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Authenticated Access Control For Vehicle Ignition System By Driver's License And Fingerprint Technology

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Abstract: *Fingerprint identification is one of the most popular and reliable personal biometric identification methods. By using this biometric authentication, we can prevent non-licensees from driving and therefore causing accidents. The proposed system consists of a smart card capable of storing the fingerprint of particular person. While issuing the license, the specific person's fingerprint is to be stored in the card. Vehicles such as bike should have a card reader capable of reading the particular license. The same automobile should have the facility of fingerprint reader device .A person, who wishes to drive the vehicle, should insert the smartcard in the vehicle and then swipe his/her finger. If the fingerprint matches with the fingerprint stored in the smart card then it goes for alcohol detection and helmet checking. After passing all authentications, the vehicle will be ignited. The vehicle will not be ignited, if any one of the authentications fails and will not proceed the next step. This increases the security of vehicles and also ensures safe driving by preventing accidents. The prototype of the ignition system is used by the Master controller is implemented along with the vehicle prototype is developed and the results are attached.*

Keywords: *Smart card reader, Fingerprint module, Alcohol sensor, Helmet detector*

I. INTRODUCTION

Driving without driving license is a major issue in many countries. Survey says that the accidents happened mostly by the unlicensed drivers, drunken drivers and less usage of helmet. Owing to unsafe conditions on roads, the rate of accidents in India has been high. According to WHO statistics for 2002, out of about 11.8 lakh road accident deaths across the world, 84,674 deaths were reported from India alone. In 2004 the number of deaths had increased to 92,618. The mortality rate in India is 8.7 per hundred thousand populations as compared to 5.6 in UK, 5.4 in Sweden, 5.0 in The Netherlands and 6.7 in Japan. In terms of mortality per 10,000 vehicles, the rate in India is as high as 14 as compared to less than two in developed countries. The estimated number of deaths in India for the years 2005, 2006 and 2014 are 1,10,300, 1,05,725 and 1,54,600. In existing method, keys were used to start the vehicle. By this method, vehicles can be stolen easily and unable to prevent accidents. The proposed system consists of smart card (driving license) capable for storing the fingerprint of a particular person. While issuing the license, the specific person's fingerprint is to be stored in the card. First, the person should insert the smart card (driving license) and provide the finger print. If the fingerprint matches with the fingerprint stored in the smart card then it goes for alcohol detection and helmet checking. A person is checked by alcohol detector whether that person is drunk or not. Helmet detector verifies and prompts the person to wear the helmet. After passing all authentications, the vehicle will be ignited. The vehicle will not be ignited, if any one of the authentications fails and will not proceed the next step. The smart card reader do not accept the driving license if the driving license is having any one of the following issues.

- If the driving license validity is expired.
- If the driving license card is learner license.
- If the driving license card is blocked.

If the person is drunk or seat belt is not worn by the user then the ignition will turn off and gives a buzzer alert.

II. LITERATURE SURVEY

Authenticated Access Control for Vehicle Ignition System by Smart Card and Fingerprint Technology [1]. The paper consists of a smart card capable of storing the fingerprint of particular person. While issuing the license, the specific person's fingerprint is to be stored in the card. Vehicles such as cars should have a card reader capable of reading the particular license. The same automobile should have the facility of fingerprint reader device .A person, who wishes to drive the vehicle, should insert the smartcard in the vehicle and then swipe his/her finger. If the fingerprint matches with the fingerprint stored in the smart card then it goes for alcohol detection and seatbelt checking. After passing all authentications, the vehicle will be ignited. The vehicle will not be ignited, if any one of the authentications fails and will not proceed the next step. This increases the security of vehicles and also ensures safe driving by preventing accidents.

Biometric Based Authentication for Vehicle Ignition System [2]. The paper also discusses the different biometric modalities that can be used for authentication, the algorithms used for recognition, and the security aspects of the system. The results show that biometric authentication for vehicle ignition has the potential to increase the security of the vehicle and prevent theft. However, there are still some technical and social challenges that need to be addressed before this technology can be widely adopted.

License and Fingerprint Detection for Security Purpose in Automobiles [3]. This paper also provides a user based authentication which is a fingerprint of a person. A person, who wishes to drive the vehicle, first step is to verify with their RFID tag (License) whether the person who wish to Drive the vehicle is allowed to drive or not; by checking the fingerprint, once verification done then ignition unit of vehicle will starts automatically. If the person fingerprint is not valid in the Fingerprint Module then the vehicle will not get started.

