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IOT based Smart Helmet for Mobikes

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Abstract

In India bikes are more prevalent, Road accidents are increasing day by day because the riders are not using the helmet, many accident cases occur due to this carelessness of not wearing helmet during driving. In order to put an end to this misery we have developed the smart helmet for bikes, a way to decrease the rate of accidents. This thought of taking responsibility of society results in this proposed model of making a bike safety headgear. This paper provides an intelligent system for two-wheeler accident prevention and detection for human life safety just by wearing the helmet.The prime objective is to force the rider to wear the helmet throughout the journey. The prevention part involves, Smart Helmet, which automatically checks whether the person is wearing the helmet or not.If this condition is not satisfied the relay does not ON the engine and it is also become necessary by government authorities to wear helmet for safety. This system will provide safety to the person from getting injured and information such as current location of the individual while travelling. Hence the idea of smart helmet makes the motorcycle driving more secured and safer than earlier.

Keywords: *Accidents, Ultrasonic Sensors, WIFI module, GPSmodule, safety and security.*

INTRODUCTION

In developing countries, road traffic accidents were the foremost vital reason for injuries and India ranks first in road accidents around the world. In Indian road system, widening of the road isn't another answer to avoid traffic in such a city. Considering the increasing number of motor cycle riders in our country and the number of accidents happening each year, it is evident that in most cases the rider suffers injuries to the head and it leads to fatal causalities. So, a smart helmet is an unique idea which makes motorcycle driving much safer than the existing system.The main objective of this system is to reduce the rate of accidents just by wearing the helmet throughout the journey. The system focuses on the methods that can be implemented to reduce the impact of road accidents. A system has been developed which will enforced by putting it on a bike which works with the helmet that is being worn by the rider while riding the bike.

Smart helmet focus on two 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 and second 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, this system will provide the current location

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through server to family members so that they can reach to the person's place of accident. In this way, the system can improve safety and prevent accidents, especially fatal to the traveller.

PROPOSED SYSTEM

The proposed system is a "SMART HELMET" system that will provide safety and security to the people from accidents by providing head safety through the helmet and give the current location of the rider through the journey. Earlier the system that has been implemented contain alcohol detection, they are wirelessly connected and prone to system failure. This system only works when the rider will wear the helmet, if the rider will not wear the helmet the bike will not start. In the proposed system, the first step is to check if the rider has actually worn the helmet. For this purpose, an ultrasonic sensor is use for detection. GPS module is use to track the location of the rider in case of any casualties occur during the time of bike riding. A Wi-Fi module is used for the communication between bike and helmet with the help of server. To run the system, we use Arduino Uno as the Arduino is a very user-friendly device which can be easily interfaced with any sensors or modules and is very compact in size.

The ultrasonic sensors will be placed on left and right side of the helmet in such a way that it does not face any difficulty while detecting the person's head. Its distance of operation is already set by United State of America in a range that only provides correct result and does not manufacture results for any error value. All the information of the rider will be shown on the server site. At the lasts all of these will be integrated in helmet with the help of wires. This is the methodology that ha been used in the proposed system.

LITERATURE REVIEW

Smart helmet for accident prevention by Priya Parameshwari et al. In this, a system is implemented in which it will automatically checks whether the person is wearing the helmet and has non- alcoholic breath during driving. Here a switch is used to detect whether the biker is wearing helmet or not. Alcohol sensor is used here to detect the biker is drunk, the output is fed to the MCU. Both the switch and the alcohol sensor are installed in the helmet. If any of the two conditions are violated the engine will not turned ON. It contains two block diagram such as for helmet and for bike [1].

Smart Helmet by Saravana Kumar k et al. Here they proposed a system in which the helmet is be used to communicate with the motor bike all the time during the initiation of the ride to find if the person wear the helmet or not and then the rider is asked for a password within the style of speech to unlock and ignite the bike by matching a userindependent password similar to any other personal computers, and not to start the engine as well. The idea of a password to unlock the bike makes the bike protected in case the bike is stolen. This paper is based on three module i.e helmet module, voice

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module and bike module. Here Arduino nano is used for connectivity and control the sensors and ultrasonic sensors used for detecting the helmet is worn or not. They also used speech synthesizer to recognize the voice to unlock the bike [2].

