ISSN No. 0976-5697

Volume 8, No. 3, March – April 2017

International Journal of Advanced Research in Computer Science

RESEARCH PAPER

Available Online at www.ijarcs.info

Preventing Drunken Driving Accidents using IoT

T. Venkat Narayana Rao
Professor, Computer Science and Engineering
Sreenidhi Institute of Science and Technology
Hyderabad, India

Karttik Reddy Yellu
Student, Computer Science and Engineering
Sreenidhi Institute of Science and Technology
Hyderabad, India

Abstract: The number of accidents in the world are increasing day by day and among these accidents, 70% are due to "drunk and drive" cases. This paper aims to reduce the number of accidents occurring due to drunken driving using IoT. This paper uses MQ-3 alcohol sensor which is interfaced with an Arduino UNO to detect the blood alcohol content in the driver's breath. The legal limit of alcohol level in India is 0.03%, which means 30 microliters of alcohol in 100 millilitre of blood. The MQ-3 alcohol sensor is placed on top of the steering so that whenever the driver exhales through his mouth the sensor calculates the alcohol level in his breath. After the engine is ignited if the alcohol content is in the range of 0.02-0.03% then the maximum speed of the car reduces to 30KMPH and if the alcohol content is beyond 0.03% then the car doesn't move from its place and limits the speed of the car to zero with a message sent to driver's nears and dears through GPS. The work presented in this paper expects to reduce the number of accidents caused by drunken driving, which is very essential element for a prosperous life tomorrow.

Keywords: IoT, alcohol, accidents, GPS, Arduino UNO, MQ-3 sensor.

I. INTRODUCTION

The use of IoT (internet of things) is increasing day by day in terms of luxury and security related issues. Many projects in the area of Home Automation are becoming popular. The world is advancing to a new era of Bluetooth connected devices like lights, fans and other electrical appliances helpful in daily lifestyle. A person sitting in front of a TV can switch on or off the fans and tubes of his house. Automatic Doorbell System is a project that indicates the house owner that some person has visited his/her house and there is no one to attend the visitor[8].

Road accidents have become a major concern these days. In a recent survey it is stated that 382 people lose their life every day because of drunken driving. The major cause of accidents are based on 2 issues i.e. excessive speed and drunken driving. These kinds of accidents not only affect the life of the person driving the car but also show a negative effect on the environment and the society. There are many cases which are reported stating that innocent people walking on the street are also the victims of the alcohol drunken driving accidents. There might be incidents like shifting the lane by drowsiness or lack of concentration which would lead to severe accidents. The traditional system completely depends upon the police officers that enables them to stop the vehicle and check for the alcohol limit in the driver's breath. If the amount of alcohol detected is beyond the legal limit, the driver will be penalized. It is difficult for the cops to monitor each and every vehicle in this situation the use of growing technology i.e. IOT will be useful. This paper focus on safety of the driver under the influence of alcohol. The proposed system consists of an MQ-3 sensor which is used for calculating the breath alcohol level, a GPS module to detect the location of the vehicle, and a GSM module to send an SMS to the registered mobile number. If a driver consume alcohol a lesser than the legal limit, then the maximum speed of the car will be reduced to 30KMPH and if the level of alcohol in the drivers breath is more than the prescribed limit then the maximum speed of the car will be set to 0KMPH. In either of the two situations there will be a message sent to the registered mobile number stating along with their GPS coordinates so that the person receiving the SMS can make some alternative arrangements like book a cab or if he is nearby, he/she could pick the person in trouble. The registered mobile number can be a relative, friend, well-wisher or a cop. This application is developed by considering the concerns of the driver i.e. even if the vehicle doesn't move from its place,the engine of the car will not be turned off. This feature is included because if the person receiving the SMS doesn't respond or, the driver can rest comfortably. The drunken driving prevention system is mainly aimed at safety of both the driver and the surroundings. This kind of system helps to reduce the number of deaths caused by drunken driving and also reduces the burden on the cops.It is evident that even cops can't have a constant watch on each and every vehicle during rush hours in traffic. To reduce the number of accidents a new model for alcohol detection in cars is presented in the following section of this paper[1][2].

II. PROPOSED SYSTEM WITH ARCHITECTURE

The proposed system ensures that the death rate due to drunken driving is reduced by 50%. Internet of things combines all the sensors, motors with the help of Arduino. In the proposed system a MQ3 alcohol sensor is employed to test the level of alcohol consumed by the driver, a GPS module to know the location of the car, a GSM module to send a message to the registered mobile number and a DC motor which represents the engine of a car. To interface the above stated sensors, motor and module, an Arduino UNO is used[3][5].

A. Hardware Requirements:

- Arduino UNO board
- Mq3 alcohol sensor
- GPS module
- GSM module
- DC motor

- Bread board
- Jumper cables

B. ***Software Requirements:***

- Arduino IDE
- Knowledge of C programming

Figure 1 depicts the flow of the proposed system. Firstly the MQ-3 alcohol sensor gets switched on along with the engine of the car. If the alcohol is detected the speed of the car will be reduced,in this system the a DC motor is used, control the speed of the car. After reducing the speed limit the control is given to the GPS module to find the location. The antenna of the GPS module receives the longitude and latitude positions, these positions are sent to the registered mobile number using a GSM module[4]. The sent message will be received by the concerned person and necessary action can be initiated.