Smart Vehicle Ignition and Monitoring System powered by the Internet of Things [4]. This paper also provides a technological breakthroughs, automakers everywhere are introducing a number of clever improvements to expand their range of products. These can range from putting basic solutions like navigation systems into place to more sophisticated ones like driver assistance systems, which can then monitor several aspects of the car in order to help the driver. The paper also includes an emergency alarm system in case of an accident. This paper's primary flaw is that it may have security holes that leave vehicle control vulnerable to online attacks.

The replacement of keys with biometric lock systems, particularly fingerprint-based ones, is the main topic of Omidiora E.O. et al.'s paper [5]. This is because fingerprints are the most established and commonly used form of biometric identification and also offer a strong security mechanism for a variety of security domains. Their prototype is made up of an ignition system module for starting the car, a hardware unit for interacting, and a fingerprint software module for storing the database of authorized users.

The PC parallel port is used to operate external devices (hardware). An easy- to-use and reasonably priced tool for creating computer-controlled projects and gadgets is the parallel port. It is frequently utilized in Atmel/PIC programmers and computer-controlled robots. Visual Basic, Visual C, and Visual C++ can all be used to program. The written device driver is then made to connect with the user mode program.

This prototype was programmed using Visual Basic 6.0 Enterprise Edition. Twenty test photos that were kept in the database were used to test the prototype. The controller was able to distinguish between the real user and the fake user, and the results were successful. Based on the minutiae extraction, the recognition software was able to differentiate between test images of high, medium, and low quality. When there is a mismatch, logic 0 is transferred, and logic 1 is transferred in the matched case. This paper's primary flaw is its vulnerability to spoofing or fake acceptance, which jeopardizes security integrity.

Security for Vehicle Ignition System by Finger Print Technology [6]. In this paper a security for vehicle ignition system by fingerprint technology is implemented. Using this paper the access to a car can be controlled using finger prints. For this an embedded finger print module is used in which the finger prints of the owner and his other authorized users will be fed into the embedded module. This finger print module is further connected to a microcontroller that controls the connection to the ignition of the car. Hence the car can only be started using a proper finger print match. Else the vehicle will not be started and sends an SMS to owner. The project will also include GSM module connected to the controller. In case of some unauthorized person trying to access the car using a unauthorized finger print then the controller, using the GSM module can automatically send SMS to the actual owner of the vehicle. Furthermore, since the controller already has a GSM modem it can also be used for additional applications like alcohol detection, over speed driving. In all these cases, automatic SMS updates can be sent to the owner of the vehicle if someone else is driving the vehicle. If required the vehicle can also be stopped if any of these conditions are detected.

Authenticated Access Control for Vehicle through Driver's License and Biometric Verification [7]. This paper on the evolution of an intelligent automobile, equipped with an array of sensors that assist the driver in analyzing various driving conditions such as topography, weather, and engine temperature. Distance detection sensors and accelerometers enhance the vehicle's capabilities for obstacle detection and cruise control. Furthermore to standard features like controls for starting the car, managing power windows, and utilizing a heads-up display for multimedia, the influence of Artificial Intelligence (AI) and Machine Learning (ML) on vehicles has transformed them from luxury items to essential components of modern transportation.

This paper [8] makes use of multiple existing models that are being applied separately. Each of these models is applied as an individual unit. The owner can examine the frequently updated database containing the data gathered from these models. As a result, this system offers additional driver-related information. During the payment periods, the driver's background might be confirmed. Additionally, this project's addition of data security, which uses the SHA-1 and SALT algorithms to protect the system from hackers, is more beneficial. Additional features can be added the suggested system, which would then help with government transportation An embedded vehicular speed detection system that is both affordable and effective is provided in this study [9]. The paper compared current approaches, including FFT, DSP, and LASAR-based methodologies, in an effort to produce superior results. When there were no other moving items in the nearby area, the output was more accurate. When the car is not moving, the radar will actually not be able to determine its true velocity.

An overview of various methods for vehicle speed detection is provided in this publication [10]. Various methods include centroid method, absolute method, motion vector technique, edge extraction, object tracking, and background picture subtraction. In MATLAB, the processing is carried out. Any of these techniques can be used to maintain vehicle speed detection and control traffic.

