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Safety Alert System for Cab Passengers

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ABSTRACT: There is one death every four minutes due to a road accident in India. According to a government survey, drowsiness and drunk driving constitute to 22 and 33 percent of accidents respectively in India. In recent years, driver drowsiness has been one of the major causes of road accidents and can lead to severe physical injuries, deaths and significant economic losses. The number of lives lost can be diminished if the assistance can be procured at the earliest. Many studies have been done and best possible solutions have been discovered. But the solutions used are expensive enough for middle and poor class people and still have scope for improvement. Therefore a cost effective system has been proposed. The main aim is, if not eradicate, to at least minimize these accidents which occur not just because of somebody's hard luck but because of their negligence due to alcohol, drowsiness.

KEYWORDS: MQ-3 alcohol sensor, Accelerometer.

I. INTRODUCTION

This new year more than 2000 people were booked for drunk and drive. Road accidents have been a major cause for concern across the Indian subcontinent. In 2019 alone, the country reported over 151 thousand people got injured due to road accidents. Each year, about three to five percent of the country's GDP was invested in road accidents. Notably, while India has about one percent of the world's vehicle population, it also accounted for about six percent of the global road traffic incidents. Almost 70 percent of the accidents involved young Indians. Road accidents occur nation wide due to alcohol. This system is implemented to reduce road accidents by detecting drowsiness and alcohol. Over 1.3 million people die each year on the road and 20 to 50 million people suffer non-fatal injuries due to road accidents. Driver drowsiness detection is a car safety technology which helps prevent accidents caused by the driver getting drowsy. Various studies have suggested that around 20% of all road accidents are drowsiness-related, up to 50% on certain roads. A driver who falls asleep at the wheel loses control of the vehicle, an action which often results in a crash with either another vehicle or stationary objects. In order to prevent these devastating accidents, the state of drowsiness of the driver should be monitored. An app is created which is used to trace the location and sends the accident location to the passenger's relatives and also shows the location of the nearest hospital using the Google Map API. This embedded system consisting of some combination of hardware and software is used to do this particular task.

II. METHODOLOGY

In this embedded system basically, it is based on safety of the passengers who travel by cab. It focuses only on breath based alcohol detection and if the alcohol intake of the passenger is more, it sends the alert message to the driver's company and passenger's relatives. It also detects the drowsiness of the driver and gives an alert alarm so as to prevent the accident. Basically the idea is categorised into three modules.

Alcohol Detection: First module is alcohol detection. MQ-3 sensor is used which has a very fast response and place it near the driver's seat, on the roof top and near the steering wheel to analyze the exhaled air and detect automatically if the driver is drunk. The signal from the sensor goes to the operational amplifier and then to the microcontroller. If the person is found drunk, the alert message will be sent to the driver's company and nearby police officer will be informed about the driver's state and the location will be sent using App.

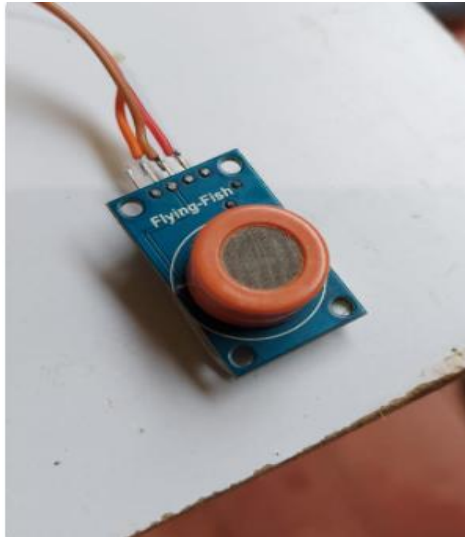


Figure 1: MQ-3 Sensor [Figure 1 detects the alcohol presence]

Drowsiness Detection: The second module focuses on the drowsiness check. An accelerometer is attached to cab driver's cap to detect whether the cab driver is drowsy or not and if the person is drowsy it gives an alarm.

