Analysis and Design a Safeguard For Bike Rider Using Embedded System

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Abstract— The objective is to provide a resources and devices for detecting and recording collusion between bikes. Sensors and cloud computing infrastructures are utilized for building system. The collision detection system communicates the accelerometer values to the processor which continuously monitors for erratic variations. When the collision occurs, the information's are passing to the concern by using a cloud-based service. GPS is used for identifying the location of the bike. The application of this system is extended to smart cities and smart helmets.

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I. INTRODUCTION

The thought of emerging this paper comes from social responsibility towards the civilization. According to a survey, around 750 people die in road accidents occurring due to bike bangs per year. The reason for the accidents may be many such as no proper driving knowledge, damaged bikes, rash driving, drunk and drive etc. But the major reason was found to be the absence of helmet on that person's head resulting in an instant death due to brain damage. In this system, we use ARDUINO UNO (ATmega328P) microcontroller which acts as brain of the system, because the entire system program instruction stored in it. Here we have two section in which one is at the helmet and the other is at the vehicle. The helmet section has touch sensor which gives the information about the status of whether the helmet is occupied or not, also we have sensors like gyroscope and vibration sensor to know the status of accident. The location of accident area along SMS have done by the GSM module we have. All the data fetched from the helmet section is transferred through RF technology and Reception take place at the vehicle section. Eye blink sensor in this concept is used to alert the driver if he is in drowsiness condition. LDR which detects the light intensity, gives the values to the controller, which automatically adjusts the brightness of the light according to the light intensity.

II. RELATED WORKS

Judos A, Vybhavi R, and Anusha b proposes a mechanism by using a parameter such as gas sensors, Zigbee, IR sensor load sensor for accident detection location-based ambulance is booked automatically[1]. Sayan tapadar, arnab kumar Saha, Dr. Himadrinath Saha, with help of internet and android phone the system can identify the accident and it can send the notification message to registered contact person. [2],[3] Sudhir Rao rupanagudi, sumakha Bharadwaj Varsha G. and Vikram subrahmanya, Fathima jabeen discuss a novel methodology used to two wheelers in avoiding rear and collision.[4] Prashant Ahuja, prof ketan bhavasar discuss a microcontroller based. Smart helmet using GSM and GPRS. [5] G. Vishnu, V. Kishore swami proposed a GSM based system which can encourage the importance of helmet for life saving to human beings. [6] Mohd Khairul Afid Mohd Rasli, Nina korlina, Juliana joharu monitor the force sensing resistance, and BLDC fan, LM311 and IC555 to detect helmet and speed of motor detection. [7] Amruth Madhusan suggests the system which aims at reducing the loss of people lives in road accidents and perform accident detection.[8] Yi-Jen Mon explains the Gyroscope Sensor testing by using Arduino Platform. [9] Luayfraiuan Then khaldonLeesy deliberate the wireless

safety device for gas leakage detection using gas sensor. [10] Ravi Kishore kodali and Adilya Valdas, the paper discuss ESP8266 Wi-Fi chip enabled microcontroller nodeMCO and smoke sensor, ultrasonic sensor.

III. MATERIALS AND APPROACHES

A. Microcontroller (Atmega 328p)

Atmega 328p is acting as CPU for this system with high operating speed. The space requirements very less it will be fixed compact inside the helmet. Operating frequency of this controller is about 16MHZ with analog and digital input ports. Atmega can receive signal from sensors and it will take appropriate control action.

B. Accelerometer (AXDL335)

This type of sensor to identify the acceleration of the bike which is acting one of the input to microcontroller. This is operating in 3 (X, Y and Z) direction with bandwidth of first two axes are 1600HZ and next two axes are about 550HZ.

C. Touch Sensor

Touch sensors will working based on touch i.e applied pressure. The mechanism behind this sensor is switching operation (open and close). Switch will close when touching the sensor because the pressure is applying, if not switch will open. Based on the sensor can give output.

Principle of touch sensors are like capacitors contains parallel plated separated by insulating material.

D. Eyeblink Sensor

Eye blink sensors working based on infrared by blinking can be identified in eyelid area with help of variable resistance device. If the eye position is open or close the output will be either high or low.

When eye didn't blink means open position the output of the sensor is low and vice versa. Then the output is given to one of the input to microcontroller to take control action by giving alarm to bike rider.

E. Vibration Motor

Vibration motor gives vibration operating based on the control signal given by microcontroller. A linear resonant actuator (LRA) gives a pressure in terms of force to the bike rider to give attention

F. Crash Sensor

Crash sensor which helps to identify when the bike rider met with an accident. This accidents occurs this sensor will be enables and output of the sensor will be electrical signal in nature sent to microcontroller.

G. Gas Sensor

Generally gas sensor are sensing multi parameter like atmosphere gases, temperature and alcohol in breathe. This sensors can operate the temperature range of -20 to 45°C. The sensing range is from 0.04 mg/L.

H. LDR

A Light Dependent Resistor working based on light. When the light available it can be detect and the same will be converted in to resistance. This signal will be given to controller. Behind LDR principle the change in resistance due to applied input .

I. Zigbee

Zibee is an IEEE 802.15.4- is a kind wireless communication between the different sensors which is involve in the application. These Zigbees are communicating in between 10 to 12 meters with 2.4GHz band.

J.GPS

GPS is a satellite navigation system used to determine the ground position of an object. To identify the object of human exact location GPS are playing critical role.

K.GSM

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900, works on frequencies 900/ 1800 MHz.. These commands are called as AT commands, there are a list of AT commands to instruct the modem to perform its functions. When a ten-digit mobile number is provided, the program instructs the modem to send the text message using a sequence of AT commands.

L. Speed Sensor

It is used to measure the speed of object generally called as tacho meters. The speed can be identified based on the revolution takes place with respect to time. It given in terms of RPM.

IV. WORKING PRINCIPLE

In this system, we use ARDUINO UNO (ATmega328P) microcontroller which acts as brain of the system, because

the entire system program instruction stored in it. Here we have two section in which one is at the helmet and the other is at the vehicle. The helmet section has touch sensor which gives the information about the status of whether the helmet is occupied or not, if the rider won't wear the helmet the ignition of the bike is off, rider won't start up the vehicle without wearing the helmet. And also we have sensors like gyroscope and crash sensor. to know the status of accident.

The location of accident area along SMS have done by the GSM module we have. All the data fetched from the helmet section is transferred through RF technology and Reception take place at the vehicle section. Eye blink sensor in this concept is used to alert the driver if he is in drowsiness condition. LDR which detects the light intensity, gives the values to the controller, which automatically adjusts the brightness of the light according to the light intensity. Hence this project helps to decrease the death rate in road accident. And it will also help to crop, they won't be tested if the rider involves drunk and drive and helmet wearing case. They won't put any fine amount to the riders who were not wearing the helmet.

C. Hardware setup

Figure 1 Helmet section

Figure 2 Vehicle section

V CONCLUSION

The two wheeler safety system developed with helmet and smart bike system is reliable and purposes to help in the prevention, detection and reporting of accidents to decrease the death rate and hence reducing the probability of drunk and drive cases. This system detects the incidence of an accident and makes provisions to sound an alert through the use of a GPS and GSM system. It aims in providing a low cost, mainly focusing on the importance of human life.

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