AUTOMATIC ENGINE LOCKING SYSTEM FOR DRUNKEN DRIVER

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ABSTRACT

Automatic engine locking system was devised to prevent drivers from driving vehicles in a boozed up state and helping in the cause to promote "not to drink and drive". The authors came up with idea of developing a prototype in which a sensor placed in the vehicle will be used to detect alcohol and upon detection it will trigger a warning for the driver and if the warnings are ignored then it will automatically lock the engine by shutting off its motors.

The MQ-3 alcohol sensor is used to detect alcohol in the vehicle and upon alcohol detection it will lock the DC motor preventing the driver from driving the vehicle in a boozed up state. Simultaneously a buzzer will also be sounded and to restart the engine the system will require a reboot.

Furthermore, after detection of the alcohol a GPS location will be send to the registered mobile number so that the location can be traced back to the driver. This project depicts an innovative way to prevent drivers from consuming alcohol while driving as it will ultimately lead to their safety as well as the safety of others around them.

KEYWORDS

Alcohol Detection, Micro controller, DC Motor representing as the vehicle engine, Buzzer for signalling an alarm to the driver, MQ-3 alcohol sensor for alcohol detection.

INTRODUCTION

Road safety has always been a major talking point for the society. There are various signs, lanes and rules that have been implemented by governments across the globe to prevent accidents and fatalities. But there is a major population that still do not follow these rules are because of that we hear about a lot of cases of road accidents, lane violations, and drunken driving fatalities and injuries.

In countries like America and Canada almost 10,000 people lose their lives each year and in developing nations like India where people are hesitant to follow traffic rules, the rate of road accidents are much higher

with almost 11,243 each year. In the year 2019 alone almost 3,300 people lost their lives due to alcohol related accidents.

Every other day there have been cases related to accidents caused especially by drunk driving in which people either loose their lives or injure others or damage public and private properties. The authors intended to put an end to this by developing this sophisticated system where the level of alcohol present in the driver's breath can be continuously monitored and if the level of alcohol goes above the threshold value the he/she will not be allowed to take control of the vehicle. Only when the level drops below the set threshold value, only then can they take control of the vehicle.

So if the driver even attempt's to drive the vehicle in a bevvy state, they will not be able to do so. Therefore, this project has been designed in such a way that it pushes public safety first especially road safety [4]. More over with the help of this project the authors aim is to reach the masses and display to them importance of road safety and create awareness amongst them.

LITERATURE REVIEW

In this project, the author has proposed to detect alcohol using many types of relevant method like use of siren which is cost effective and this type of siren will alert the driver or the passenger if any about the presence of alcohol. The author has proposed to use GPS and GSM module to send the messages to mobile to alert the people to take an action in accidental situation as well as the location of the vehicle [1]. Through this technology, when driver is drunk or in an unconscious state due to over consumption of alcohol, the MQ-3 alcohol sensor will detect alcohol and a buzzer will be triggered after which the GSM module will send an alert message to the registered mobile number and the GPS will provide with the accurate location. The author has tried to use a health monitoring system and infrared sensor for detection of alcohol. The main disadvantage is the possibility of showing a false alarm. The minute changes in some situation can result in a false alarm but the authors have designed the prototype in such a manner that it can detect accurately without raising any false or anything. The author has proposed the use of microcontroller which is not very costly but can get the job done [2]. An expensive system like an Arduino will be used in the future which is much more sophisticated and also much more features can be added to them. Although they are a bit expensive which makes them not accessible to most of the people, that is why a Microcontroller is used which is cheap and cost effective. The author suggests the use of MQ-3 alcohol sensor to detect alcohol in the vehicle. The authors suggested on using the MQ-2 alcohol sensor but after considerations and the unreliability of the MQ-2 sensor and its high frequency of generating false alarms it was decided to use an MQ-3 alcohol sensor. This sensor is much more reliable, efficient as well as can detect alcohol accurately without any false alarms or signals. The concerned authors have also suggested the use of LED lights as an indication that alcohol has been detected. It provides the driver as well the passengers with them information regarding the consumption or presence of alcohol in the vehicle, which will in turn provide a safe alternative rather than the unsafety of driving the vehicle in that state. In this project the authors have also used a buzzer which is used to sound the alarm when the alcohol is detected [9]. Basically, the process of sounding the buzzer is that when the MQ-3 alcohol sensor detects alcohol the circuitry or the microcontroller will give a command to the buzzer that alcohol has been detected and once detected the buzzer will receive the command and trigger the sound notifying to the driver and the passenger that if any that there is presence of alcohol in the vehicle. The authors have also proposed the use of a DC motor which is represented as the engine of the vehicle or the motor which keeps the engine running [3]. Once alcohol is detected and the buzzer is sounded the engine is immediately stopped and the control of restarting the engine is taken away from the driver. It is done so that the driver cannot force the vehicle to keep it under his/her control. The only plausible way to restart the engine would be to keep lower the alcohol level by various methods. Also to make the prototype much more efficient and low power consuming, the authors also added a voltage regulator which converts the 9 volt DC into 5 volt DC so that there is no fluctuation of power when the process is taking place. This allows the authors to completely rely on the system without getting them regularly checked for flaws [4].

