ARM Based Drunk Driver Identification with Tracking System

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Abstract— The most of the accidents in every country are caused by the drunken driving. But still in many places the rules are being violated, hence to avoid these situations we need a more efficient system which will be firstly able to verify that whether the drive is in intoxicated situation or not. In this paper we are introducing a method that when the drunk driver is found then the vehicle ignition function should get disabled and a massage in the form of vehicle location will be sent to the driver’s relative whose number is pre-defined in the system.

Keywords— Alcohol detection system, Vehicle controlling system, ARM Controller, GPS, GSM.

I. INTRODUCTION

Road accidents and collisions occur frequently. According to a survey done by W.H.O Almost every 90 seconds, a person is injured in a drunken driving crash. Drink and drive not only bring road traffic hidden danger to others, but also affects the safety of driver’s own life. In order to overcome the accidents caused due alcohol consumption by the driver while driving, an effective system is implemented based on ARM Controller and MQ3 alcohol sensor. With alcohol sensor MQ3, the alcohol concentration is detected through ADC which is inbuilt in ARM controller, the detection signal is converted to digital signal. According to the digital signal, the car is controlled automatically, can't be driving after driver drinking, thus avoid the occurrence of drunk driving.

II. EXISTING METHODOLOGY AND LITERATURE SURVEY

Hongjie Leng and Yingzi Lin [7] developed a novel carbon nanotube (CNT)-based alcohol sensor with a particular focus on the response delay problem presented in CNT based sensors. Shegeyuki Kojima et al [9] designed a new algorithm to distinguish between the normal and intoxicated state of a person which is proposed as the basic theory of the sensing system. The entire solution requires only a mobile phone placed in vehicle and with accelerometer and orientation sensor. Aditya et al [10] suggested that biometrics can be used in the security mechanism for the motor vehicles, as an anti theft device. William R. Reagen [8] developed a system for locating missing vehicles.

Ms. DHIVYA.M M.E.-Applied Electronics, Department of ECE Kalaighnr Karunanidhi Institute of Technology Coimbatore, India had implemented a system as “Hybrid Driver Safety, Vigilance and Security System for Vehicle”. This system is able to avoid the accident by use of heart rate monitoring system, alcohol detection and person level identification method in addition to this three method there is detection method such as eye blink sensor, theft detection, security system is used [4]. D.Sowmya I.Suneetha N.Pushpalata AITS, Tirupati, India had made a system as “Driver Behavior Monitoring through Sensors and Tracking the Accident using Wireless Technology”, which monitors the driver behavior And control the speed of a vehicle [12]. Pratiksha Bhuta, Karan Desai, Archita Keni has developed a system named as “Alcohol Detection and Vehicle Controlling”, in this system the AT89C51 microcontroller is used and the vehicle is controlled [1].

III. HARDWARE REQUIREMENT

The following figure1 shows the block diagram of the system. The entire system is implemented using LPC2148 ARM Controller, MQ3 alcohol sensor, Global Positioning System, GSM Module and Vehicle ignition function.
3.1. ARM Controller: The ARM Controller (LPC2148) board is the central unit of the system. All the components are interfaced to the board and programmed as per their functionality to operate in synchronization.

3.2. ALCOHOL MODULE: The alcohol sensor (MQ3) is used to sense the alcohol. The analog output of which is applied to the ARM Controller.

3.3. GSM: The GSM (SIM900A) module is used to send an SMS to the contacts of the user about the location of the vehicle. It is beneficial in emergency situations.

3.4. GPS: The GPS (SIM28ML) module is used to track the location of the user which is send via SMS through GSM module.

3.5. LCD: The 16 x 2 LCD is used to make the system user friendly such as when the alcohol is detected, it simply displays the message indicating “ALCOHOL DETECTED”.

