

A SMART VEHICLE FOR ACCIDENT PREVENTION USING IoT

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Abstract:In the present world, Accidents are a major problem in every country. The risk, danger and often tragic results of drowsy driving are alarming and shocking to everyone. Accidents are the dangerous combination of driving and sleepiness. This usually happens when a driver has not slept enough, medications, drinking alcohol, shift work or long late-night drives.

So, to ensure the safety of the driver and reduce the possibilities of car accidents/crashes, we proposed the concept of A Smart Vehicle for Accident Prevention using Internet of Things (IoT).This concept involves scanning of driver's eyes continuously using the Eye Scanner, so that whenever the car driver closes his eyes for a longer period (2 seconds or more),the scanner generates or activates the alarm and the alarm starts ringing loudly. This will wake up the driver and make him conscious for driving ahead. The alarm system will be included as an application in the car music system.

Key words: IR sensor(eyeblink), alcohol sensor, seatbelt leaf switch, IoT cloud,etc.

1. Introduction

Many accidents are happening because of the laziness in the drivers. Thousands of people are getting harmed by this. This methodology gives examination of police detailed accident information. This current examination gives additional information we can use this information to decrease the number of accidents due to drowsiness. These accidents generally happen when the driver is consumed with alcohol. Smashed driving is the common and most reason for happening of accidents all over the world. This framework is ought to be introduced and implemented in the vehicle. This proposed framework 'A Smart Vehicle for Accident Prevention using IoT' is used to decrease the number of accidents due to drowsiness of drivers.

2. Existing System

In the present world, accidents are considered as a major problem in everycountry. The risk, danger and often tragic results of accidents are alarming and shocking to everyone. The accidents usually happen when a driver has not slept enough, drinking alcohol, medications, shift work or long late-night drives. As time spent in a car is increasing, accidents caused by above scenarios is also increasing year by year.

Experts state that driver drowsiness is responsible for about 30% to 35% of severe traffic accidents and results in loss of many precious lives. It is a complete manual solution where the police check whether the driver has consumed alcohol or not with breath analyser, whether he is engaged with the seatbelt or not, for preventing accidents. This manual approach consumes lot of time which indeed leads to traffic jams and we could not prevent the accidents through the existing system if the vehicle has not passed through any check post.

Problems with the existing system are:

1. Accidents happen before police checking.
2. Manual Police checking consumes lot of time which leads to traffic jam.
3. There is no device for drowsiness detection.

3. Proposed System

This idea includes examining of driver's eyes constantly utilizing the Eye Scanner, so that at whatever point the vehicle driver shuts his eyes for a more drawn out period (2 seconds or more), the scanner produces or enacts the alert and the caution begins ringing uproariously. This will awaken the driver and make him cognizant for driving ahead. The caution framework will be incorporated as an application in the vehicle music framework.

Notwithstanding examining the circumstance of risk because of Drowsy driving, the motor of the vehicle will be halted. Along these lines we can make total answer for security gadget to alarm lazy drivers,

henceforth sparing numerous valuable human lives. If there should be an occurrence of expansion, we may caution the driver utilizing this ready framework post disturbing the driver will get the closest refreshment end direct him to goal with definite separation and anticipated that time should reach and will likewise report through route/music speakers of the vehicle. On the off chance that any vehicle or item is available, at that point speed of the vehicle backed off.

Work Flow for the Proposed System:

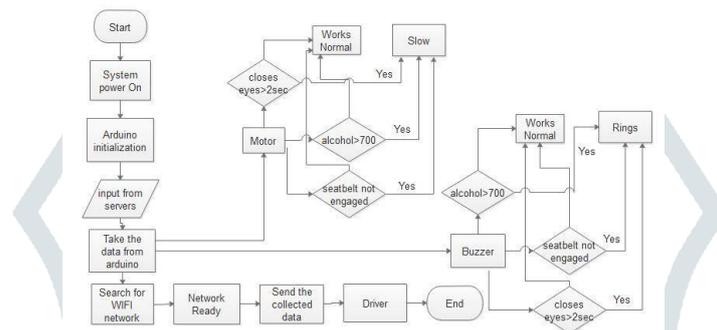


Fig:1 Flow chart for working of the Proposed System

The above Figure 1 shows the work flow operations of all the sensors, Arduino board, IG Motor and Buzzer.

