“ALCOHOL DETECTION WITH ENGINE LOCKING”

Submitted in partial fulfilment of the requirements for the partial completion of

PROJECT WORK-I [22EC5PWPJ1]

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM

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2023-2024

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DECLARATION

We undersigned students of fifth semester B.E in ECE, B.M.S College of Engineering, Bangalore, hereby declare that the dissertation entitled "ALCOHOL DETECTION WITH ENGINE LOCKING", embodies the report of my project work carried out independently by us under the guidance of Mrs K POORNIMA KAMATH Assistant Professor, ECE Department, BMSCE, Bangalore in partial fulfilment for the award of Bachelor of Engineering in Electronics and Communication Engineering from Visvesvaraya Technological University, Belgaum during the academic year 2023-2024.

We also declare that to the best of our knowledge and belief, this project has not been submitted for the award of any other degree on an earlier occasion by any student.

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CERTIFICATE

This is to certify that the project entitled **"ALCOHOL DETECTION WITH ENGINE LOCKING"** is a bonafide work carried out by **SHRINIDHI BAPURI**(USN:1BM21EC164), **SNEHA S**(USN:1BM21EC164), **SNEHA S GOWDA**((USN:1BM21EC165) and **SRUSHTI SHETTY**(USN:1BM21EC170) in partial fulfilment for the partial completion of PROJECT WORK-I [22EC5PWPJ1] during the academic year 2023-2024.

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ABSTRACT

The main purpose behind this project is “DRUNK DRIVING DETECTION”. Now a day’s many accidents happening because of the alcohol consumption of the driver or the person who is driving the car. The drunk driving is a major reason of accident in almost all countries all over the world. Alcohol detection in car project is designed for the safety of the people seating inside the car. This project should be installed inside the vehicle. In this project we have developed an automatic engine locking system. The input for the system is alcoholic breath.

The controller waits for the output from alcohol sensor. Here a stimulating process activated using a dc motor through the freewheeling diode & complete process is under the supervision of an intelligent Atmega 328microcontroller. Even through efficient set up requirements have been adopted for the traditional methods, where in this process this could be a better idea of interesting the complete state of the art design into the system. Most of traditional systems are likely to be more dependent on the operator & it may fail due to various factors like battery life, power consumption as well as the unavoidable external disturbances. Thus, drunk driving is a major reason of accidents in almost all countries all over the world. Alcohol detector in car project is designed for the safety of the people seating inside the car. If there are many traces of alcohol above the set limit then the engine will be locked by the system and at the same time the buzzer will on so, that we can avoids accidents.

ACKNOWLEDGEMENT

Any achievement, be it scholastic or otherwise does not depend solely on the individual efforts but on the guidance, encouragement and cooperation of intellectuals, elders and friends. A number of personalities, in their own capacities have helped us in carrying out this project work. We would like to take this opportunity to thank them all.

We express profound gratitude to respected principal **Dr. S. Muralidhara,** BMS College of Engineering for providing a congenial environment to work in. Our sincere gratitude to

Dr. Siddappaji, Professor, Head of the Department, Electronics and Communication Engineering and our guide for this Project for encouraging and providing this opportunity to carry out the project in the department and who helped us in all the ways to carry out the project work. He stood beside and guided us in every step.

We would like to thank our guide **Mrs. Poornima Kamath,** Assistant Professor, Department of ECE who helped us in all the ways to carry out the project work. She stood beside and guided us in every step.

We thank all our professors for providing the basic knowledge without which this project wouldn't have been possible. Last but not the least we thank our family and friends, who made their valuable support compelled us to maintain a standard throughout our endeavour.

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CHAPTER 1. INTRODUCTION

1.1 Introduction

At present days most accidents happening caused by drunken driving. These accidents are increasing deaths and economic losses .It is not the only problem for drivers it also affects the travellers who are traveling beside.

Accidents are frequently the consequence of a human error on the road, and they can occasionally be brought on by alcohol intake which alters the victim's way of thinking. Law enforcement agencies have made significant efforts to lower the risk of drunk driving, but none have been able to significantly diminish it.

The World Health Organization (WHO) estimates that road traffic accidents are the eighth leading cause of death for persons of all ages and the top cause of death for those under 30 years old. Around 1.3 million people worldwide lose their lives in motor vehicle accidents every year, and another 20 to 50 million are injured. Although developing countries account for only 54% of the world's registered vehicles, 90% of road traffic fatalities occur therein.

