



ALCOHOL DETECTION AND ENGINE LOCK USING IMAGEPROCESSING

Rashmi Pawar¹, Snehal Varkute¹, Shatavari Deo¹, Prof. Anagha Malkapurkar (Guide)²

^{1,2}Department of Electronics & Telecommunication, A. C. Patil, College of Engineering Kharghar, Navi Mumbai.

ABSTRACT

This project represents a solution where we try to tackle the problem of loss of life and property due to drunken driving. In our project, we have used Arduino UNO microcontroller attached to an alcohol sensor which detects the presence of alcohol by analysing breath of a person driving the vehicle. Engine of the vehicle is turned off and the emergency siren is blown as soon as alcohol is detected, thereby minimizing the chances of any mishaps that could have happened. Therefore, loss of life and property is avoided. Also, the system checks for drowsy driver using image processing based on Open-CV & D-lib libraries of Python and provides local alerts as well as sends notifications to Telegram.

1. INTRODUCTION

Drowsiness and fatigue are multidimensional features that researchers over the past decade have found difficult to define. Indeed, it is one of the leading contributing factors in traffic accidents worldwide. Solving the problem became critical when the design of earlier accident prevention systems was found ineffective for alerting the driver. Currently, transport systems are an essential part of human activities. We can be a victim of drowsiness while driving, simply after too short night sleep, altered physical condition, increases the probability of an occurrence of accidents. Driver drowsiness and fatigue are among the important causes of road accidents. Every year, they increase the number of deaths and fatalities globally. In this context, it is important to use new technologies to design and build systems that are able to monitor drivers.

AIM & OBJECTIVE

To design and develop an Alcohol Detection Based Engine Lock System which has the following features:

- Alcohol detection using Arduino and lock engine.
- Image processing for finding drowsy features using Open-CV.
- Audio alerts and send alert to Telegram.

2. LITERATURE SURVEY

The author has proposed a method to detect alcohol but uses GPS and GSM module which increases the overall cost which could be avoided. In our project, we are using a siren which will be more cost efficient. Use of siren will alert the people nearby and hence any kind of necessary action can be taken. [1]

The authors propose to use a smart helmet to avoid accidents. There are many flaws with their design. A major shortcoming is the limitation of the application to only vehicles which use helmets, i.e., 2 wheelers which is not a feasible idea while driving, especially for short distances. Another drawback being, the system when implemented makes the helmet too heavy which is not favorable for driving. Also, they have used an expensive microcontroller whereas we are using open-source hardware, which is very cheap. [2]

The authors discuss about complex health monitoring systems and infrared sensor to detect the presence of alcohol. A major drawback of this system is the possibility of a false alarm. The system is designed in a manner that even a slight change in some particular condition can result in ringing false alarms even though everything was normal. In our project, we are using only the required technology thereby making the system more reliable and cost effective when implemented. [3]

EXISTING SYSTEM

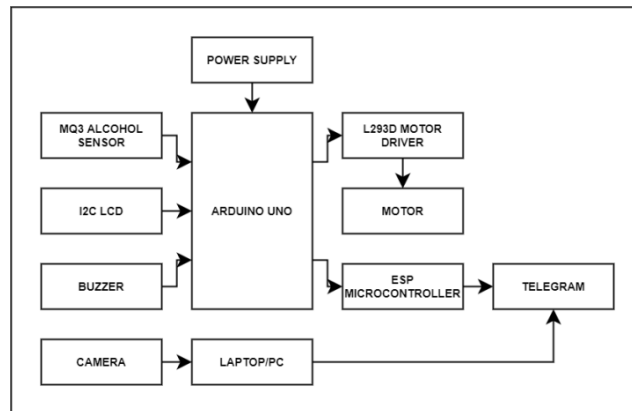
Most of the systems studied or seen in literature review are based on image processing techniques where a camera continuously monitors the driver's face to detect for drowsiness or fatigue. If the driver seems to be drowsy, the system alerts the driver through sound. Other devices use EOG, EEG or Heart rate sensor to monitor the driver's status and provide alerts accordingly.

3. METHODOLOGY

The Alcohol Detection and engine lock system helps to reduce accidents which are occurring due to drunk and driving. The MQ-3 sensor detects the presence of alcohol in the surroundings. The sensor provides output on the basis of the concentration of the alcohol, if the alcohol concentration is higher the conductivity of MQ-3 sensor increases which in turn gives the reading to ARDUINO. If the reading is greater than the threshold level, ARDUINO will stop the DC motor. The red LED will blink if the distance is less than the safe distance to give indication to other vehicle that the vehicle in front of them is unsafe. Now, with the help of SIM900A the message will be sent to civil forces that the particular vehicle is unsafe and can be a threat to other peoples.