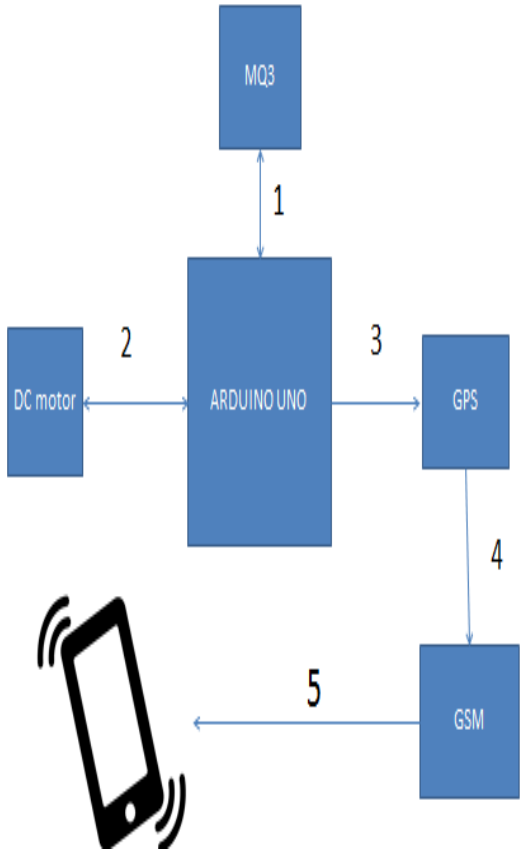

Fig 1. Flow chart for the proposed model

III. IMPLEMENTATION

Step 1: initiate the application and check for the liquor consumption limit by the driver.

Step a: Set the maximum speed of the car to 30KMPH.

Step b: Send an SMS to the registered mobile number along with the GPS location of the car stating that "your dear ones are risking their lives by driving under the influence of alcohol". GPS positions are X^0 latitude and Y^0 longitude. Please take some action".

Step 2: Check whether the driver is drunk beyond the legal limit.

Step a: Reset the speed of the car to 0 KMPH.

Step b: send an SMS to the registered mobile number along with the GPS location of the car stating that "your dear ones are risking their lives by drinking alcohol beyond the legal limit and driving. GPS positions are X^0 latitude and Y^0 longitude. Please take some action".

Step 3: If the driver is not under the influence of alcohol continue moving in normal speed.

IV. CHALLANGES

There are two main challenges with respect to the status of the driver:

1. Driver indrunkmode before staring the drive.
2. Driver drinks while driving.

The first case may occur if the driver has attended a party and he has consumed alcohol and then entered the car. In such a situation the system is designed in such a way that whenever the driver starts the engine of the car, the MQ-3 alcohol sensor starts sensing for alcohol and does its assigned job. MQ-3 sensor detects alcohol as the driver starts exhaling; it works on the basis of sensing the level of alcohol consumed[3].

The second case may ariseif the driver is over stressed or wants to relax while driving. The designed system continues to operate from the time the engine is switched on till it is switched off. Therefore, even if the driver consumes alcohol while driving the car can also be detected and take necessary action with the help of proposed system.

This proposed system ensures that in any of the above situationsthe system responds without failure.

The position of the sensor also plays an important role in identifying the drunk driver. The position of the MQ-3 alcohol sensor should be such that it should detect only the breath alcohol level of the driver but not the breath alcohol level of passengers. Therefore the position of the sensor should be on top of the steering wheel.

As seen in the figure 2 the sensor is placed on the steering wheel to ensure only the breath alcohol level of the driver is taken into consideration. Remaining sensors and modules like the GSM module, GPS module can be places anywhere convenient inside the car

Fig 2. Position of the sensor

V. RESULTS AND DISCUSSION

The driver enters the car and starts the engine, along with the engine the proposed system also gets powered up. Now the MQ-3 alcohol sensor is ready for detecting the breath alcohol level of the driver. In India the legal limit of blood alcohol level is 0.03%. Figure 3 depicts outcome of suvh situation taken from a real time scenario i.e. sending of appropriateSMS to the registered mobile number.

Fig 3.Snapshot of received message if alcohol level is within the legal limits

With the received message from the GPS module inside the car, the concerned person can take any necessary actions like booking a cab for that person, or informing another person close to the location of the drunk driver[6][7].

Figure 4 is a snapshot of the situation wherein the level of alcohol consumed is beyond the legal limit then the car's speed will be reduced to 0KMPH which means that the car will not move from its place and the engine of the car will not be switched off. Again in such situation also an appropriate SMS will also be sent to the registered mobile number.