As a result, an autonomous alcohol detection device that can operate without regard to place or time is required. Drunk driving is an extremely risky behaviour because excessive alcohol intake leads to the distortion of the driver's cognitive patterns .The number of traffic accidents due to drunk driving has risen dramatically in recent years. As a result, it has become clear that intoxicated driving endangers public safety. According to National Highway Traffic Safety Administration (NHTSA) estimates that 21% of accidents are caused by drowsiness.

1.2 Problem Definition

Drivers under the influence of alcohol shows a clear failure of perception recognition and vehicle control. So, by this accident occurs.

There was no technology to lock the engine of the vehicle after sensing the alcohol consumption by the driver which was considered to the main cause of the accidents. There was manual checking after particular distance on the roads or the highways but still these checks were not sufficient to stop the happening of the mishaps.

The problem with breath analysers is that it might be too late before the traffic police might actually catch a person who is driving the vehicle in a drunken state. Most of the times people actually got away with the drunken driving and thereby putting a lot lives in stake.

1.3 Problem Solution

Accidents can reduce using the Detection of Drunk Driving. It can be done by mq3 sensor with Arduino. Programmed code in Arduino for an automatic engine locking system to detection of drunk Driving and Drowsiness.

MQ3 sensor detects Driving Under the Influence (DUI) of alcohol, it can be used to lock the engine.

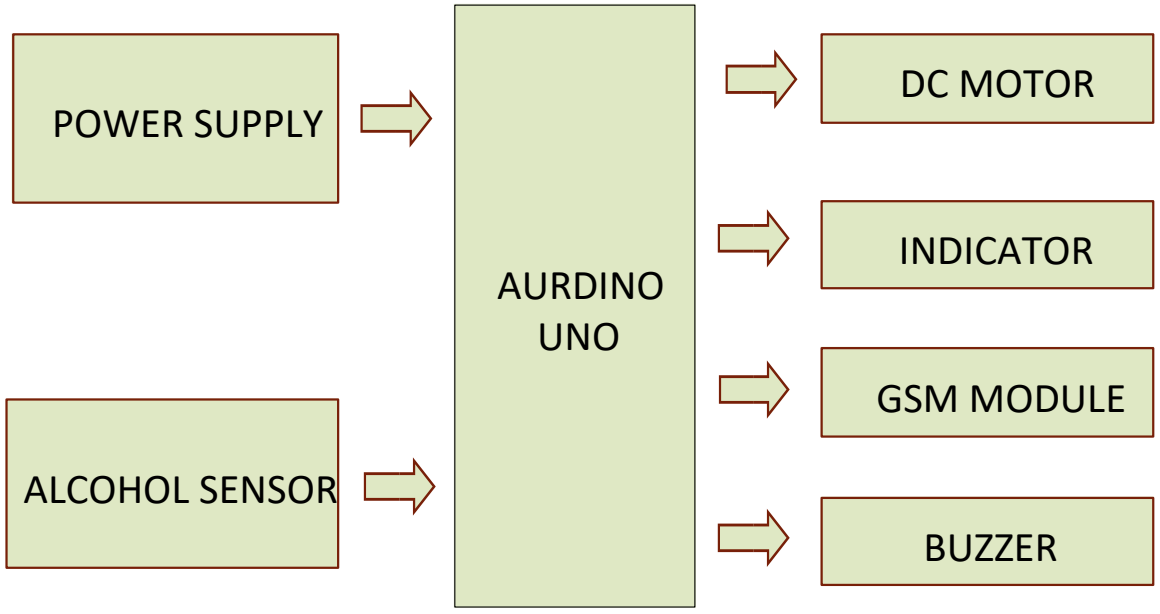

Fig1.BLOCK DIAGRAM

CHAPTER 2: LITERATURE SURVEY

Over the last decade, there have been various studies done related to drunk driving. Features using a driver's Visual characteristics, Physiological and Driving- behaviour based studies have been conducted each having their own advantages for drowsiness detection and by using sensors for drunk driving detection. Numerous research paper and designed prototype which we have studied to enhance our proposed system in terms of design, operation, accuracy and cost.

Musab A. M. Ali, M. N. Mohammed, Shahad Al-Youif Alcohol Detection for Car Locking System. In this paper, they have focused on linking the ignition control of the vehicle with the alcohol checking mechanism. From this paper we referred, alcohol detection and simplified the existing system thus making it less complex, added real time message-based confirmation system.