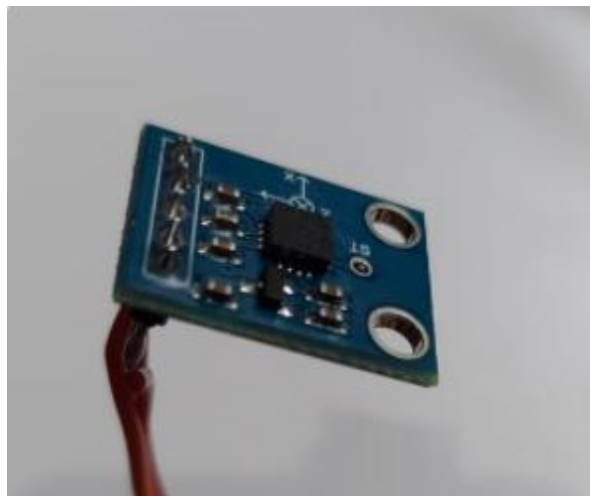


Figure 2: Accelerometer [Figure 2 focuses on the drowsiness check]

An App: The third module being the android app, will display the graph of the corresponding alcohol detection and drowsiness state of the cab driver and will also send the alert message to the driver's company and nearby police station and hospitals to minimize the response time and cab driver's company will be monitoring the driver's state. If accident occurs, the android app in the driver's phone sends alert messages to the close contact of the cab passenger, saved in the app design, along with the location of the accident site. Nearest hospital using the shortest route algorithm is displayed in the Google Map, hence minimizing the emergency medical services response time and reducing deaths significantly due to accidents and location of the accident site is sent to nearby police station, hospitals and company's driver.

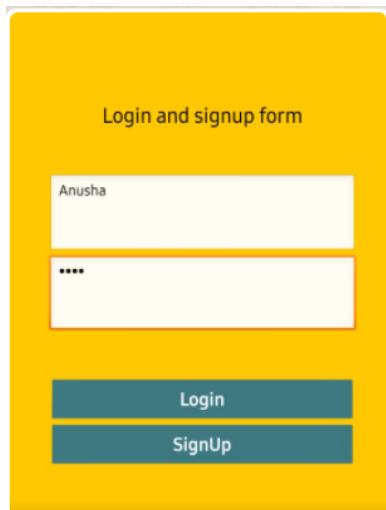


Fig 3(a)

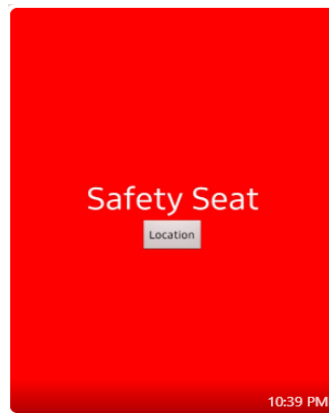


Fig 3(b)

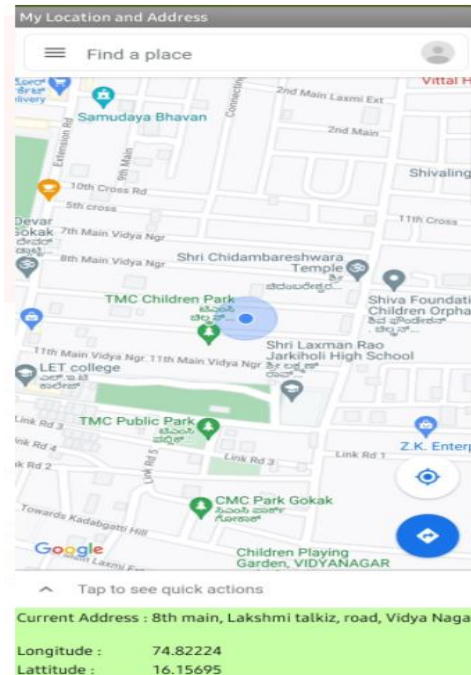


Fig 3(c)

