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An Android Application to Notify the Detection of Alcohol Consumption While Driving

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Abstract - *With increasing need for better vehicles and human security, there is now a strong emphasis on developing measures to prevent accidents of vehicles. Nowadays, we can see an increase in road accidents, due to which there is a rise in the death rate and it has become the major concern one can't imagine. The main reason for the road accidents is the alcohol consumption done by the driver. So, here is a proposed system which detects the alcohol consumption of the driver by using the MQ3 sensors placed on the steering of the vehicle. And notifies it through the android application to the owner or the family members of the driver. This paper attempts to explore the possibility of using the technology that would detect the alcohol and notify it using the technology. The technology used here does not allow the driver to start the vehicle, if the driver has done the alcohol consumption above the threshold level. This is done by measuring the sensors connected which gives a buzzer sound when the driver is drunk and notified by GSM modem installed in the vehicle. One of the advantages of this system is that the alcohol sensors sense only the person sitting in the driver's seat and will not take into account of the fellow traveler. So the driver with alcohol consumption is identified and notified to the relative or the owner of the vehicle.*

Key Words: MQ3, Android application, GPS/GSM Modem, Alcohol checking, Drunken driving

1. INTRODUCTION

Driving a vehicle requires complete focus, reflexive action and quick decision-making abilities for the drivers to avoid any unexpected incidents. The consumption of alcohol beyond safety limits can obstruct the functioning of the brain and impact "self-control" capability of the driver resulting in accidents that can prove fatal not only for the driver but also for the fellow-passenger. As we know most of the road accidents are caused by the drunken driving, it has become a major issue. The solution to this issue can be given as designing a system which could automatically switch off the vehicle's engine, when alcohol is detected in the driver's breath. In this system, MQ3 sensors are used to detect the consumption of alcohol.

These sensors are fitted onto the steering wheel of the vehicle, so as to take the driver's breath as an input. When the drivers try to start the vehicle, the sensors get activated and detect the alcohol consumption in the driver's breath. Once, the presence of alcohol is detected, the micro-controller stops the engine of the vehicle and the indicators in the vehicle are activated. Green LED light indicates no alcohol consumption and Red LED light indicates the alcohol consumption with a message saying 'Alcohol Detected' which is displayed on the LED screen and a siren is blown to alert the nearby people to convey that something is wrong with the vehicle and inform the concerned authorities to avoid any kind of incident.

1.1 DRIVER'S BEHAVIOUR

The normal behavior of the driver could be said when the driver drives the vehicle with complete focus without any mistake while driving. His mind should have quick decision making power in order if there would be any sudden incident happening or which would be about to happen. The driver should be able to do any reflexive action to avoid unexpected incidents. The drunken driver could not be able to stand in the abilities required.

1.2 THE DRUNK BEHAVIOUR

When the driver is drunk, or better say overdrunk, he is not able to visualize things properly. It could be seen when the drunk people walk, so when a driver is drunk and tries to drive the vehicle, he is not able to stand with the required abilities like the reflexive action, quick decision making power, etc. Therefore, after being drunk, the driver's behavior changes as like he applies sudden break while driving, accelerating the vehicle with high speed, not being able to control the speed of the vehicle, which results in different incidents like bumping the vehicle somewhere, or a road accident or a crash.

So, in order to detect and notify the behaviour of the driver and avoid the different incidents or say accidents, the given system is proposed.

1.3 FACE DETECTION OF DRUNK DRIVER

The face detection technique is used to detect the facial expressions of the driver. First of all, the facial expressions like the eye movements, the facial muscles, etc. are captured of the driver who is not drunk and it is stored in the database. Then every time, the driver tries to start the vehicle, the face detection system is activated by all the sensors in the vehicle and it captures the current image of the facial expressions of the driver and compares it with the stored image in the database. It analyses the expressions and sends the according notifications to the micro- controller, where if in the analyzed data, both the

images do not match or a change is found in the eye movements, facial expressions, then the fuel supply is stopped by the micro controller and the driver is not able to start the vehicle.