PROPOSED METHODOLOGY

The main objective of this project is to develop an efficient and accurate system using an 8051 microcontroller and an MQ-3 alcohol sensor to detect the presence of alcohol and lock the engine automatically.

Using an 8051 Microcontroller we propose a design which consists of an MQ-3 Alcohol Sensor which will detect the presence of alcohol in the person's breath and after analysing the percentage of it, if it I has a higher percentage it will automatically lock the system preventing the driver to drive the vehicle. Hence, due to this drunken driving is controlled and accidents and can therefore be prevented.
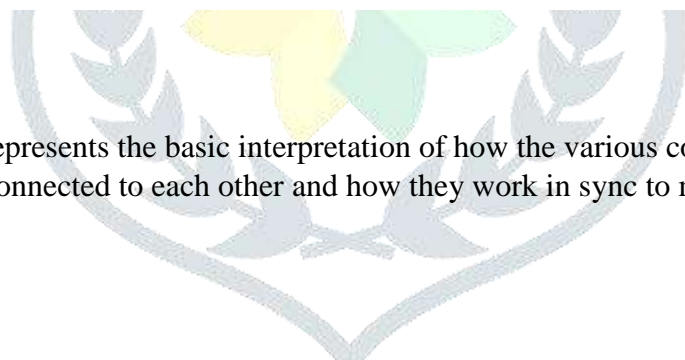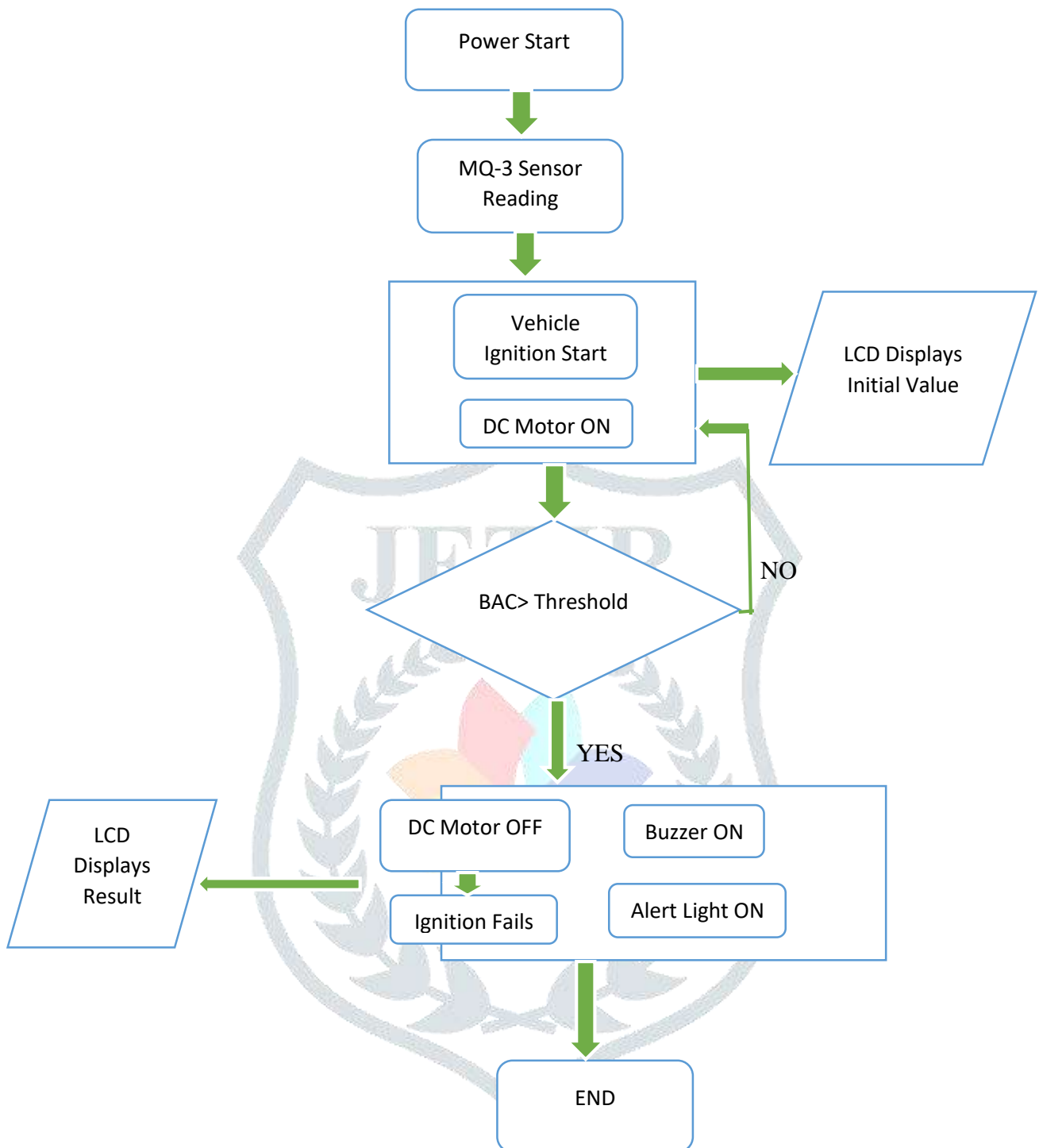
