7.CONCLUSION:

This paper aims at the benefits of the society by reducing the death rate caused due to not wearing the helmet and riding bike by consuming alcohol and providing the information to family about the accident and location of the same. A Smart helmet system is developed which has embedded systems which will monitor whether the rider is wearing a helmet and if the rider has consumed alcohol. In either of the cases the bike would not start and the rider would not be able to use it. This is a preventive method to reduce accidents and fatalities on the road. This system also has a GPS and GSM unit which will send a message and the location of the bike to the family members of the bike rider in the unfortunate event of an accident. This will help in providing timely help to the rider and reduce the fatalities.

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