Using lidar data from roadside locations, this work proposes an integrated vehicle tracking framework [11]. In the first case, vehicle clusters were identified using a three-step schema from the raw point clouds. Following that, a tracking process based on centroid identification was used to determine clusters for every vehicle.

Vehicle Ignition using Fingerprint Sensor [12]. This paper focuses on the ignition of vehicle using fingerprint sensor and liquid crystal display, we are generating the same results along with same proficiency and accuracy in it by reducing its cost factor, so that it is easily affordable by customers and we can widely spread and implement the security in different domains. This approach would be fruitful to users who want to possess valid and authenticated entry.

The author of this research [13] examined a variety of technologies, including laser light systems, average speed computers, vision-based systems, and radar-based technologies, that are used to identify speed violations. Each of them has issues such as poor accuracy, inability to function in poor weather or low light, high cost, limited range, line of sight, difficulty focusing on a specific vehicle, etc. Therefore, in order to compute the average speed for various vehicle kinds, we need a system that can be run automatically with acceptable precision, function even in poor weather and lighting conditions, and uniquely identify the vehicle with its type.

The subject matter of this study [14] is video surveillance systems. Numerous fields can benefit from the implementation of these technologies, including robotics, object recognition, accident and fire detection, and premises security. In these systems, the media that is handled is video. Motion detection is one of the most crucial phases in video surveillance systems. In this step, moving objects in video clips that the security camera recorded are identified. In the subject of video analysis, the motion detection stage is one of the most researched problems with numerous research papers focusing on it.

Development of Vehicle Ignition using Fingerprint [15]. This paper is about building a prototype of vehicle ignition using fingerprint sensor. This system can prevent the vehicles from being stolen. It is developed to control the ignition of the vehicle through the fingerprint scanner. This system consists of GSM SIM 900 that connects to the Arduino which is the microcontroller of the project. To make sure the system is secure, only authorized fingerprint is paired with the Arduino to start the ignition. Vehicles ignite when the enrolled fingerprint is matched against the fingerprints in the database while users with no match in the database are prevent from igniting the vehicle. A theft alarm from buzzer, a notification to the owner's mobile phone via GSM SIM 900 and status display in the LCD are the appropriate signal to the owner. This article describes briefly in detail about the design and implementation of the ignition system.

III. OBJECTIVES

- To enhance vehicle security through dual authentication.
- To streamline access while prioritizing driver identity verification.

IV. PROPOSED METHOD

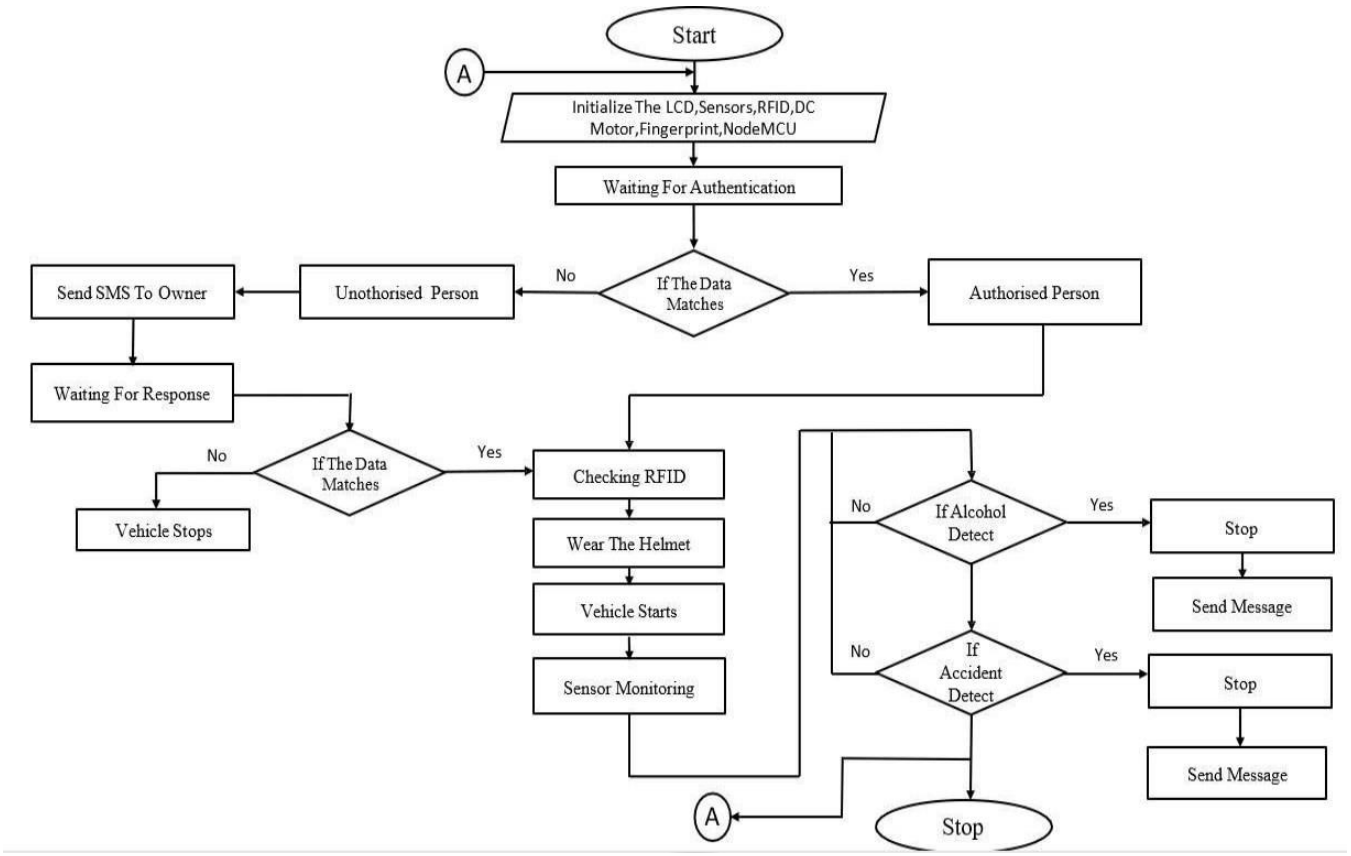
The smart card used in the proposed system is a driver's license that has the ability to store a fingerprint. The license holder's fingerprint must be recorded on the card at the time of issuance. First, the individual needs to produce their fingerprint and insert their smart card (driver's license). The system moves on to alcohol