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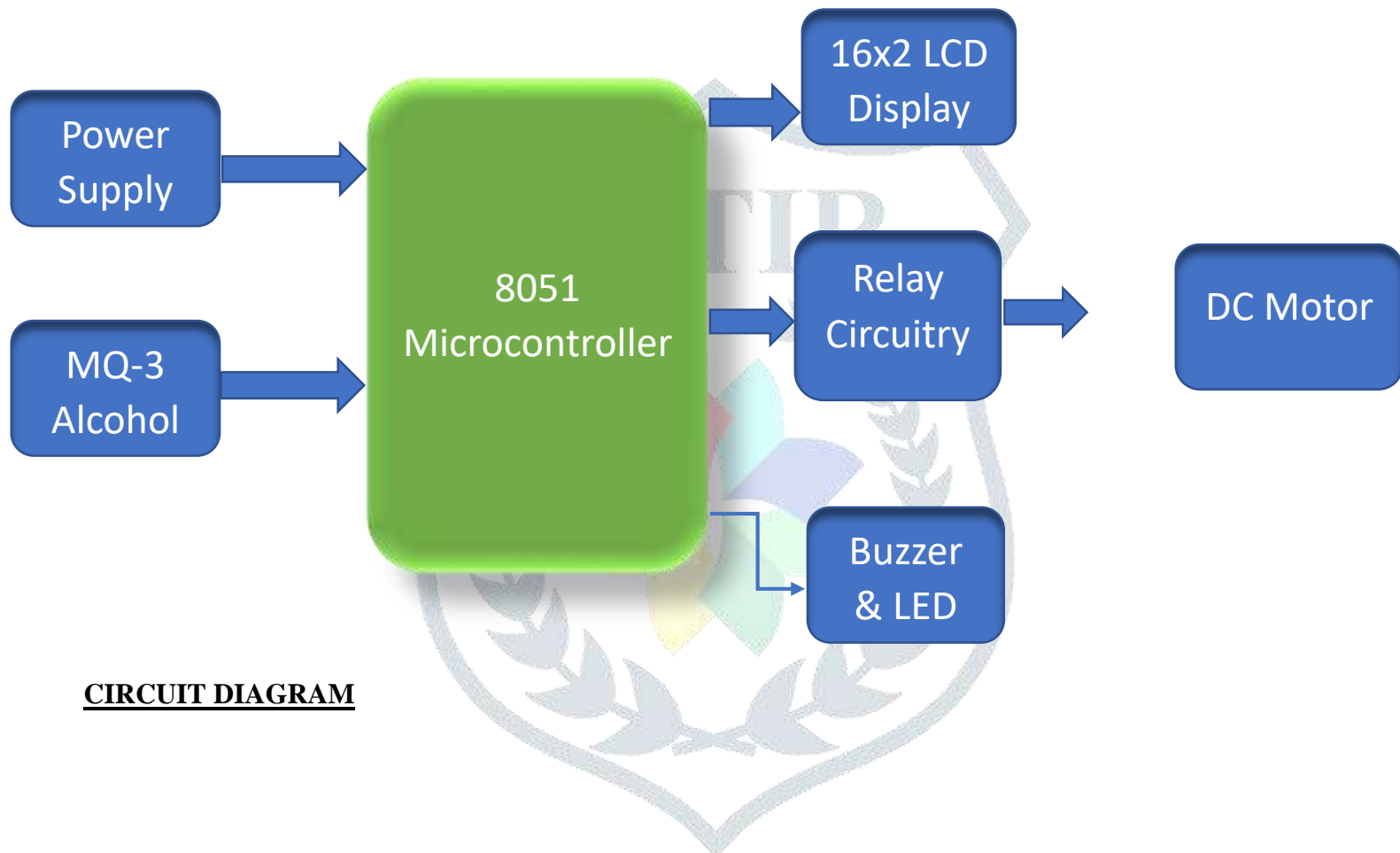
CIRCUIT DIAGRAM
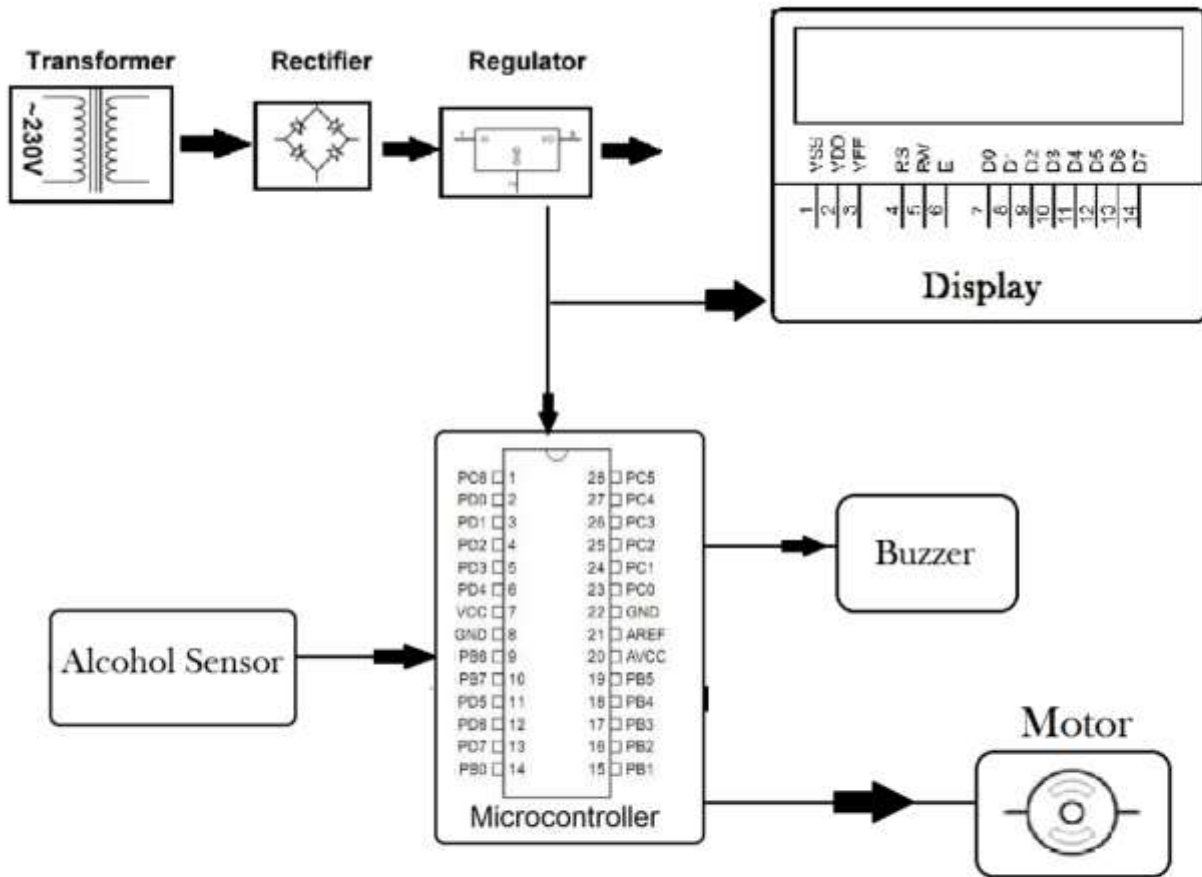
The circuit diagram above represents the basic interpretation of how the various components used in the projects by the authors are connected to each other and how they work in sync to make the operation a full proof success.