Steps

(i) IR Sensor:

1. Place the eye in front of IR Sensor and observe the change in the LED.
2. When you remove the eye, you will see that the LED gets turned off.
3. If the LED is turned on, then it means the driver has closed his eyes for more than 2 seconds and the motor stops with a beep sound
4. If the LED is turned off, then it means the driver has not closed his eyes and the motor continue to work.

(ii) Alcohol Sensor:

1. When the alcohol sensor detects the alcohol concentration to be more than 750, you will see that the LED gets turned on and the concentration level displays in the LCD Screen and the motor gets turned off with a beep sound.
2. When the alcohol sensor detects the alcohol concentration to be less than 750, concentration level displays in the LCD Screen and the motor will run as usual.

(iii) Seat Belt Sensor:

1. When the leaf switch is locked, it means the driver is engaged with the seat belt and the motor runs as usual.
2. When the leaf switch is locked, it means the driver is not engaged with the seat belt and the motor stops with a beep sound.

Need for the Proposed System:

1. Helps in preventing accidents.
2. Manual Police checking is not necessary.
3. There is device for drowsiness detection

4. Result

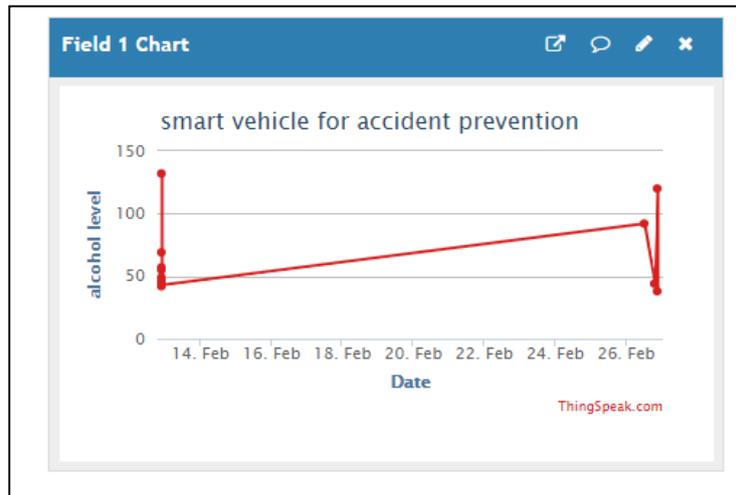


Fig:2 Alcohol sensor graph

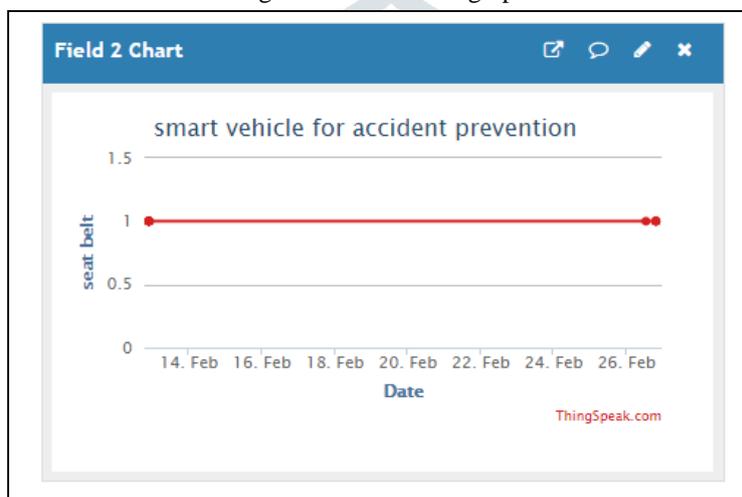


Fig:3 Seat belt sensor graph

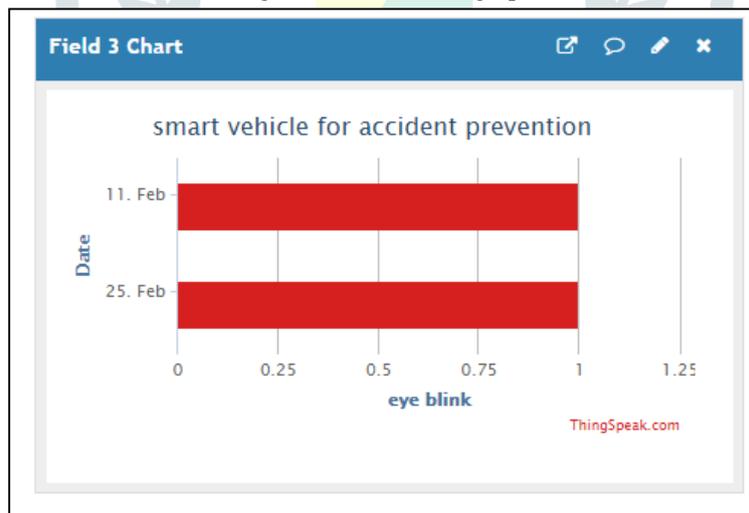


Fig:4 Eye Blink sensor graph

The above figure 2 shows the Alcohol sensor graph posted in the IOT Cloud through the ESP8266 Wi-Fi Modem, figure 3 shows the Seat Belt sensor graph posted in the IOT Cloud through the ESP8266 Wi-Fi Modem, figure 4 shows the Eyeblink sensor graph posted in the IOT Cloud through the ESP8266 Wi-Fi Modem.

5.Related work

1.Safety Device for Drowsy Driving using IoT.

TanishSumedhaMaindalkar, Shubham More [1] presents a safety device for drowsy driving using IOT. Drowsy driving is a major problem in every country. The risk, danger, and often tragic results of drowsy driving are alarming and shocking to everyone. Drowsy driving is the dangerous combination of driving and sleepiness or we can say fatigue. This usually happens when a driver has not slept enough, but it can also happen due to untreated sleep disorders, medications, drinking alcohol, shift work or long late-night drives. In this project a self-powered IRIS scanner will be fitted into the dashboard in front of driver that will be scanning the driver eyes. So, whenever a driver is drowsy or feeling siesta his/her eyes may go shut very frequently and for longer durations. So, whenever the eyes are closed for more than two seconds or longer the sensor will trigger the action and activate the alarm so the alarm makes the driver conscious.

2. Driver drowsiness recognition based on computer vision technology.

