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Iot Based Smart Motor Cycle Helmet

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Abstract: The object of this paper is force to wear a helmet while riding on two wheeler motor cycle. Most of the death cases are found due to the two wheeler accident happening in our country. In most cases rider suffers due to the head injuries and lost their life. To resolve this issues, we are developing a smart helmet which will be very useful for the riders while driving on two wheelers The most of accidents occurs due to highly consumption of alcohol and prevent road accidents. The main purpose of this smart helmet is to give safety to the rider. We will implement by using alcohol detection, accident identification, location tracking, used as a hands-free device, solar powered, fall detection. The helmet will have connected to the ignition as the rider will force to wear the helmet, if the rider will not wear the helmet then ignition will not turn on. For emergency service we will use gsm module to send message to the register number.

Key Words: - ***Smart helmet, IOT, GSM, GPS, Sensors, Bluetooth, Alcohol Detector, Arduino Nano, Accident prevention, Ultrasonic Sensor, IR sensors, PIR sensors, camera, RF module, Night vision glass, Buzzer.***

I. INTRODUCTION

In today's world most of the people are used to drive two wheeler bike. Riding a bike now become a trend, but while driving people are not using helmet. Some people are used to drive very fast bike due to which accidents occurs, due to not wearing helmets most of the people died because of head injuries. Most of the accidents occurs due to drink and drive cases many people lost their life. Because of not wearing helmet. Most of the country forcing riders to wear a helmet while driving but due to some uncivilized citizen this rules are being violated. Thus the object of this project is force to wear helmet while riding, if the rider will not wear helmet then bike will not start. If the rider is drunk and tried to drive bike, then will the help of sensor in helmet it will automatically inform to police. We will implement by using alcohol detection, accident identification, location tracking, used as a hands-free device, solar powered, fall detection. The helmet will have connected to the ignition as the rider will force to wear the helmet, if the rider will not wear the helmet then ignition will not turn on. Camera will be use to record the while driving. PIR sensor will use to measure the distance. Bluetooth module will be there for mobile connection such as for incoming call so that rider can easily pick up the call. Thus with the help of smart helmet we can reduce the death cases due to accidents and saves many lives.

II. PURPOSED SYSTEM

The purpose the system has two main issues which motivates for developing this project.

- First to identify the helmet is worn or not.
- Second to detect for alcohol consumption.

We designed a system such a way that the helmet checks the two conditions before turned ON the ignition as the both 2 condition is satisfied then only the ignition will be start. For that our system includes an alcohol sensor and a helmet sensing switch. 1st condition to start the ignition is that the rider wore the helmet or not if not then the 1st condition is not satisfied. If helmet is wore, then the condition is satisfied. Alcohol sensor MQ3 is used here for detecting the alcohol concentration present in the driver's breath. Sensor provides an analog resistive output based on the alcohol concentration. The 2nd condition is to detect the consumption of alcohol for that, an alcohol sensor (MQ3) will detect the rider is drunk or not as the alcohol sensor detect driver is not consuming alcohol then 2nd condition is satisfied and the both condition is satisfied then only the engine will ready to start. Switch is used to detect whether the biker is wearing helmet. It is connected to the external battery for obtaining the power. The bike gets started only when the helmet sensing switch is in the close position otherwise the bike will not get start. IR sensor will use to detect the helmet is wearing or not, as the rider wore helmet IR sensor will give the signal to the controller. We are using Accelerometer (ADXL335) to detect the accident occur or not. We are ultrasonic sensor to detect distance of next Infront vehicle as vehicle is nearer then the ultrasonic will active as it will connect to the buzzer as output the buzzer will turn on and rider will alert. GPS module will use to locate the position of the rider. GSM module will use as the accident occur it will send the message to the register number. Camera is used to record while driving and it will

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connected externally to the helmet . We are night vision lens externally to see the clearly while driving at night so that there will no chances to occur accident and to see the next vehicle or any other obstacle. A Controller which controls all the functions of other blocks in this system.