detection and helmet verifying if the fingerprint matches the fingerprint that is saved on the smart card. An alcohol detector checks a person to see if they are intoxicated or not. The helmet detector asks and confirms that the wearer is wearing a helmet.

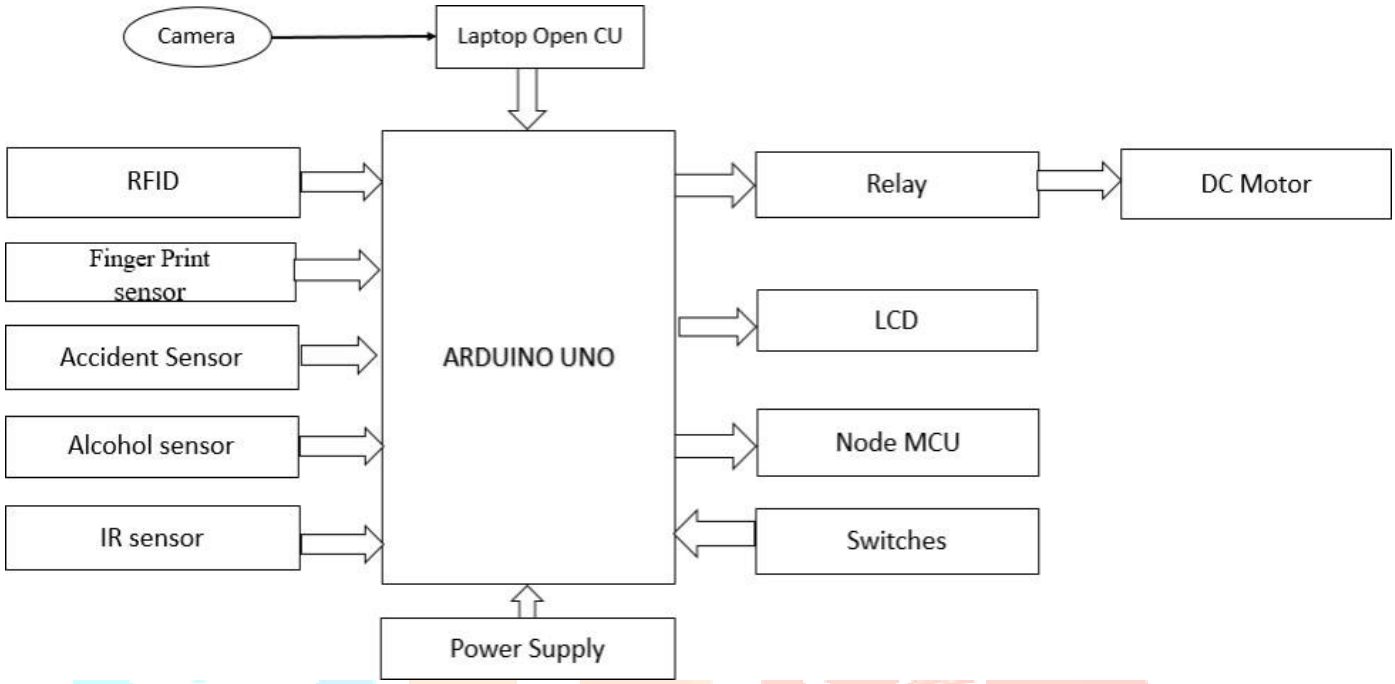
The Vehicle will start once all authentications have been completed. If any of the authentications are unsuccessful, the Vehicle won't start and won't move on to the next phase. If a driver's license has even one of the following problems, the smart card reader will not accept it.