Wei Zhang, Bo Cheng [2] presents Driver drowsiness is one of the major causes of traffic accidents, A nonintrusive drowsiness recognition method using eye tracking and image processing. A robust eye detection algorithm is introduced to address the problems caused by changes in illumination and driver posture. Six measures are calculated with percentage of eyelid closure, maximum closure duration, blink frequency, average opening level of the eyes, opening velocity of the eyes, and closing velocity of the eyes. These measures are combined using Fisher's linear discriminant functions using a stepwise method to reduce the correlations and extract an independent index. Results with six participants in driving simulator experiments demonstrate the feasibility of this video-based drowsiness recognition method that provided 86% accuracy.

3.A Smart Vehicle using wireless black box and eyeblink sensing technology along with seatbelt-controlled ignition.

C. Mohamedaslam, Ajmal Roshan T, Mohamed SahalM.T, NajeebN.A.Nisi[3]proposeda concept to construct a smart vehicle system with minimizing the limitations of existing methods and also enhancing the security of vehicles and human beings and also reduces the accidental injuries. smart vehicle system will entail a speed and other parameters of vehicle sensing mechanism which automatically messages to traffic police with the details of vehicle position when an accident occurs using the GSM/GPRS system. The system also contains seat belt sensor, vehicle black box, and an eye blink sensor. This method is an advanced version of speed detection, seat belt alarms system and it is placed in vehicles. A speed sensor, seat belt sensor and various sensors which senses various parameters of the vehicle is connected to a microcontroller which detects when the abnormal conditions occur or any accidents occur then sends text message, using GSM technology, to a police ambulance services and the driver's relatives. The text send to various authorities contains the details of the vehicle and its position.

6. Conclusions and Future Scope

In this paper we discuss about what is Internet of Things and the importance of IOT in our life. This paper also discusses about unique and attractive features of the above proposed system base. We have to conclude that to decrease number of accidents which is occurring due to alcohol consumed drivers and save human's life because of accidental situations. The proposed car safety system is based on different types of sensors to collect the car parameters conditions, process it to take the corrective decision at anytime and anywhere However this proposed system has fulfilled challenges in terms of cost, energy, communications technology.

Our project can be extended using Cloud Computing for GSM Services so that we may alert the guardians of the driver all over the world by sending alert SMS which can be stored in IoT cloud.

References

- [1] Safety Device for Drowsy Driving using IoT.
- [2] Driver drowsiness recognition based on computer vision technology, Article in Tsinghua Science & Technology 17(3):354-362.
- [3] A Smart Vehicle using wireless black box and eyeblink sensing technology along with seatbelt-controlled ignition.

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