K. Al Hammadi, M. Ismaeel and T. Faisal Intelligent Car Safety System. In this paper, they focused on electric switch circuit between the ignition and the seat belt of the driver. We have used this circuit and tried to link this with our proposed system by making some changes.

M. Khaksar Toroghi and R. Mahadevan Multiscale metabolic modelling approach for predicting blood alcohol concentration. In this they did a detailed research on the BAC (body alcohol content of the human body). With the help of the study of BAC and other factors, we calculated the threshold value of the alcohol content for our system.

The Vehicle Engine Lock System for Alcohol Detection P. Ranjana, Rajeswari Mukesh, Achhint Kumar, N.N.S.S.Sujith, C.H.Sathyasai VEHICLE ENGINE LOCK SYSTEM FOR ALCOHOL DETECTION 364 Published By: Blue Eyes Intelligence Engineering & Sciences Publication Retrieval Number: E10760275S419/19©BEIESP intentional accidents has become more in recent years due to the development of new in-vehicle technology. The drivers scenario like eye blink are collected and drivers were dictated on how to drive through their mobile phones.

It analyses the behaviour of the driver and classifies it and avoids the accidents through the metric obtained. An ardiuno based embedded system is designed for a more safe and secure journey . They used a vehicle based control in the school zone and controls the speed of the

vehicle in brides, hospital areas and many other important areas . Though there are many works carried out they concentre only on a specific feature and the accuracy level should be improved.

This technique which utilizes GPS and GSM to ascertain alcohol but this technique is very expensive, but the expenses can be cut off to a great extent. In this project a buzzer is being used which is highly economical, and can keep people in close proximity vigilant.

Composite health monitoring and sensors based on infrared are utilized to ascertain alcohol as but the chance of false alarm can't be avoided in this system, because minute change in some situations can result in false alarm but in our project use of required technology makes it more authentic.

Worrying about the drunken driving the previous publications suggests the system to overcome the issue but using mQ2 alcohol sensor has come flames .MQ2 alcohol sensor is not authentic and raises the chance of false alarm while we have used MQ3 which is highly authentic.

To cope with alcohol detection simultaneous the publications have proposed a system which is very complicated and use of P89V57RD2 microcontroller makes it highly expensive also this system can only be equipped with 2 wheelers whereas , Ardiuno uno microcontroller is economical as well as can be equipped with any class of vehicle making it more authentic and successful.

CHAPTER 3: METHODOLOGY AND IMPLEMENTATION

3.1 Project Execution Steps

It consists of mainly four steps.

- The first stage is boosting the system.
- Next stage is detecting the alcohol.
- The third stage measuring the alcohol, in this stage the alcohol is beyond the limit gives the input to the Arduino.
- If it exceeds the limit, the engine will stop and buzzer, indication will on and message is sent to a registered mobile number through GMS module.
- Else engine runs normally and buzzer, indication will be off.

