ORIGINAL RESEARCH PAPER
Volume - 11 | Issue - 11 | November - 2022 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

IOT BASED ACCIDENT PREVENTION USING ARDUINO IDE

Computer Science

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ABSTRACT

This paper introduces the Internet of Things (IOT) based application to prevent the accidents on roads which is increasing more on daily basis. This is focuses on drowsy driver detection using the sensors and collision control management is used to handle the critical situations. Generally, road accidents occur due to tiredness of driver to avoid the collision in traffic roads. Now a days it's difficult to predict the accident on roads, also challenging task. This is a serious problem causing thousands of road accidents each year. In this infrared eye blink sensor is used with buzzer to wake up the driver whenever he feels sleepy or drowsy and HR SC-04 Ultrasonic sensor is used to monitor the distance between the vehicles.

KEYWORDS

Accident, Collision, Drowsy, Eye detection, Prevention

I. INTRODUCTION

The recent trends in computer science IoT is a new technology where smart devices can design and trained to do the work. The Internet of things is interconnected of various objects which are uniquely identified by the sensors and actuators. The designing architecture is embedded with machine to machine and different protocols. The field of automation is used to build a smart device to work on a particular task and manage the things smoothly.

The development is tremendous in the field of computer science IOT is also one of the major topics. Each object relates to internet to perform a task using smart device. The physical devices are interconnected and implemented with inside the Arduino Processor implanted inside their design to impart and detect collaborations among the one another. In India, road accidents are a major problem. The risk is reducing accident in alert system for a driver, the drowsiness of a driver and collision of vehicles. It's a dangerous falling asleep at driving and drive carefully. This has become major challenge to develop a system for the prevention.

II. LITERATURE SURVEY

A. Existing Work

The various research work is carried out in the field of computer science specially on the Internet of things. [1] They explained the Internet of things-based vehicle accident track and prevent the accidents for night shifts drivers. They included the eye blink sensor and monitoring system to avoid the accidents. [2] The researcher worked on the iot based smart helmet for the safety of drivers they performed on the Raspberry Pi processor using open cv software.

The iot based applications [3] are used in all fields in this paper author describes the accident prevention and detection for intelligent transportation device for prevent the accident on highway roads.[4] The world health organization every year report in the report that road accidents are increasing.[5][6] on road vehicle visualization can done in this paper and introduced the smart device to visualize all vehicles on roads using vanets network technology. Tracking devices through the GPS is used more in all vehicles in this paper they are used iot based smart bus tracking as well as management [7].

This paper describes about the smart ticketing with bus management using IoT for detect and manage the ticketing facility [8][10]. The mobile device is also used for the car detection and accident prevention by using inbuilt mobile sensors [9].

The increasing in the accidents on roads over the years. This paper is endeavors to introduce the smart devices for the safety and safe journey using the Arduino Uno processor and implemented in python language to build the smart device called Smart Sunglasses.

B. Objectives and Contribution of paper

The novel objectives and contributions of this paper are The IoT device sensor is connected with the sunglasses (Smart Google) sensor activated and it detects the eyes blinking. The experiments have been conducted on real-time data in lab for detection & prevention of accident.

III. METHODOLOGY

This set up is made to avoid collision of vehicles to avoid accidents. The model works like this, a ultrasonic sensor HC SR-04 is used to detect the vehicles and give warning to the driver. We have divided the distance between vehicles into three zones.

Zone 1: The zone 1 distance should be more than 80 units. This distance is more than enough between the vehicles. Accidents does not occur if vehicles maintain this amount of distance.

Zone 2: The distance between the vehicles will be between 50 to 80 units. Here the diver must pay attention as chances are there for accidents to occur. Here in this zone a visual waning is given to the driver to warn him and look after the distance.

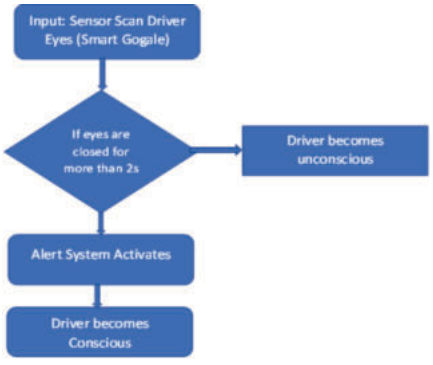

Fig. 1. Proposed Methodology of Smart Sunglass

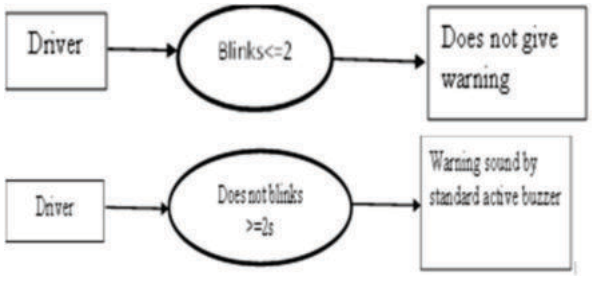

Fig. 2. Zone 1: Driver eyes blinks detection Zone 2: Driver active buzzer to wake up

The distance between the vehicles will be less than 50 units. This zone is prone for accidents. Slight mistake in driver by over speeding may cause heavy damage. The white LED will warn the driver. Here the driver will be warned audibly by the piezo buzzer.

Arduino Uno, Flame Sensor, L293D Motor driver, Servo SG90, Jumper wires, Bo Motors Mini water Pump, 18650 Battery.

