ANTICIPATING DRUNKEN DRIVING ACCIDENTS WITH IOT

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Abstract

The figure of accidents are growing day by day and among these accidents, 65% are due to "drunk and drive" cases. This paper aims to decrease the number of accident cases occurring due to drunk and driving using IoT. This paper uses AL9000P alcohol sensor 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 mean 30 microliters of alcohol in 100 millilitre of blood. The AL9000P 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 20KMPH 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 KMPH with a message sent to driver's nears and dears through GPS. The work stated in current paper expect to reduce the total number of accidents caused by drunk and driving, which is very important element for a better tomorrow.

Index Terms: IoT, Alcohol, Accidents, ArduinoUNO, AL9000P fuel processor.

I. INTRODUCTION

The use of IoT (internet of things) is fast increasing day by day in terms of luxury and security issue. A lot of projects in the area of Home Automation are becoming fashionable. The world is affecting towards a new era of Bluetooth connected devices like lights, fans and other electrical appliances helpful in daily way of life. A person sitting in front of a TV can switch on or off the fans and tubes of the house. Automatic Doorbell System is a project that indicate the house owner that some person had visited his/her house and there is no one to attend the visitor[6].

Road accidents have become a main concern these days. In a modern survey it is stated that 385 people lose their life every day because of drunken driving. The chief cause of accidents are based on two issues i.e. extreme speed and drunken driving. These kinds of accidents not only effect the life of the person driving the car but also show a pessimistic effect on the environment and the society. There are many cases which are reported stating that the innocent people walking on the street are also becoming the victims of the alcohol drunken driving accidents. There might be incidents like shifting the lane by drowsiness or due to lack of concentration which would lead to main accidents. The traditional system majorly depends upon the police officers that enables to stop the vehicle and confirm for the alcohol limit in the driver's breath. If the amount of alcohol detected is afar the legal limit, the driver will be penalized accordingly. It is difficult for the police to observe each and every vehicle in this situation the use of growing technology i.e. IOT will be useful.

II. PROPOSED SYSTEM WITH ARCHITECTURE

The proposed system ensure that the death rate due to drunken driving is abridged by 40%. Internet of things combine all the sensors, motors with the help of Arduino. In the proposed system a AL9000P alcohol sensor is engage to test the level of alcohol

consumed by the driver, a GPS module to be acquainted with the location of the car, a GSM module to send a message to the registered mobile number and a DC motor which represent the engine of a car. To interface the above stated sensors, motor and module, an Arduino UNO is used[1][2].

A . ***Hardware Requirements:***

- Arduino UNO board
- AL900P alcohol sensor
- GPS module
- GSM module
- DC motor
- Bread board
- Jumper Cables

B . ***Software Requirements:***

- Arduino IDE
- Knowledge of C programming

Figure 1 depict the flow of the proposed system. Firstly the AL900P alcohol sensor gets switch on along with the engine of the car. If the alcohol is detected then the speed of the car will get reduced, in this system the a DC motor will be used, control the speed of the car. After dropping the speed limit the control is handed over to the GPS module to discover the location. The antenna of the GPS module receive the longitude and latitude positions, these positions are sent to the registered mobile number using a GSM module[3]. The sent message will be received by the concern person and necessary action will be taken.

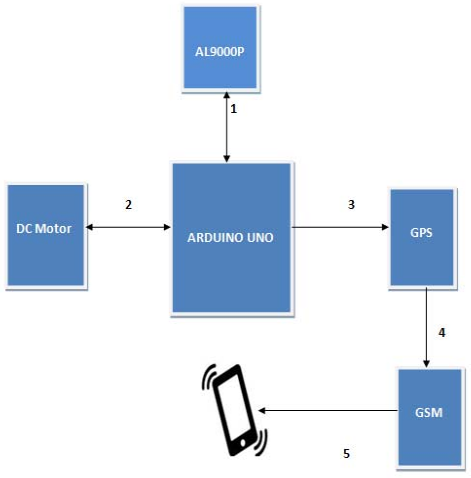

Fig.1. Flow chart for the future model

The following steps as follow:

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

Step a: Set the maximum speed of the car to 20 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 in trouble risking their lives by driving under the influence of alcohol". GPS positions are X^0 latitude and Y^0 longitude. Please take necessary action action".