2. PROBLEM IDENTIFICATION AND ITS SOLUTION

During the research, two problems were identified. One of them is- If their driver's alcohol consumption level is above the threshold level and if the driver wears a mask on the face, which is now necessary in the current pandemic situation, the alcohol consumption done by the driver cannot be measured properly or may not be detected. The solution to this could be stated as like using the face detection system and the sensors which could detect the unusual behavior of the drunken driver. The unusual behavior of the driver could be like the eye movements of the driver, the sudden applying of the brake, accelerating the vehicle with a high speed, not being able to control the vehicle, etc. If the face detection system and the sensors fitted in the vehicle detect all these unusual behavior of the driver irrespective of the regular behavior of the driver, a notification is sent to the microcontroller and it does the further process of not supplying the fuel to the vehicle and the drunken driver could not be able to start the vehicle. The second problem identified is, in the existing system, only the nearby people are aware of the drunken driver through the buzzer(which buzzes when the driver is detected as drunk) placed in the vehicle. The family members of the driver or the owner of the car are not aware about the driver. The solution to this problem could be stated as like to develop an Android application which notifies the situation of the driver. The sensors attached on the steering wheel and the vehicle detect if the driver has done the alcohol consumption and sends the notification to the microcontroller and as well as using the GSM/GPS module, a notification is sent to the family members of the driver or the owner of the vehicle or whosoever the person whose details are registered in the database. The person is informed about the situation of the driver, whether he is drunk or not and if drunk, then at which place he is stuck in the vehicle.

3. HARDWARE DESCRIPTION

The breath of the drivers is taken as an input to the sensor. The sensors are placed on the steering of the vehicle. The alcohol content within the blood is captured through the driver's breath. The sensors are attached to the microcontroller where it is programmed to induce the information through the sensors. It analyzes the information then it decides if the person has consumed alcohol or not and a notification is sent to installed android application by GSM modem installed within the vehicle. Thus, it minimizes the loss by saving the life and property of someone. The components accustomed to build this product are

• Indicating light-This a LED light which is able to indicate if the motive force has consumed alcohol or not

• Alarm– This is often a buzzer sound which comes when an alcohol is detected within the driver's breath.

• Engine lock: This unit comprises a DC motor. The DC motor will stop, if the alcohol content is more than the threshold and also the driver cannot start the vehicle.

• Alcohol checking: It is used to check the breath of the driving person and locks the engine if the person is drunk. The micro-controller only locks, if the alcohol content is detected in the driver's breath.

•Face detection system: It is used to detect the current facial expressions of the driver with the stored ones and analyze it and send the notifications according to the analysed data.

3.1 ALCOHOL SENSOR MODULE - MQ3

This module is formed using Alcohol Gas Sensor MQ3. It's a low cost semiconductor sensor which might detect the presence of alcohol gases at concentrations from 0.05 mg/L to 10 mg/L. SnO2 is the sensitive material utilized for this sensor, whose conductivity is lower in cleaner air. Its conductivity increases because the concentration of alcohol gases increases. It has high sensitivity to alcohol and includes a good resistance to disturbances because of smoke, vapor and gasoline. This module provides both digital and analog outputs. MQ3 alcohol sensor modules are often easily interfaced with Microcontrollers, Arduino Boards, Raspberry Pi etc.

This alcohol sensor is suitable for detecting alcohol concentration in your breath, similar to your common breath analyzer. It is a high sensitivity and fast latent period. Sensor provides an analog resistive output supported alcohol concentration. The drive circuit is extremely simple, all it needs is one resistor. An easy interface may well be a 0-3.3V ADC.

3.2 ARDUINO BOARD

The Arduino UNO is the main unit of model-device. The microcontroller board supported the ATmega 328. It is a programmable microcontroller for prototyping electromechanical devices. It has 14 digital inputs/output pins (of which 6 is used as PWM output), 6 analog inputs, a 16 MHz ceramic resonators the Arduino differs from all preceding board is that it doesn't use the FTDI USB to serial driver chip.

3.3 LIQUID CRYSTAL DISPLAY

Liquid crystal display is the electronic display module. A 16*2 LCD display is an incredibly basic module and it is usually used in various devices and logic gates. These LCDs are economical; easily programmable; don't have any limitation of displaying special and even custom characters (unlike in 7 segments), animations and rest. A 16*2 LCD means it can display 16 characters per line and there are 2 such lines, each character is displayed in 5*7 pixel matrix. This LCD has 2 registers, the command register which stores the command instructions given to the LCD and the data register which stores the information to be displayed on the LCD. A command is an instruction given to the LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. . The information is the ASCII value of the character to be displayed on the LCD.