Smart Helmet and Intelligent Bike system by Prajitha Prasad et al. The idea of this work is to reduce the rate of accident and drunk drive cases. Here the used the flex sensor to check if the person wearing the helmet or not. They also used alcohol sensors for detecting the alcoholic content in riders' breath. If the rider is not wearing the helmet or if there is any alcohol content found in rider's breath, the bike remains off. Here GSM is used for sending message to the predefined number when the accelerometer is tilted. In this paper all the output will displayed on LCD screen. This paper contains bike unit and helmet unit and also includes circuit diagram of transmitter unit and receiver unit [3].

Alcohol Detection Using Smart Helmet by Sudharsana Vijayan et al. The system proposes an intelligent system, Smart Helmet, here the system will automatically check whether the person is wearing the helmet and has non- alcoholic breath while driving. Here they implement a transmitter at the helmet and the receiver at the bike. There is a switch which is used to ensure that the helmet is on the head. The ON condition of the switch ensures the putting of the helmet in accurate manner. In this system also an alcohol sensor is placed near to the mouth of the driver in the helmet to detect the presence of alcohol. The data to be transferred is coded with RF encoder and transmitted through frequency transmitter. The receiver at the bike receives the information and decodes it through RF decoder. The engine should not ON if any of the two conditions is violated. MCU will controls the function of relay and thus the ignition, it will control the engine through a relay and a relay interfacing circuit [4].

Implementation of A Smart Helmet by Deekshitha K I and Mrs. Pushpalatha S, this proposed system based on two modules one on vehicle and another is on helmet. Helmet unit comprises of Alcohol and Crush Sensor, alcohol sensor will not allow rider to take the bike and Crush Sensor identifies the accident detections, here the alaso used the eye blink sensor, which identifies the sleeping nature of the driver in the earliest and triggers a siren to awake in, in negligent cases, it will stop the bike. Vehicle will contain the GPS, GSM and Motor driver unit, GSM for communication, GSM for the Location tracking and MOTOR Driver unit is to monitoring the engine. Both the units are connected via RF Transmitter and Receiver [5].

Smart Helmet using wearable Technology by Akshay B Patil et al. Here they placed a proximity sensor in the helmet to check the usage of helmet and alcohol sensors are also used to detect the alcohol content in rider's breathe. The main feature of this system is that it is independent and can directly operate without any connection between bike and helmet, as they have used gyroscope sensor MPU6050 which give angle of orientation when a user makes a turn which is used to switch on led indicators situated at the back of helmet depending on direction of turn the user takes

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and it even be used for stop signalling by measuring de-acceleration of bike given by the same sensor. Solar panels are also used to get power from helmet whenever sunshine is available and store in battery which could be used to power up pi and other sensors [6].

Design of Smart Helmet and Bike Management system by Dr.B.Paulchamy et al. Here they proposed system which is designed in such a way that if the rider will not wear the helmet the bike will not start and 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. The system will transmit the data in real time, additionally the system is incredibly clever enough to give information that bike getting high speed then GSM system send a message to government [7].

Smart Helmet by Nilesh. M. Verulkar et al. They have used Arduino uno that makes the overall system simple and this system consists of RF transmitter and RF receiver system. The bike will not get start without wearing helmet by the user or rider, as user wear helmet a RF signal radiate from transmitter and once these RF signal get sensed by the receiver is connected to the ignition of the bike and the bike will get start. An alcohol detector is placed closed to the mouth of the rider in the helmet to notice the presence of alcohol breath. Here LDR sensor is used which can turn the headlights of the bike ON and OFF automatically. Also, the vibration sensors are used in different places of helmet where the probability of hitting is more which are connected to Arduino. GSM modeule is also used here, so when the rider crashes and the helmet hit the ground, the sensors sense and the Arduino extract data using the GSM module that is interfaced with Arduino [8].