4. PROPOSED SYSTEM

1. the engine is locked and also a buzzer is activated.
2. This project uses Arduino UNO as the main microcontroller.
3. A MQ3 Alcohol sensor is used to detect whether the person driving the car has consumed alcohol.
4. If the person has drunk then the sensor senses it and reports it to the Arduino.
5. The Arduino in response locks the L293D Motor Driver from operating.
6. Hence Arduino sends a command to the ESP microcontroller to send an alert message to the person's emergency contact over Telegram.
7. The system also comprises of drowsy driver detection using image processing.
8. Here a Laptop Camera is used for live drowsy driver detection which can be replaced by camera-based microcontroller for actual use.
9. If the driver is found drowsy an audio alert is given to the user. Also, an alert is sent to Telegram.



Block Diagram

5. HARDWARE IMPLEMENTATION

1. Arduino UNO



Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, and Raspberry-Pi boards and can control relays, LEDs, servos, and motors as an output.

2. MQ3 Alcohol Sensor



This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common Breathalyzer. It has a high sensitivity and fast response time. The sensor provides an analog resistive output based on alcohol concentration.

3. Buzzer



An audio signalling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

4. I2C LCD



The character LCD is ideal for displaying text and numbers and special characters. LCDs incorporate a small add-on circuit (backpack) mounted on the back of the LCD module. The module features a controller chip handling I2C communications and an adjustable potentiometer for changing the intensity of the LED backlight. An I2C LCD advantage is that wiring is straightforward, requiring only two data pins to control the LCD.

5. L293D Motor Driver

L293D Motor Driver Module is a medium power motor driver perfect for driving DC Motors and Stepper Motors. It uses the



popular L293 motor driver IC. It can drive 4 DC motors on and off, or drive 2 DC motors with directional and speed control. The driver greatly simplifies and increases the ease with which you may control motors, relays etc. from micro-controllers. It can drive motors up to 12V with a total DC current of up to 600mA. You can connect the two channels in parallel to double the maximum current or in series to double the maximum input voltage. This motor_driver is perfect for robotics and mechatronics projects for controlling motors from microcontrollers, switches, relays etc. Perfect for driving DC and Stepper motors for micro-mouse, line-following robots, robot arms, etc.

6. DC Motor



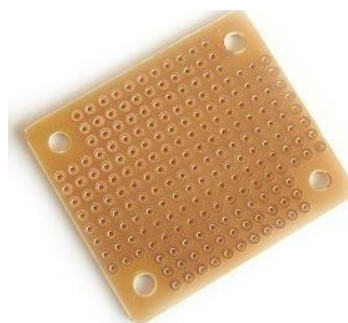
Small DC motors are used in tools, toys and various household appliances. In retail, the applications of DC motors include conveyors and turntables, while in an industrial setting, large DC motor uses also include braking and reversing applications.

7. Node MCU ESP12E Microcontroller



Node MCU is an open source [IOT](#) platform. It includes firmware which runs on the ESP8266 [Wi-Fi SoC](#) from ExpressiveSystems, and hardware which is based on the ESP-12 module. The term "Node MCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the e Lua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open-source projects, such as lua-cjson and SPIFFS.

8. Zero PCB



Perfboard or Zero Pcb is a material for prototyping electronic circuits (also called DOT PCB). It is a thin, rigid sheet with holes pre-drilled at standard intervals across a grid, usually a square grid of 0.1 inches (2.54 mm) spacing. These holes are ringed by round or square copper pads, though bare boards are also available. Inexpensive perfboard may have pads on only one side of the board, while better quality perfboard can have pads on both sides (plate-through holes). Since each pad is electrically isolated, the builder makes all connections with either wire wrap or miniature point to point wiring techniques. Discrete components are soldered to the prototype board such as resistors, capacitors, and integrated circuits. The substrate is typically made of paper laminated with phenolic resin (such as FR-2) or a fiberglass-reinforced epoxy laminate (FR-4).

9. Male Header



Pin headers are stiff metallic connectors that are soldered to a circuit board and stick up to receive a connection from a female socket. While pin headers (often called PH, or headers) are male by definition, female equivalents are also quite common, and we refer to them as female headers (FH) or header connectors.

10. Female Header



The *female connector* is generally a receptacle that receives and holds the male *connector*.

11. Jumper Wires



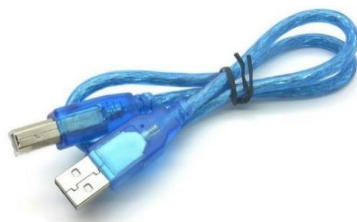
Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering. Jumper wires are typically used with breadboards and other prototyping tools in order to make it easy to change a circuit as needed.

12. Connecting Wires



Since stranded wire is more flexible than solid core wire of equal size, it can be used when the wire needs to move around frequently.