The software and hardware requirements are Arduino IDE Software and Arduino Board, HC SR-04, White LED, Blue LED, Piezo Buzzer, Wires Node MCU, Motor, Robot Kit Goggles, Standard Active

Buzzer, HW Battery 9V with connector, Arduino nano R3 Board with CH340, chip Soldered, infrared Eye Blink Sensor.

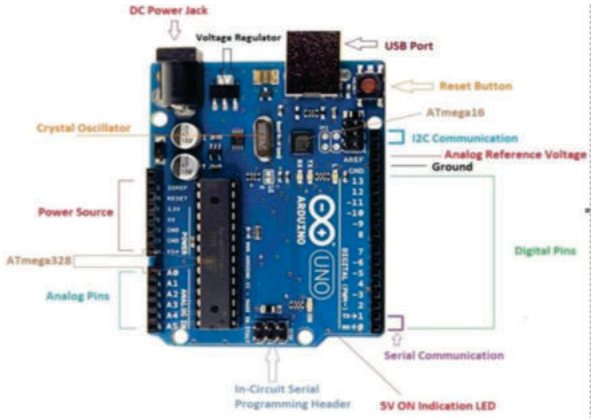

Fig. 3. Arduino IDE Components

IV. PROPOSED WORK

Internet of Things (IOT) is the major broad area in the field of electronics and computer science. In India, road accidents are a major problem for taking risk of reducing accidents is alerting the driver from the sleep. Analysing the current situation of the society accident prevention is very much needed research topic for young researchers.

The new trends in computer bscience open the field of Internet of Things to train the device to perform task perfectly with smart and minute devices. The smart devides are built to perform the various functions on generalize structure is a difficult task. This system we use IR eye blink sensor. Whenever the driver doesnot blinks his eyes for 2 seconds then the buzzer gets activated and gives a beep sound to wake up the driver.

In the collision control management we use HR SC-04 ultrasonic sensor to sense the distance of the vehicles. Here we have divided the distance between vehicles in to 2 zones. The first zone is more than 80 units, in this area there will be no indication as there is good distance between vehicles. Next zone is between 80 units and 50 units, in this area there will be blue led indication so that the driver must pay attention to the distance, white led will glow with activated buzzer sound so that the driver must take necessary actions to avoid the collision.

V. EXPERIMENTAL RESULTS

This has become a major challenge to develop the system. This system has developed based on the rate of blinking of eyes. This system is developed by Arduino uno. Fig 1(A) indicates the open eyes of the driver and Fig 1(B) indicates the closed eyes of the driver. If any drowsy condition occurs which means driver's eyes are closed for 2 seconds, then buzzer was activated and alerts the driver. In collision control management whenever the distance reduces between vehicles then the buzzer gets activated and led light glows to warn the driver.

In the present world the percentage of accidents has increased so widely because people were not helping when accident occurs even if the person is fallen in front of their eyes.

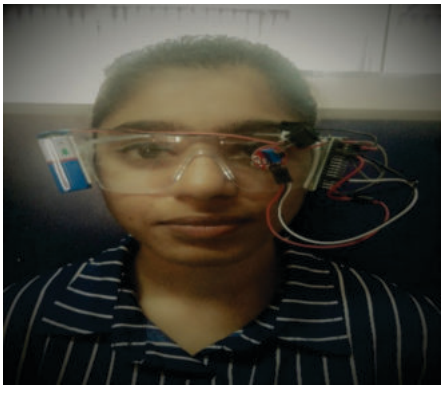

Fig. 4. IOT Sensor connected with Gogal

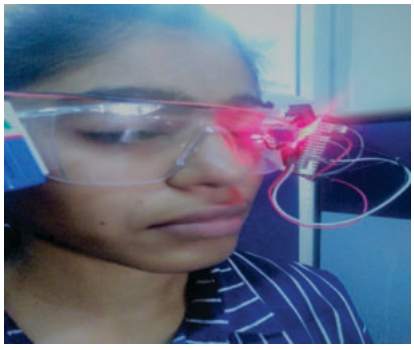

Fig. 5. Sensor detecting eyes closed

In the above picture the driver does not blink the eye for more than or equal to 2 seconds. The system senses the condition and alerts the driver by making a beep sound. The sound will be present until the driver wakes up and blinks his/her eye. When the driver does not blink the eye then the IR sensor blinks red colour and gives a loud beep sound. The loudness of the sound can be altered according to the driver convenience. The advanced security issues[14-15] are there to perform the IoT devices with internet connectivity [10-13].

VI. CONCLUSION

The proposed system uses the IoT for vehicle accident detection and alarming the authorities regarding accidents, vehicle tracking using GPS Modem. In this project we have designed IoT based vehicle accident detection and tracking system using GPS Modem. Hence IoT can revolutionize the way the system interacts and respond for the variety of applications especially in case of traffic control.

The driver drowsiness is analysed, and driver's drowsiness is detected, and alert system is also designed. The difference between two vehicles is analyzed and respective measures are taken by the driver. In this paper, the discussion regards the avoidance of accidents due to drowsiness and collision is discussed with eye blink and distance between vehicles respectively and corresponding system was developed.

TABLE I. IOT SENSOR DEVICES WITH CAPACITY

Sl.No	IoT Sensor Devices		
	Sensor	Memory capacity	Volts
1.	Arduino IDE	32K bytes Flash memory and 2K bytes of SRAM.	5v-6v
2.	IR Emitter	-	5v-6v
3.	Hc-sr04 ultrasonic sensor	Distance 2CM to 400CM	-

Acknowledgment

Acknowledge the department of computer science and maharani Lakshmi Ammanni college for women Autonomous, Bangalore. Giving opportunity to do the research.

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