3.2 Project Execution Flow

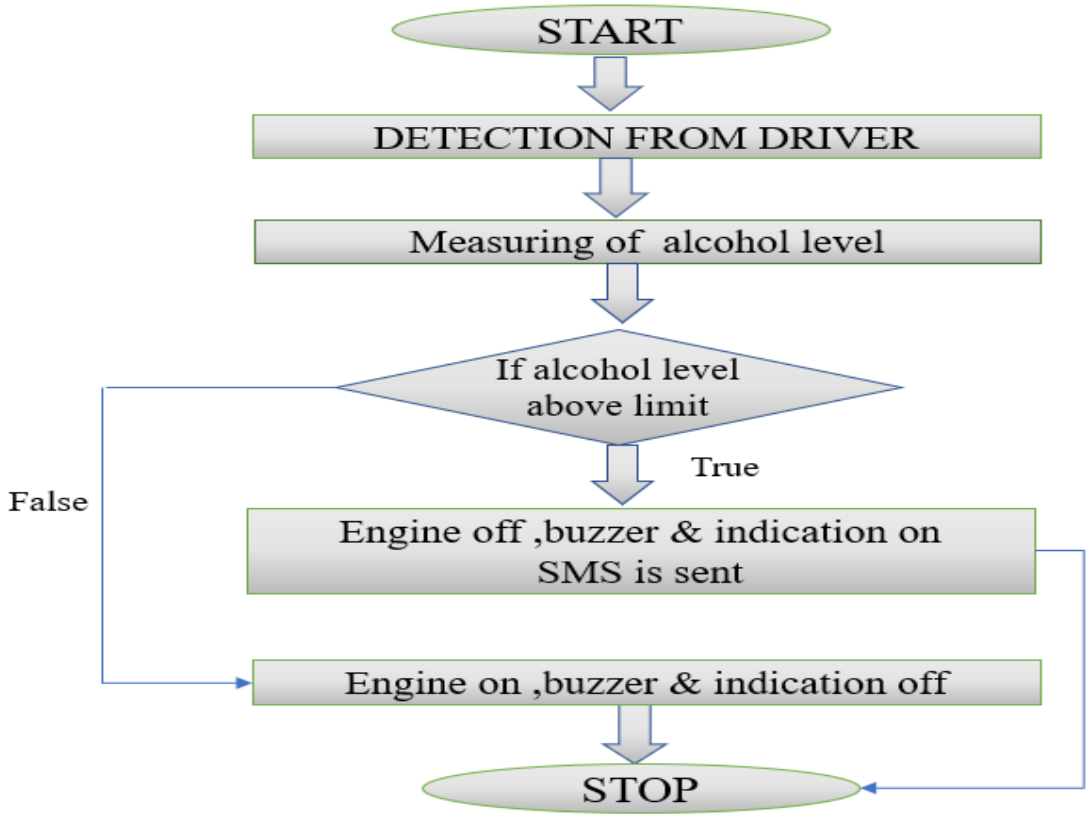

Fig.2 Flow Chart of Working

3.3 Component Description:

3.3.1 HARDWARE REQUIREMENTS

- Power Supply
- Arduino UNO
- MQ3 Alcohol Sensor
- DC motor
- Buzzer
- Relay
- GSM Module
- Breadboard
- Jumper Wires
- Battery

HARDWARE DESCRIPTION

Arduino UNO board:

It is an open-source electronic platform based on easy-to-use hardware and software. It is used for sending receiving and processing the signal and it helps to rotate the servo motor and shows the display on the screen.

Features:

- Microcontroller ATmega328
- Operating Voltage 5V
- Input Voltage 7-12V(Recommended)
- Input Voltage (limits) 6-20V
- Digital I/O Pins 14 (of which 6 provide PWM output)
- Analog Input Pins 6
- DC Current per I/O Pin 40 mA
- DC Current for 3.3V Pin 50 mA
- Flash Memory 32 KB (ATmega328)
- SRAM 2 KB (ATmega328)
- EEPROM 1 KB (ATmega328)
- Clock Speed 16 MHz

Figure 3: Arduino UNO

DC Motor:

DC or direct current motor works on the principal, when a current carrying conductor is placed in a magnetic field; it experiences a torque and has a tendency to move. This is known as motoring action. If the direction of current in the wire is reversed, the direction of rotation also

reverses. When magnetic field and electric field interact, they produce a mechanical force, and based on that the working principle of DC motor is established. In our project DC motor is using as engine starter which would be connected to crank of the engine. The speed of a dc motor is directly proportional to the supply voltage, so if we reduce the supply voltage, the motor will at half speed. The speed controller work by varying the average voltage sent to the motor. This voltage is depending upon the alcohol sensor (mq3). That means when the alcohol sensor sensed the alcohol percentage less than 40%, the motor will run. But if the sensor sensed the alcohol percentage above 40%, the motor will stop.

Figure 4: DC Motor

Buzzer/Alarm:

A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, electro-acoustic or piezoelectric audio signalling device. A piezo electric buzzer can be driven by an oscillating electronic circuit or other audio signal source. A click, beep or ring can indicate that a button has been pressed. A conventional Piezo bell works between 3 – 12 volts DC.

Figure 5: Buzzer

MQ3 Sensor:

The Analog Gas Sensor-Mq3 Is Suitable for Alcohol Detecting the Sensor Can be used as a Breath Analyzer. It Has a High Sensitivity to Alcohol & Small Sensitivity to Benzene. The Alcohol Module Is Used to Sense the Alcohol. The Analog Output of Which Is Applied to The Arduino Board. Resistance Value of Mq3 Is Different Components.