Alcohol Detection Sensors of Smart Helmet by R.Aishwarya et al. In this system they used gas sensors to detect whether the traveller is drunk or not and a keypad is used by which the rider doesn't need any key to start the vehicle. The rider just needs to enter the pincode into the keypad to unlock the key but only after wearing helmet as the push button (smart button) is fitted in helmet which will detect the rider wore the helmet or not [9].

Smart Helmet using GSM and GPS by Aditi Varade et al. The working of this system is very simple they placed a limit switch inside the helmet, which will detect whether the rider has worn the helmet or not, if not then the bike will not start. Smart helmet band provides aid in case of accident with the help of GSM and GPS technology. If the person met with an accident then in such situation a message along with the location is sent to the ambulance or family member to rescue him. Here the microcontroller ATMEGA16 is used for connectivity. Also, the GPS and GSM module is used to send a text message and location to the predefined number. Here they also used the Accelerometer ADXL335 for speed limit [10].

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IMPLEMENTATION

The proposed system has been implemented for the safety and security purpose of a person during travelling.In this system, the first module is to generate connection between Arduino UNO R3 kit with ultrasonic sensors. The pair of ultrasonic sensors are place on both the sides of the helmet which will detect the head inside the helmet. The signal given by ultrasonic sensors to Arduino kit will allow the ignition of engine.The figure4.1 given below shows the result of ultrasonic sensors.

In next module of the system, connection of Arduino kit with GPS sensor (NEO 6M). The main work of GPS is to locate the real time position of biker and monitor its location and speed of biker will save in server which is connected through Wi-Fi module. The streams of GPS take, shows location of rider in longitudes and latitudinal way. The fig 4.2 given below shows the result of GPS module.

Another module of this system is WIFI (ESP 8266) module which is also connected with Arduino kit along with GPS and Ultrasonic sensors. This provide communication of the system with the server so that the information of the rider such as its location along with speed, time and date will show on the server site via “metrojit.000webhostapp.com”. The fig 4.3 shows the screen of site contain the information.

The Arduino is a very helpful device which can be easily interfaced with any sensors or modules and is very compact in size. Now we are clear that the Arduino will send a declaration to the bike for an ignition request. But how shall the communication take place? For this purpose, we used electronic solenoid valve that is being placed near the engine. When the valve gets the affirmation then only the fuel will allow to flow through it. This is the last module used in the system.