Figure 3: An app [Figure 3 being the android app, will send the location to cab driver’s company and sends the alert message] Fig 3(a) Login/Signup Interface, Fig 3(b) App Interface Button, Fig 3(c) Location of cab

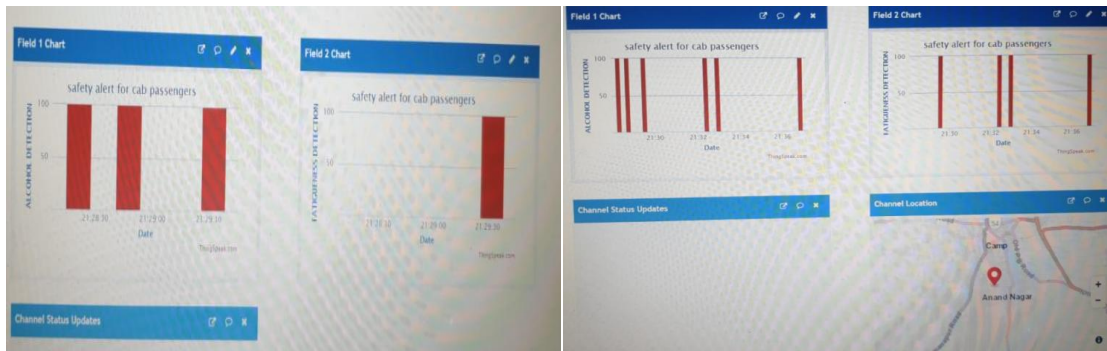


Figure 4: Graph [Figure 4 shows the corresponding graphs for alcohol detection and drowsiness detection and sends the location to cab driver’s company cloud]

III. PROPOSED SYSTEM

In before cab system there were no such app for controlling accident and detection of the alcohol presence and drowsiness of the driver and whether the driver is focusing on road or not. Due to this Number of accidents were increased. Passengers felt unsafe to use cab. To overcome the limitations of the existing system, the proposed system has used the shortest route algorithm to find the nearest hospitals thus lowering the response time significantly. MQ-3 sensors instead of MQ-2 sensors are used to give a better response for alcohol detection. The system is also cost effective due to the use of simple and cheap components for the purpose. Easier implementation and lower cost with higher efficiency; such factors make the proposed design of the system a more viable and a more feasible product in today’s world. The main objective of the proposed system is to help reduce the road accidents up to a large extent and to shorten the response

time between the accident and arrival of emergency medical services. Advantages of Proposed System- Minimize these accidents which occur not just because of somebody's hard luck but because of their negligence. Passengers will feel safe to travel in cab.

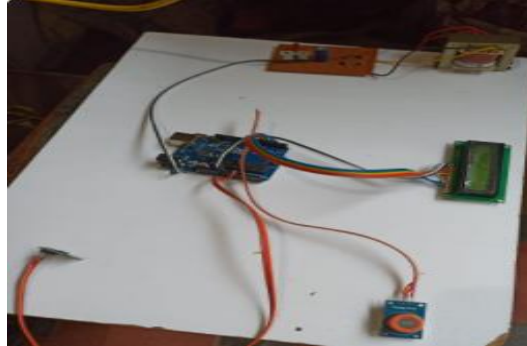


Figure 5: Hardware Setup [Figure 5 shows the circuit of the project]

IV. CONCLUSION

The android app can be improved by making different accounts for different users and store all the data. From this database, data of each user can be easily accessed. Hence, the app can be useful to a large section of people due to being economically viable and can greatly contribute to saving lives and quicker emergency medical response. In this error detection using sensors can be made accurately by using different sensors for further improvement of the system. The MQ-3 Sensor and Accelerometer gives accurate results for the corresponding alcohol detection and fatigue level detection and also the android app helps us to trace the location and reach the nearest hospital. Hence, decreasing the number of road accidents and deaths.

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