Figure 6: MQ3 Alcohol Sensor

Relay:

The relay module is **an electrically operated switch that can be turned on or off deciding to let current flow through or not**. They are designed to be controlled with low voltages like 3.3V like the ESP32, ESP8266, etc

Figure 7: Relay Module

Battery Source:

To provide Energy for motor to perform battery is a very important component.

Figure 8: Battery

GSM Module:

GSM is a standard set developed by the European Telecommunications Standards Institute (ETSI) to describe technologies for second-generation (2G) digital cellular networks. A GSM modem is a specialised type of modem that accepts a SIM card and operates over a subscription to a mobile operator just like a mobile phone. GSM modems are a cost-effective solution for receiving SMS messages because the sender is paying for the message delivery. To perform these tasks, a GSM modem must support an extended AT command set for sending and receiving SMS messages, as defined in the ETSI GSM 07.05 and 3GPP TS 27.005 specifications. It should also be noted that not all phones support this modem interface for sending and receiving SMS messages, particularly most smartphones like the Blackberry, iPhone and Windows mobile devices.

Figure 9: GSM Module

Jumper Wires:

A jumper wire (also known as jumper, jumper wire, jumper cable, DuPont wire, or DuPont cable – named for one manufacturer of them) is an electrical wire or group of them in a cable with a connector or pin at each end (or sometimes without them simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Figure 10: Jumper Wires for Connection

3.4 Software Architecture:

3.4.1 SOFTWARE REQUIREMENTS

- Arduino IDE

3.4.2 Program:

```
const int alcoholPin = A1; // Analog pin for alcohol sensor
const int relayPin = 2;    // Digital pin for relay module
const int buzzerPin = 3;   // Digital pin for buzzer
const int ledPin = 4;      // Digital pin for LED

const int THRESHOLD_VALUE = 300; // Adjust this value based on your sensor readings

void setup() {
  pinMode(alcoholPin, INPUT);
  pinMode(relayPin, OUTPUT);
  pinMode(buzzerPin, OUTPUT);
  pinMode(ledPin, OUTPUT);

  digitalWrite(relayPin, LOW); // Ensure the relay is initially off
}

void loop() {
  int alcoholValue = analogRead(alcoholPin);

  // You may need to calibrate the alcohol sensor based on your specific model
  if (alcoholValue > THRESHOLD_VALUE) {
    // Alcohol detected, take necessary actions
    digitalWrite(relayPin, HIGH); // Turn on relay to lock the engine
    digitalWrite(buzzerPin, HIGH); // Turn on buzzer to sound an alarm
    digitalWrite(ledPin, HIGH); // Turn on LED to indicate alcohol detection
  } else {
    // No alcohol detected, reset actions
    digitalWrite(relayPin, LOW); // Turn off relay to unlock the engine
    digitalWrite(buzzerPin, LOW); // Turn off buzzer
    digitalWrite(ledPin, LOW); // Turn off LED
  }

  delay(1000); // Adjust the delay based on your application
}
```

CHAPTER 4: RESULTS AND DISCUSSIONS

If alcoholic person tries command on vehicle the alcoholic sensor determines the existing of alcohol and shut down the vehicle engine and sound alarm by which the nearby people will exchange the seat. We can avoid any kind of loss of life by using this system. All equipment's are totally tested and connected as required thereby giving us the much-needed result.

4.1 Applications and advantages

The applications of this project are easily visible.

- The Alcohol detection with engine locking system can be implemented in any 4- wheelers.
- The Alcohol detection with engine locking system can help prevent accidents due to drunk driving.
- The Alcohol detection with engine locking system can be very helpful for police.
- The Alcohol detection with engine locking system prove automatic safety system for cars and other vehicles.

CHAPTER 5: CONCLUSION AND FUTURE WORK

5.1 Conclusion:

An effective solution is provided to develop the intelligent system for vehicles which will monitor various parameters of vehicle in between constant time period and will send this data to the base unit as explained in this paper, by using hardware platform whose Core is Arduino, Alcohol sensor mq3. The whole Control system has the advantage of small volume and high reliability. Future scope of this system is to control the accidents and providing useful details about the accidental vehicle, thereby reducing the rate of accidents taking place due to drunken driving. This system brings innovation to the existing technology in the vehicles and also improves the safety features, hence proving to be an effective development in the automobile industry.

5.2 Future Scope:

We can implement Heart Rate Pulse Variability to find accurately & identify the driving behaviour of drivers and to assist them by sending emergency alert to nearby Health care center.

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