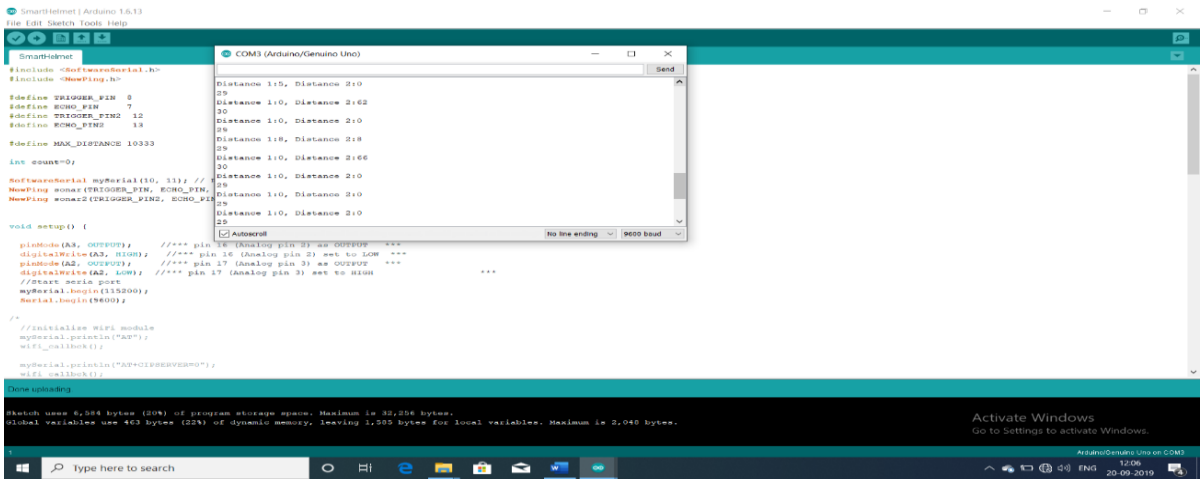

Fig 4.1: Output of Ultrasonic sensor

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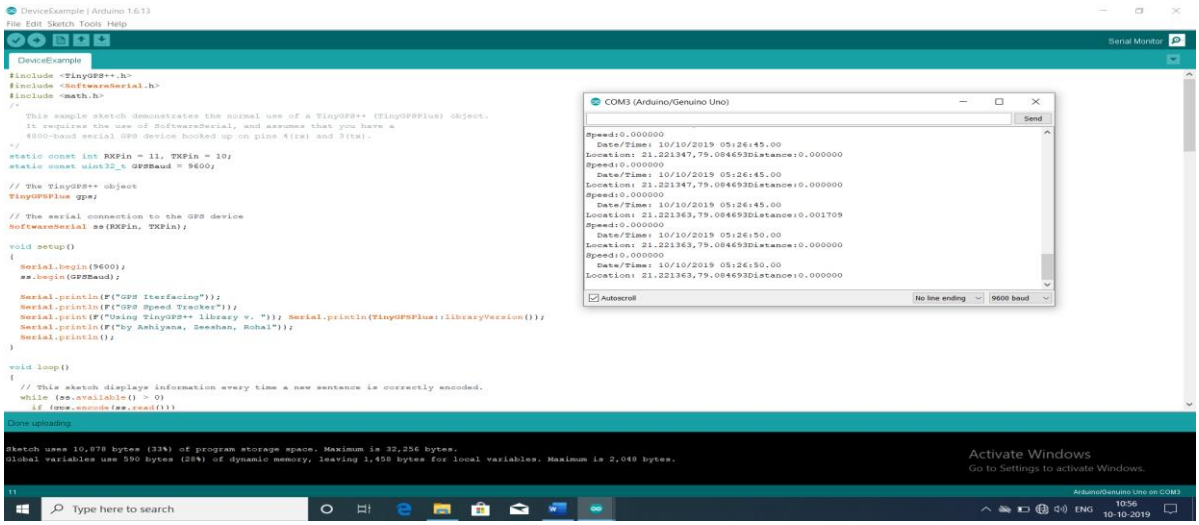