3.4 GPS/GSM MODEM

The proposed GPS/GSM System built based on an embedded system, used to find the position of any vehicle by using Global Positioning System (GPS) and Global system for mobile communication (GSM). The Android mobile within the vehicle receives the latitudinal data from the satellite through GPS and the GPRS enabled SIM sends a message to another application. The user interface is on another Android mobile where the user can receive notification of alcohol detected and also the position of the vehicle. The application is installed within the android mobile of the owner and the family members. There's a GSM modem installed within the vehicle tracking and locking system. As soon as the alcohol is detected the system installed within the vehicle sends a notification message to the owner or relatives using the SIM in the GSM modem.

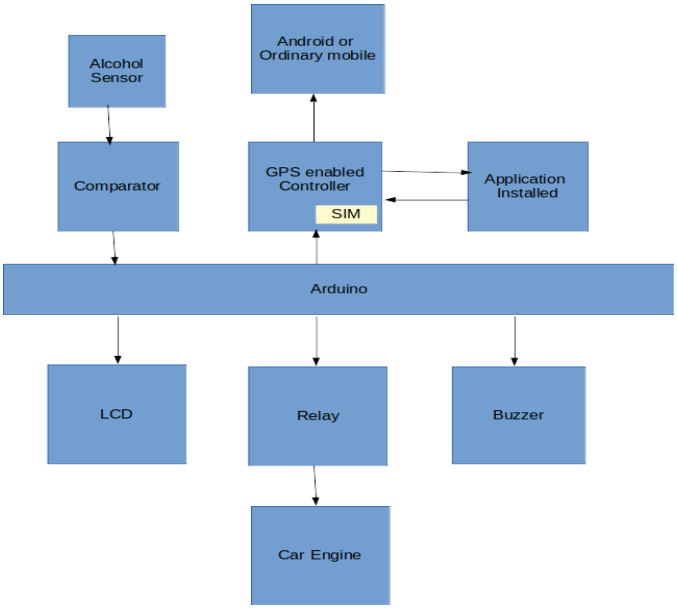

Fig -1: HARDWARE MODULES

4. SOFTWARE DESCRIPTION

The software is important for the hardware to work properly and to urge the expected output. A software module is important for hardware setup. The hardware is programmed using the embedded C code. The code written in an Arduino IDE and saved with the extension .ion for execution.

5. THE OPERATIONAL FLOW

Once the driver uses the key to ignite the engine the MQ3 sensor gets activated and detects the alcohol level through his breath, and if it is measured to be beyond the threshold level, the vehicle does not start. In case, if the driver is not drunk before but starts consuming the alcohol while on move, the sensor keeps measuring and once the level crosses the limit, the vehicle starts slowing down and gets stationed at the detected location.

It is important to embed the MQ-3 alcohol sensor at that position that is at the top of the steering wheel so, it will detect the alcohol level of the driver alone and not that of the fellow passengers in the vehicle. The remaining sensors and modules like GSM (Global System Module for mobile) and GPS (Global Positioning System) module are often placed anywhere inside the motor-vehicle as per the convenience and design compulsion by manufacturers.