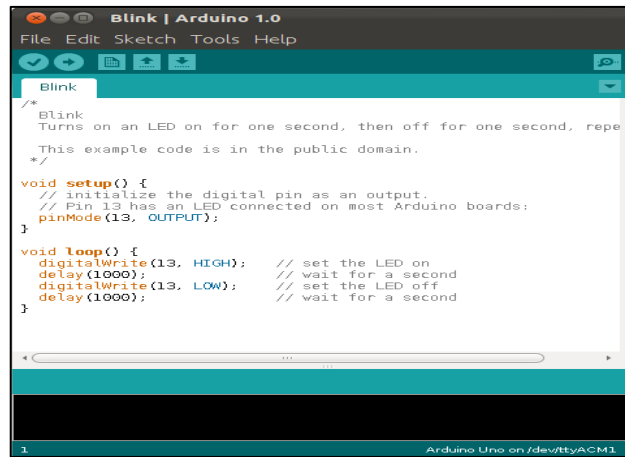
13. USB



USB stands for Universal Serial Bus. It is used as a data cable for programming as well as for supplying power.

6. SOFTWARE IMPLEMENTATION

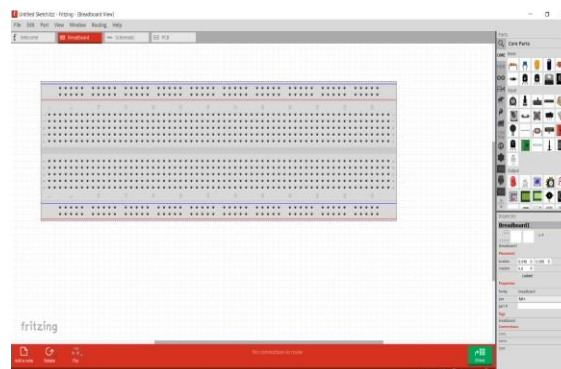
A. Arduino IDE



Arduino integrated development environment (IDE) is a cross-platform application (for Windows, mac-OS, Linux) that is written in the programming language Java. It is used to write and upload programs to Arduino board. The source code for the IDE is released under the GNU General Public License, version. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution. The Arduino IDE employs the program to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

B. Fritzing

Fritzing is an open-source hardware initiative that makes electronics accessible as a creative material for anyone. We offer a software tool, a community website and services in the spirit of Processing and Arduino, fostering a creative ecosystem that allows users to document their prototypes, share them with others, teach electronics in a classroom, and layout and manufacture professional PCBs.



C. Telegram

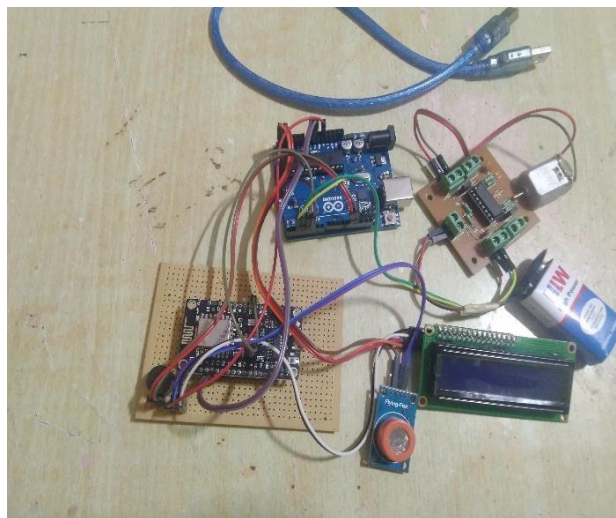


Telegram is a messaging app with a focus on speed and security, it's super-fast, simple and free. You can use Telegram on all your devices at the same time — your messages sync seamlessly across any number of your phones, tablets or computers. Telegram has over 500 million monthly active users and is one of the 10 most downloaded apps in the world.

With Telegram, you can send messages, photos, videos and files of any type (doc, zip, mp3, etc), as well as create groups for up to 200,000 people or channels for broadcasting to unlimited audiences. You can write to your phone contacts and find people by their usernames. As a result, Telegram is like SMS and email combined — and can take care of all your personal or business messaging needs. In addition to this, we support end-to-end encrypted voice and video calls, as well as voice chats in groups for thousands of participants.

7. RESULTS

If an alcoholic person tries to command a vehicle, the alcoholic sensor determines the existing amount of alcohol and shuts down the vehicle engine and sounds an alarm by which the nearby people will exchange the seat. People are aware of the situation by using this system. All equipment is totally tested and connected as required, thereby giving us the much-needed result as shown in the image below.



8. FUTURE SCOPE

With road safety being the most important aspect, researchers are seen envisaging how best one can provide a system that takes complete care and keeps track of drivers' work. The project has a great potential due to its uniqueness as compared to the existing conventional systems. Advantages of the model are listed below, which makes it a great device in the market.

- Maintenance cost is very less.
- Risk of accidents reduces significantly.
- It is environmentally friendly, no harmful emissions.
- Power consumption is much lower.

9. CONCLUSION

As the system requirement and the required components can be easily made available this project can be implemented easily. It will provide the safety to drivers and change the way of their driving as well as system. It has been presented the original design of the system with an extremely reduced cost. It is reliable system with quick and easy installation. The system might be easily extended. It will improve system scalability and reduce accident due to fatigue and drowsiness.

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