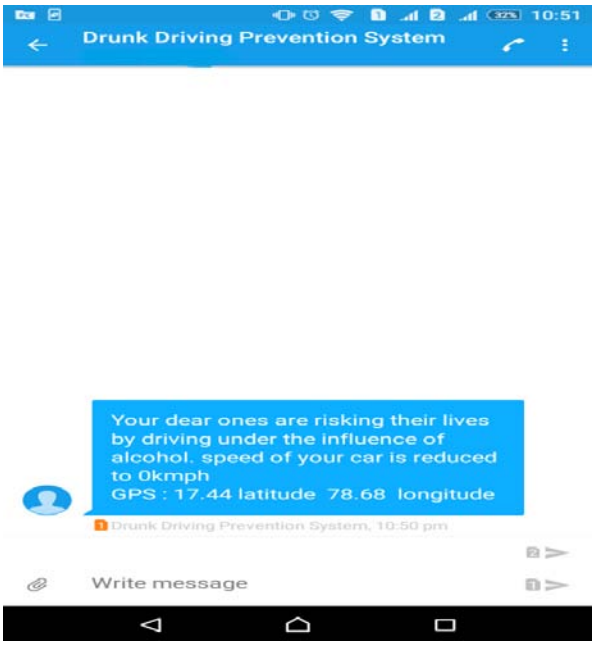

Fig 4.Snapshot of received message if alcohol level is beyond the legal limits.

If the driver is not under the influence of alcohol ,the sensor doesn't recognise the alcohol content in the driver's breath and hence the vehicle moves in a normal way without invoking any messaging module[8].

VI. ADVANTAGES OF THE PROPOSED SYSTEM

- Safer life:There are many accidents in which the driver often loses his precious life under the influence of alcohol.
- Convenient to traffic :A person under the influence of alcohol doesn't have control on his actions. In the same way the driver's mind doesn't coordinate with his body as a result he violates the traffic rules which can be dangerous. Whereas, the proposed system takes proper action based on the alcohol content
- Compact size:Only the MQ-3 alcohol sensor is placed on the steering wheel and the rest of the components are hidden. The MQ3 sensor doesn't occupy more than 3inches space.
- Reduced number of accidents:The main focus the this system is to reduce the number of accidents which are basically due to alcohol consumption during driving[i.e. approx. 50% accidents]. As the GPS coordinates reaches the registered mobile number, action can be initiated well in advanced.
- Helpful for police: Every vehicle cannot be checked by the cops manually. There are many situations in which cops have a major role to play like investigating some crime scene, investigating a robbery case or regulating the traffic etc. thus reducingtraffic police task.

VII.CONCLUSION

This paper is based on drunken driving prevention system using IoT. It connects sensors, modules, motors, etc. which can be used as an advent of advancement of the

technology. Drunken driving prevention system is an application of IOT which provides safety to the drunk driver as well as the people at large. As every new product has a vast scope of improvement, this model also have some provision to improve upon which can be worked out in near future to make this a much more successful and safety provider system. As this system can be implemented only if the windows of the car are shut and air currents would disturb the detection level of the MQ-3 alcohol sensor. This situation can be considered as a future scope for a upgraded sensor technology. In case of motor bikes or heavy vehicles there are no window closing options, in such a case the proposed system needs a few changes for its effective working. The system illustrated in this paper is tested on many scenarios and results were found to be effective in order to reduce the number of accidents gradually.

REFERENCES

[1] Vaishnavi, Umadev,Vinothini "Intelligent Alcohol Detection System For Car" International Journal of Scientific & Engineering Research, Volume 5, Issue 11, November-2014.

[2] Phalak, Kowekar, Joshi "Smartphone and Sensor Based Drunk Driving Prevention System" International Journal For Research In Emerging Science And Technology, Volume-2, Issue-9, Sep-2015.

[3] Bhuta, Desai,Keni "Alcohol Detection and Vehicle Controlling" International Journal of Engineering Trends and Applications (IJETA) – Volume 2 Issue 2, Mar-Apr 2015.

[4] Sivakumar, Dr.R.Krishnaraj"Road Traffic Accidents (RTAS) Due To Drunken Driving In IndiachallengesIn Prevention." IRACST- International Journal of Research in Management & Technology (IJRMT), Vol. 2, No. 4, August 2012.

[5] Ramanath, Sudharsan, Udhayara "Drunken Driving and Rash Driving Prevention System" 2010 International Conference on Mechanical and Electrical Technology (ICMET 2010).

[6] Vijay, Saritha, Priyadharshini, Deepeka, Laxmi "Drunken Drive Protection System" International Journal of Scientific & Engineering Research Volume 2, Issue 12, December-2011.

[7] Barua,Pranshu Jain, Gupta, Gadre "Road Accident Prevention Unit (R.A.P.U)" 2013 Texas Instruments India Educators' Conference.

[8] T.Venkat Narayana Rao, Karttik Reddy Yellu "Automatic Safety Home Bell System with Message Enabled Features" IJCSET(www.ijcset.net) | December 2016 ,Vol 6, Issue 12, 410-413.