III. BLOCK DIAGRAM

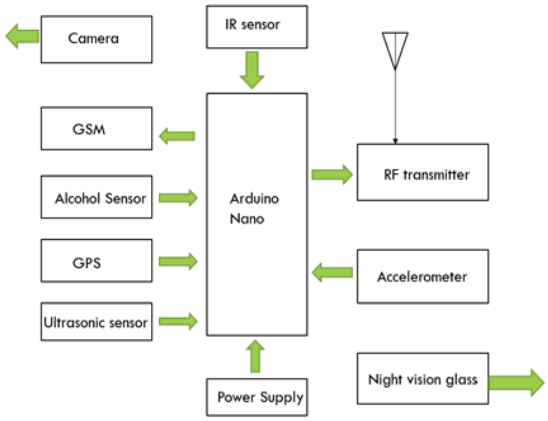

Fig.1. Block diagram of working model

IV. COMPONENT USED

Alcohol Sensor:

- Alcohol Gas Sensor MQ3

Technical Specifications:

- Concentration: 0.05 mg/L ~ 10 mg/L Alcohol
- Operating Voltage: 5V ±0.1
- Current Consumption: 150mA
- Operation Temperature: -10°C ~ 70°C

Arduino Nano: Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The boards 19 feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++.

RF Module: This RF module comprises of an RF Transmitter and an RF Receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434 MHz. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps.The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

Buzzer: A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, piezoelectric audio signal device.

Ultrasonic Sensor: An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity

GPS sensors: GPS sensors are receivers with antennas that use a satellite-based navigation system with a network of 24 satellites in orbit around the earth to provide position, velocity, and timing information.

IR sensor: The IR sensor module consists mainly of the IR Transmitter and Receiver, Op amp, Variable Resistor (Trimmer pot), output LED in brief. IR LED Transmitter. IR LED emits light, in the range of Infrared frequency. IR light is invisible to us as its wavelength (700nm – 1mm) is much higher than the visible light range

PIR Sensor: A PIR sensor used to sense movement of people, animals, or other objects. When a living or non-living thing stars as an obstacle for the bike, in the sensor's held of view the temperature will rise from room temperature to body temperature. A change is seen in the output voltage from the incoming infrared radiation which is converted by the PIR sensors, and this triggers the detection. In helmet module PIR sensor is use to detect motion of head outside to inside to the helmet.

Camera: It is used to record video while driving.

Night Vision Glass: It help to see the clear in darkness by magnifying the surrounding light and the object clearly.

V. Related To Work

A. Transmitter Section

Helmet unit: This project describes the design of an effective safety system for a bike, in order to avoid accidents. Vehicle accidents are due to the use of alcohol nowadays. Hence wearing of the helmet with alcohol detection and. In our project we combine these two aims in a single embedded system. This transmitter section is connected to the alcohol sensor, helmet sensing switch, controller, encoder and a RF transmitter. Both the switch and the alcohol sensor are fitted in the helmet while the heart pulse sensor is fixed in hand will start to count the heart beat after starting the bike. The sensor is an electronic device which converts the physical quantity into electrical quantity. Controller reads data from the sensors, finds if the driver has non-alcoholic breath and helmet sensor switch is in closed position digital output to an encoder only if the first two conditions are satisfied. It encodes one of the active inputs to a coded binary output. RF transmitter transmits this coded binary output from the encoder. In this RF system, the digital data is represented as variations in the amplitude of carrier wave

B. Receiver Section

*Vehicle unit***:** The receiver section is placed on the bike. It consists of an RF receiver, RF decoder, controller, audio, LCD display and sound indicator (buzzer). This section will get the power from the bike battery. RF receiver receives the coded binary data transmitted by the RF transmitter and given to the RF decoder. RF decoder decodes the input and gives four-bit digital data to the controller only if the address bit of encoder and decoder matches. Controller operate the engine of the vehicle when it receives digital data from the transmitter section. The visual indication is provided by the controller unit according to the coding. It operates the engine / dc motor when the conditions get satisfied and the buzzer will give sound indication when the rider's heart rate goes abnormal. All these output operations are done through a relay circuit but it cannot operate the relay directly, so a relay interface is also used here. The system is provided by the motor vehicle department to avoid abnormal circumstances.

VI. Conclusion

Nowadays, most cases of accidents area unit by motor bikes. The severities of those accidents are increased because of the absence of helmet or by the usage of alcoholic drinks. In our project we have develop an electronic smart helmet system that efficiently checks the wearing of helmet and drunken driving. By implementing this system, a safe two wheeler journey is possible which would decrease the head injuries throughout accidents caused from the absence of helmet and additionally reduce the accident rate due to drunken driving. We have a tendency to introduce advanced sensors techniques and radio frequency wireless communications are included in this project to make it a good one.

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