Fig 4.2: Output of GPS Sensor

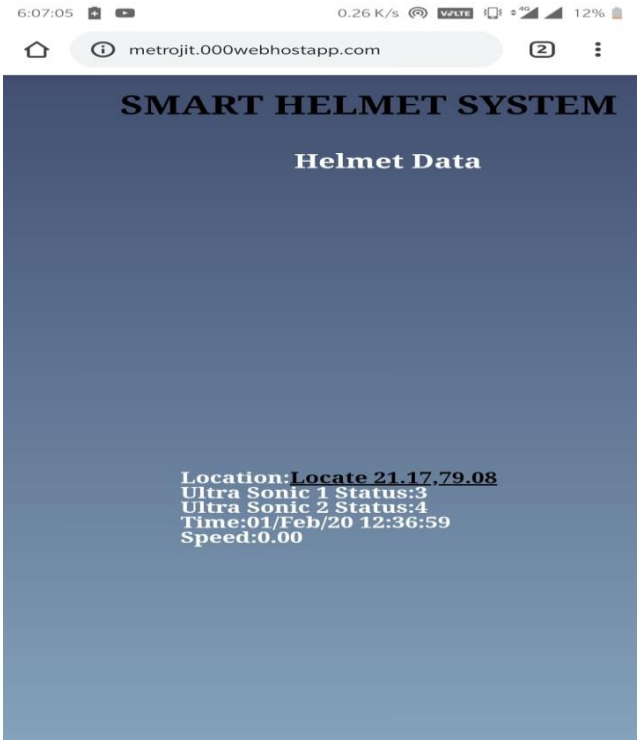

Fig 4.3: Server Site Screen

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DIAGRAMS

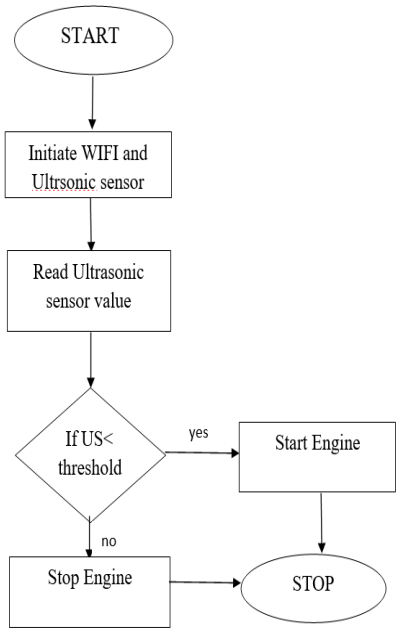

Fig 5.1: Ignition of Engine

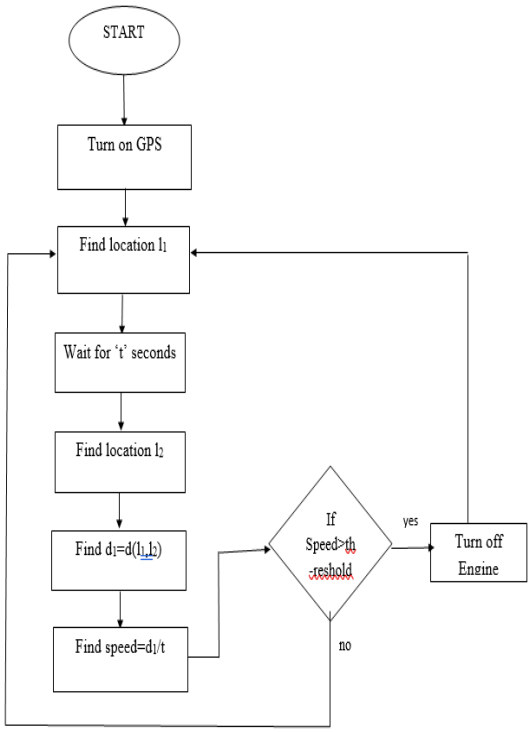

Fig 5.2: Location and Speed Tracking

RESULT

The outcome of the proposed system is that it will provide advanced safety and security to the rider throughout the journey. Smart helmet guarantees the protection of the motorcyclist, with the aid of checking whether or not the rider is carrying the helmet.It is economical and can prevent the fine imposed on people by making the helmet wearing is compulsory. It is easy to implement and cost effective and efficient.This is a situation where we found some solution to the problem of increased in rate of accidents.

CONCLUSION

The helmet is very necessary and very effective for the safety of life by using various kinds of sensors. we make an intelligent system which work in real time system**.** In this work we plan to improve the safety of the person (user) who will ride the bike by the smart helmet with additional features including GPS to track the exact location of the person whenever the accident occur it will help to provide the emergency medical help to that person and will send message of accident occurrence to the family members.

FUTURE SCOPE

After the implementation of Ultrasonic sensors and GPS module in the system, we will implement a connection with the server by using Wi-Fi module. The integration of Wi-Fi, Ultrasonic

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sensors, GPS module will be done. Apart from this we can implement various bioelectric sensors on the helmet to measure various activities. We can also use small camera for the recording the driver's activity. It can be used to transfer the message from the one vehicle to another vehicle by using wireless transmitter. Decrease the death rate in road accidents. We can implement the detection of license along with helmets to drive using detection devices.

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