FLOWCHART

In the above flowchart the authors have tried to explain the working of the prototype in a manner which is easily understandable by the reader. In the flowchart it is clearly shown that when the power supply is given, the MQ-3 alcohol sensor will start reading for alcohol presence and continue to display its initial response in the LCD screen. But if alcohol is detected and it reaches above the set threshold level then as shown the DC motor will be turned OFF and the buzzer will sound followed by an alert light in this case a red LED. Finally the LCD screen will display a message indicating the presence of alcohol and thus, we the authors get to know the presence of alcohol.

8051 MICROCONTROLLER

8051 Microcontroller uses a 16 bit address bus for data transfer along with an 8 bit data bus for carrying data for various applications [5].

The 8 bit microcontroller family comes with 128kb RAM,4 ports ,2 timers and 1 serial port all on a single chip. It is also very easy to program these chips and operate them. They are used in various communications, management systems, robotics etc.

MQ-3 ALOCHOL SENSOR

An MQ-3 sensor is capable in identifying Alcohol, Benzene, CH_4, Hexane, LPG, CO. It has a sensitive SnO_2 material as a gas sensor, which has a lower conductivity in clean air [6].

Inside the sensor there is a resistance A and B which detects alcohol if their resistances are varied. If the concentration of alcohol is high [10], then the resistance is low and vice versa. The alcohol is then measured by using this varied resistance.

16X 2 LCD DISPLAY

This is used to display the presence of alcohol if it is detected or not. It is basically a 7 segment display which can be programmed and can be used to operate with various other microcontrollers and other devices [7]. Data registers is used to store the information that is to be exhibited on the LCD. The information is the ASCII value of the character which is displayed on the LCD.

LED LIGHTS

A few LED lights are used in our project, they are used to indicate the power indication and the presence of alcohol, if alcohol is present then a red LED will glow indicating the presence alcohol and if no alcohol is detected then a green LED will glow [8].


DC MOTOR

It is a class of motors which converts DC electrical motor to mechanical energy. In our project we have utilized the dc motor in a way so that it depicts the engine of a car [13]. In this way we can show how our project actually functions and responds in the presence of alcohol.