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

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

Step b: an SMS will be sent to the registered mobile number along with the GPS location of the car saying 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 the alcohol continue moving in normal speed.

III. CHALLANGES

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

1. Driver in drunk mode 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 AL9000P alcohol sensor starts sensing for alcohol and does its assigned job. AL9000P sensor detect alcohol as the driver starts exhaling; it mechanism on the basis of sensing the level of alcohol consumed[1].

The second case may happen if the driver is over stress 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 essential action with the help of proposed system.

This proposed system ensure that in any of the above situations the system responds without failure.

The position of the sensor also plays an very important role in identifying the drunk driver. The position of the AL9000P 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.

Fig.2. Position of the sensor

IV. RESULTS AND DISCUSSION

The driver enters the car and start the engine, along with the engine the planned system also gets powered up. Now the AL9000P alcohol sensor is ready to detect the breath alcohol level of the driver. In India the legal limit for blood alcohol level is 0.03%. Figure 3 depicts outcome of situation taken from a real time scenario i.e. sending of appropriate SMS to the registered mobile number.

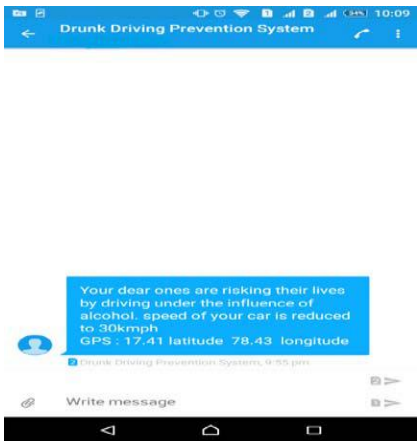

Fig 3.Snapshot of received message if alcohol level is within the legal limits

With the received message from the GPS module inside the car, the concerned person can take any essential actions like booking a cab for that person, or informing another person close to the location of the drunk driver[4][5].

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.

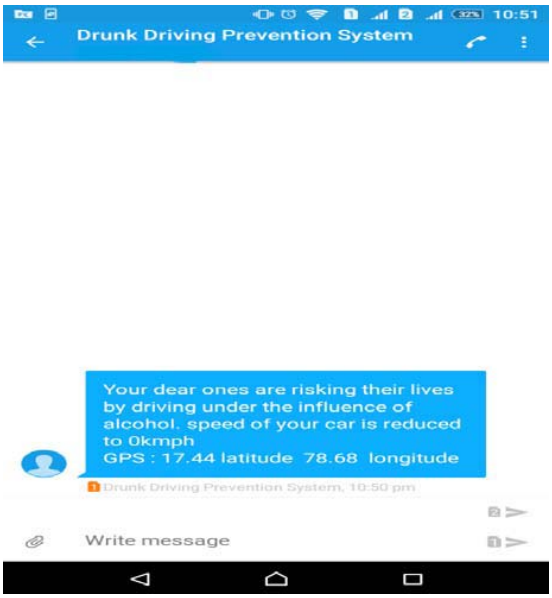

Fig 4.Snapshot of received message if alcohol level is beyond the legal limits.

If the driver is not under the influence of the alcohol ,the sensor does not recognize the alcohol content in the driver's breath and hence the vehicle move in a normal way without sending any messaging module[6].

V. ADVANTAGES OF THE PROPOSED SYSTEM

- Safer life: There are several accidents in which the driver often loses his life under the influence of alcohol.

- Convenient to traffic :A person under the influence of alcohol does not have control on his driving. In the same way the driver's mind does not coordinate with his body as a result he may break the traffic rules which can be unsafe. Whereas, the proposed system takes appropriate action based on the alcohol content

- Compact size: Only the AL9000P alcohol sensor is placed on the steering wheel and the rest of the components are hidden. The AL900P sensor doesn't occupy more than 4inches 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 a lot of situations in which cops have a main role to play like investigate some crime scene, investigate a robbery case or monitoring the traffic etc. thus reducing traffic police task.

VI. CONCLUSION

This paper is base on drunken driving prevention system using IoT. It connects sensors, modules, motors, etc. which can be used as an start of advancement of the
technology. Drunken driving prevention system is an application of IOT which provide safety to the drunken driver as well as the people at huge. As every new product has a huge scope of improvement, this model also have some prerequisite 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 AL9000P alcohol sensor. This situation can be measured 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 valuable 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.

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