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**Microprocessor Interfacing & Assembly Language**

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**Alcohol Detection with Engine Locking System using Arduino, GSM & GPS**

**Introduction:** This project proposed a design and implementation which can detect the alcohol level in the body of a drunken driver to avoid accidents occurring due to drunk and driving. Now a days, traffic accident has become a very common issue in Bangladesh. The current scenario shows the road accidents are occurring because of drunk driving. In past three and a half years, around 25thousands people died in road accidents across our country. The record suggests 20 people were died in Bangladesh every day. Majority of road accidents are caused by drunk driving. For this reason, road safety has become a major public health concern. In this project of alcohol detection with engine locking system will help to diminish road accident which happen because of drunk driving. The following objectives will be used in this system: Arduino UNO R3, MQ2 sensor, Buzzer, LCD Display, SIM900A, DC motor, power supply.

**Methodology:** This system will detect using Arduino uno whether the driver is drunk or not and will control the vehicle. This system consists of some different unit such as the power supply, alcohol detection senor, alarm, display, ignition and engine locking unit. MQ2 sensor is used to detect the presence of alcohol. This system will continuously monitor the alcohol level by using MQ2 sensor. If the reading is greater than the threshold, Arduino will stop DC motor as well as engine will be locked otherwise it will continue moving. When alcohol will be detected, LCD display will show “Alcohol is detected” and Buzzer will be automatically started. GSM 900A module is worked for Sending message of vehicle’s absolute location, as we were not able to work on hardware and have done simulation, it was not possible to add GSM module in simulation, that is why we used only GPS to track absolute location and showed it in virtual terminal.

System flow chart are given below:

ALCOHOL DETECTION With ENGINE LOCKING SYSTEM

MONITOR ALCOHOL LEVEL OF THE DRIVER

IS ALCOHOL LEVEL GREATER

No

YES

1. Engine on
2. LCD will not show anything.
3. Buzzer off

1.Engine will be locked

2.LCD display will show.

3. Buzzer on

4. GPS will track that location

We have researched about this system in online platform. We read a lot of research paper about this topic which published in International journal and conference and then collected data as well as information from that couple of well categories papers.

**Procedure:**

**Arduino Uno r3:**  In this process we used Arduino uno r3 as a microcontroller. Arduino uno R3 serves as the system's brain. All the components are connected to the board and configured to perform their functions. It has 14 digital Input / output pins of which 6 can be used as PWM outputs 6 analog input.

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Arduino Uno R3

**MQ2sensor:** To detect the presence of alcohol, the MQ-2 sensor is used.it takes data from the environment and give this data to Arduino, then Arduino determines whether the consumption level is within limit or not. In MQ-2 sensor, there have 4 pins, vcc, GND, out and test pin. We connect the sensor GND pin with Arduino GND and Vcc with 5-volt vcc. The test pin used to collect the data from environment, and we also connect the Out pin with Arduino pin 9 to give reading to Arduino.

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 MQ2 Sensor

**Buzzer**: A buzzer is used as the warning system, and it sounds when alcohol is detected. The buzzer's Supply wire is connected to Pin 6 of the Arduino, and the buzzer's Ground wire is connected to a Ground.

**Dc Motor**: We used a dc motor in the project to demonstrate whether the engine would turn off if alcohol is detected. We used a l293d motor driver to drive the dc motor. We connect the motor driver vcc and en pin with 5v and vs with 12 v. Motor driver IN1, IN2 pin is connected to pin 4 and 5 of the Arduino to pass the command.

**LCD display:** To demonstrate whether alcohol is detected or not, we use an LCD monitor. It will show alcohol detected if the alcohol level is high, and it will show alcohol not detected if the alcohol level is low.

**GPS:** The Global Positioning System (GPS) is a satellite-based global navigation system that provides position, velocity, and time synchronization. In this project, we used a GPS module for provides position.  We also used Virtual Terminal to display values obtained from the GPS Module, but we would not use Virtual Terminal in a real-world project.  GPS module RXD pin is connected to RXD pin of the Arduino, and virtual terminal RXD pin to TXD pin of the Arduino.  I am using the RX pin of the Arduino to get data from the GPS Module, and then using the TX pin to send it to the Serial Terminal.

**GSM**: We decided to transmit a message and the location of a vehicle to the nearest police station using GSM.  However, since we are unable to deliver this message to the police officer in this simulation, we will not enforce it.  “AT+CMGS” this command is used to send message to a given recipient.

**Result:** If driver takes alcohol during driving vehicle, then MQ2 sensor detect alcohol and locks the engine instantly. After that, Buzzer starts sound and LCD display shows that alcohol is detected. GPS tracks that location. So, people in that vehicle can be aware of that situation by the help of LCD display and can take necessary step. Hence, passengers can be safe from road accident.

The result of our experiment is presented below:

Box and whisker chart

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**Discussion :** Now days many accidents are happening due to drunk driving.The proposed system developed an intelligent system to detect the presence of alcohol and stop the engine.

The calculation of an instrument to give an equal value to the true value or quantity being calculated is known as accuracy. The accuracy can be related to the percentage error as

Error = Actual reading – Experimental reading

Percentage error = Error⁄Actual reading × 100%

Alcohol concentrations in ppm, voltage, and percentage. The voltage and percentage are represented by the ppm values. The percentage alcohol level is shown to the driver by our system. The concentration level, or BAC level, is represented by the ppm values. Depending on the resistance of the alcohol sensor, the voltage values increase or decrease. To detect alcohol and locking concept was achieved by programming instruction to the microcontroller to lock the vehicle engine when the alcohol sensor reading is above 40%.The microcontroller determines if the sensor reading is above the defined limit by analyzing the analog voltage values from the sensor. Arduino uno take this data as input. LCD display is connected to the Arduino.By taking this data LCD display shown the result as ‘Alcohol Detect’. Buzzer is used as a warning system. DC motor lock the engine .To track the vehicle, we are using GPS and receive position though SMS by GSM.

**Conclusion and recommendation:** We provided an extremely competent way to deal with and improve a smart system for vehicles to reduce the number of accidents caused by drunk driving. Vehicle security is dynamically important, as people are beginning to realize.The aim of the next level of this system is to monitor the consequences of alcohol abuse. This device enhances individual stability, resulting in a persuasive advancement in the vehicle industry in terms of reducing setbacks resulting from driving.

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