3.6. DC MOTOR: It is used as a dummy for indicating the engine locking facility whenever alcohol is detected.

IV. SOFTWARE DESCRIPTION

The entire circuitry works by programming the ARM controller. To program the ARM controller (LPC2148), we use Keil uVision4 IDE, the Keil software is a compiler and debugger use to compile C code, assemble assembly source files, link and locate object modules and libraries, create HEX files, and debug your target program. Flash magic is used to dump the hex file into the microcontroller. The following figure2 shows the flow chart.
V. WORKING

The following figure shows the complete interfacing diagram of the system. The entire system works according to commands issued by microcontroller unit which is the brain of the system. The entire system is powered by a battery source which will work continuously even when the vehicle is in off condition which will cause to keep GPS module continuously enable and the current location of the vehicle will be tracked.

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS transmissions occur on a frequency of 1575.42 and 1227.60 MHz. The Global Positioning System satellites transmit signals to equipment on the ground. GPS receivers passively receive satellite signals. The GPS module works on the National Marine Electronic Association (NMEA) sentences provided by any GPS device. These sentences contain the standard information required to get position, speed, and other parameters. In order to find out the location there is a need of the longitude and latitude and these are available in the sentence as “$GPRMC - Recommended Minimum Specific GPS/TRANSIT Data”. The GPS Module is interfaced with the LPC2148 to the UART0 of port P0 as shown in the above figure. The GPS module continuously receives the signal from the satellite and tracked the location which will be further transferred to the desired recipient through GSM module.
The MQ3 alcohol sensor is the backbone of the system which is responsible to sense the alcohol. Basically, it has 6 pins, even though it has 6 pins, user can use only 4 of them. Two of them are for the heating system named as H and the other 2 are for connecting power and ground named as A and B. Inside of the sensor, there is a little tube and basically this tube is a heating system that is made of aluminum oxide and tin dioxide and inside of it there are heater coils, which practically produce the heat. When coil is heated then the SnO2 ceramics will become the semi-conductor, so there are more movable electrons, which means that it is ready to make more current flow and as soon as the alcohol molecules in the air meet the electrode that is between alumina and tin dioxide, ethanol burns into acetic acid then more current is produced. So the more alcohol molecules there are the more current we will get. Because of this current change, we get the different values from the sensor. The MQ3 is interfaced to the ADC0.7 channel of ADC0 which is available at port P0. The following figure 4 shows the working connections for MQ3.

Figure4. Connections for Alcohol Sensor

The GSM Module is interfaced to the UART1 of the port P0 as shown in above figure 3. The GSM module works according to commands send to it. In this system we are only sending a massage for that purpose we are using only two commands such as “AT” to check whether serial interface and GSM modem is working or not, and “AT + CMGS” to send SMS to the given recipient. As soon as driver tries to turn on the vehicle firstly our system verify whether the driver is in intoxicated situation or not. If the alcohol is sensed then the vehicle ignition function get blocked until the alcohol is sensed and a massage in the form of vehicle current location issued to the driver’s relative whose number is predefined in the system.

VI. RESULT

Hardware module for ARM Based Drunk Driver Identification with Tracking System was done and output was obtained. The following figure 5 shows hardware module for ARM Based Drunk Driver Identification with Tracking System is obtained through alcohol detection. Based on alcohol consumption different values are ranged with the inputs such as normal and abnormal conditions.

Figure5. Longitude and Latitude are traced through GPS Module
If the alcohol consumed by the person is above threshold value then it is said to be abnormal condition. For alcohol detection method, if the consumption of alcohol value is above abnormal then ignition system is not yet started by use of DC motor and hence the current location of the vehicle tracked by GPS module is sent to the driver’s relatives through GSM module.

VII. APPLICATION

This method is used in four wheelers like cars; it can also be used in other vehicles like two wheelers. The main goal is to avoid accidents, and warnings are issued through GSM technology.

VIII. FUTURE SCOPE

In future, this system can be implemented with modification such as heart beat monitoring system, obstacle sensing system also PIR sensor which will provide complete security to the driver.

IX. CONCLUSION

This system effectively confirms that the driver is not in a drunken condition before driving and while driving the car. By implementing this system it is possible to safe journey by two wheelers as well as the four wheelers.

REFERENCES