VOLTAGE REGULATOR

It is used for regulation of voltage. It consists of three pins. One is input and another one is output and ground. This circuit creates and maintains the fixed voltage. It is prescribed limit which is tolerated by the electrical circuit using of voltage
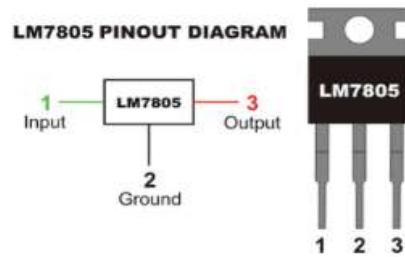
CENTRE TAPPED TRANSFORMER

It is used in the project as to supply power to the complete system. The authors have used a 240 volts step down transformer for the purpose itself.

BUZZER

It is a device which is used to give an alert signal in the form of a sound or a buzzer. Upon hearing that it will indicate us that something unusual has occurred and it needs to be looked at [14]. The buzzer is connected to the microcontroller and once it receives a signal from the microcontroller it will act accordingly to the signal it received. Also its frequency and tone can be changed and it can be used accordingly.

RESULT
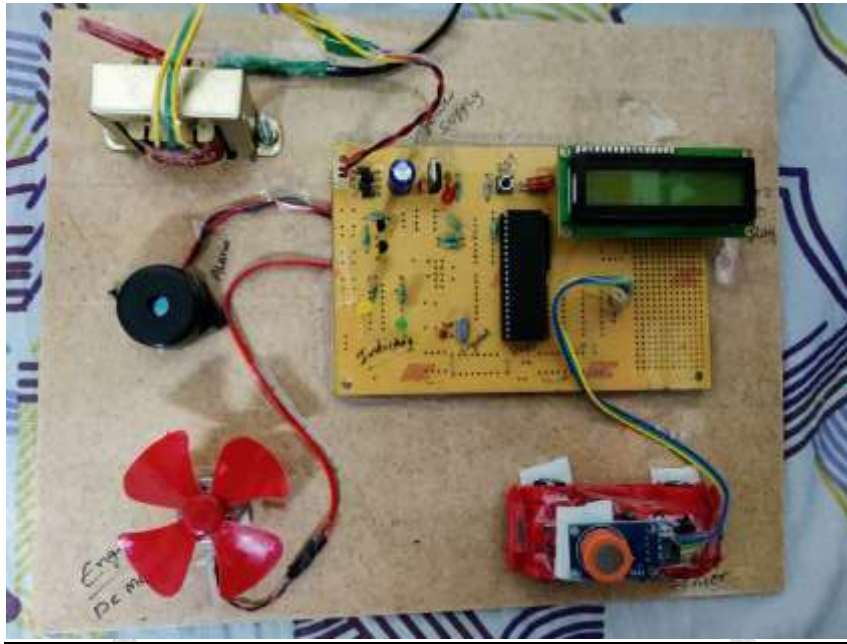
In this project we came to know that whenever a drunk person will try to take control of a vehicle the sensor after sensing the presence of alcohol will automatically lock the car's engine, preventing the driver to drive [15]. After the engine is locked it will sound the buzzer again indicating that it is not safe to drive. Also the LCD screen will display 'Alcohol Detected' so that the other people are made aware of the situation and also so that they can act accordingly. Therefore, by using this system we avoid any kind of loss in life or property.

CONCLUSION

In this project, we have tried to tackle the serious problem of drunken driving by developing and designing an efficient system. Our main motive is to ultimately urge people to create awareness amongst themselves and prevent them from drink and driving [9]. If this project can be implemented on a large scale then surely a lot of precious lives can be saved and it will also urge the public to stop people from drink and drive.

ADVANTAGES

1. Loss of live and property due to drunk driving will be minimized.
2. Can be implemented in various types of vehicle.
3. More safety, less accidents.

APPLICATIONS

1. It can be implemented in all types of vehicles.
2. It can be used by various industries to keep employees in check.

FUTURE WORK

In the future various car companies can use this circuit to prevent people from driving if they are drunk. Also, government should also make some laws for the automobile industry to mandate the implement of these circuits to reduce the cases of drunk driving [11]. In this type of system securely stopping the car so that it doesn't affect the incoming traffic can also be implemented in the near future.

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