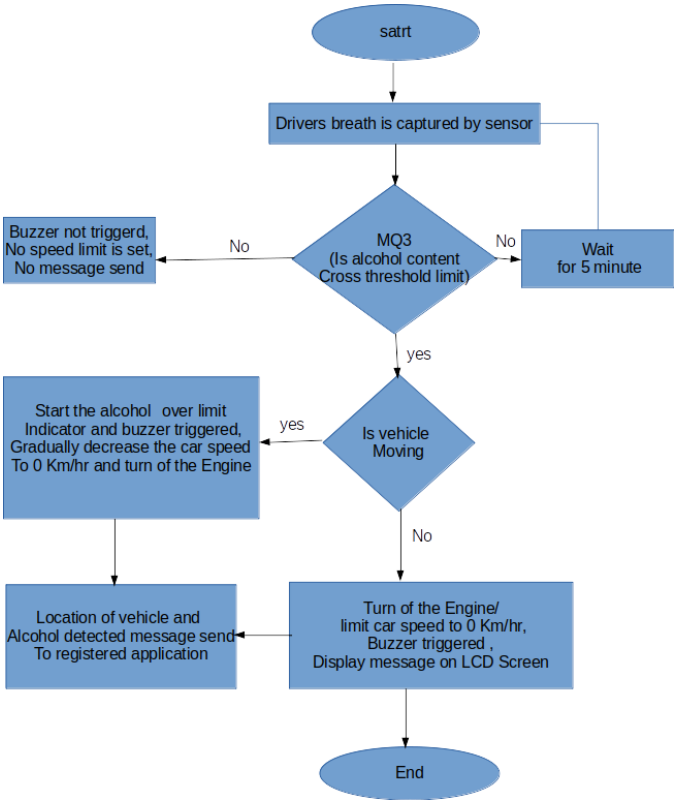

Fig -2: Operational Flow

Some of the operational cases are listed below:

1. In the first case, the driver may have consumed alcohol above the legal limit and then entered the car. During this situation, the system is designed in a way such that whenever the driver starts or tries to ignite the engine of the motor-vehicle, the MQ-3 alcohol sensor gets activated, the sensor starts sensing for alcohol and does its assigned job. As the driver starts breathing, The MQ-3 sensor detects alcohol content in the driver's breath; it works on the basis of sensing the extent of alcohol consumed from his breath when he exhales.

2. The second possible case could be if the driver is stressed out or wants to relax while driving and starts consuming alcohol while on the move. The system will continue to operate during the entire course of driving and will keep checking the alcohol content on a continual basis. The instant detected level goes beyond the stipulated legal-limits it triggers the desired action.

3. The third case occurs when the driver is not drunk and the passengers in the vehicle start consuming alcohol while on move. In that case it will not detect since the system is embedded on the steering wheel and has a limited range of two-meters. Not only the positioning of the device matter, but also the behavior of the fellow-passenger (consuming alcohol) as he/she has to make sure that they don't enter into the defined range that triggers the activation of the sensor.

The proposed system have following advantages

- Safe driving
- Prevents traffic chaos
- Compact size
- Reduces in accident number
- Apt devices for police
- Android application for the relatives or the owner of the vehicle.

6. CONCLUSION

In this paper, a system is proposed that detects if the driver is drunk and notifies it to the family members of the driver as well as the owner of the vehicle. It has an advantage of detecting only the driver. It detects the level of alcohol consumption done by the driver. If it is upto the threshold level, the driver will be allowed to drive the vehicle otherwise the driver would not be allowed to drive i.e the fuel supply will not be supplied to the vehicle and the drunk driver could not be able to start the vehicle. The android application for the proposed system sends a notification to the family members and the owner of the vehicle through which they could know the status of the driver. The application included in the transmitted module contains an embedded system to combine the use of GPS and GSM devices to retrieve the location and status of the vehicle.

REFERENCES

[1] "Vehicle Engine Lock System for Theft and Alcohol Detection International" Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-7, Issue-5S4, February 2019

[2] I.J. Intelligent Systems and Applications, 2013, 09, 86-93 Published Online August 2013 in MECS (http://www.mecs-press.org/) DOI:10.5815/ijisa.2013.09.10

[3] 4th - Somaiya International Conference on Technology and Information Management (SICTIM'18)

[4] K J Somaiya Institute of Management Studies and Research (SIMSR)

[5] Rohitaksha K et al, / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (3) , 2014, 3754-3758

[6] D. S. a. A. Chowdhury, "A Real Time Embedded System Application for Driver Drowsiness and Alcoholic Intoxication," International Journal of Engineering Trends and Technology (IJETT) , vol. 10, no. 9, Apr 2014.

[7] https://www.arduino.cc/

[8] Vehicle tracking system overview [online] http://www.roseindia.net/technology/vehicle tracking/VehicleTrackingSystems.shtml
[9] Paul Baskett , Yi Shang , Michael V. Patterson , Timothy Trull , Towards A System for Body-Area Sensing and Detection of Alcohol Craving and Mood Dvsregulation , © 2013 IEEE.