- If the driving license validity is expired.
- If the driving license card is a learner license.
- If the driving license card is blocked.

The flow chart of the proposed system is shown in figure below.



The block diagram of the proposed system is shown in figure below.



V. RESULT

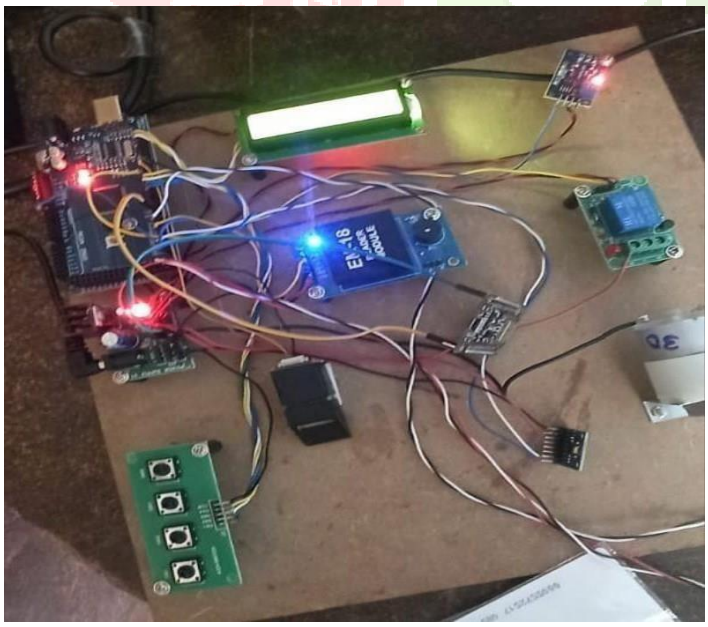


Fig 5.1. Working Model

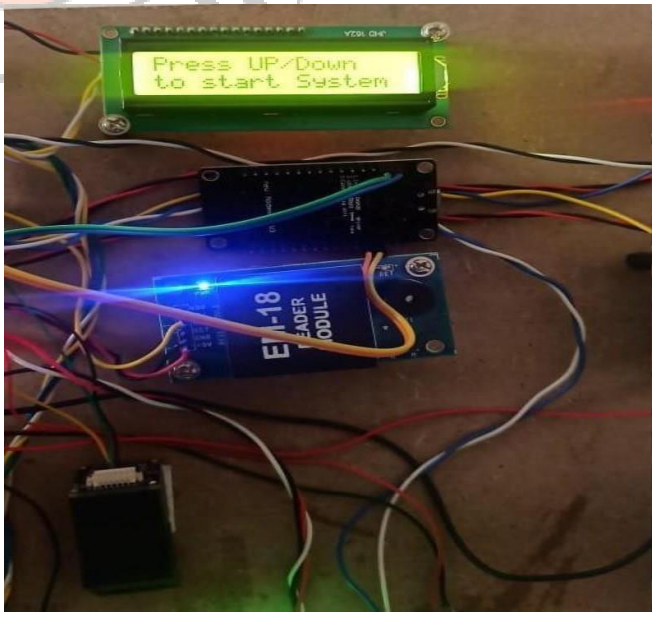


Fig 5.2. Waiting for face authentication

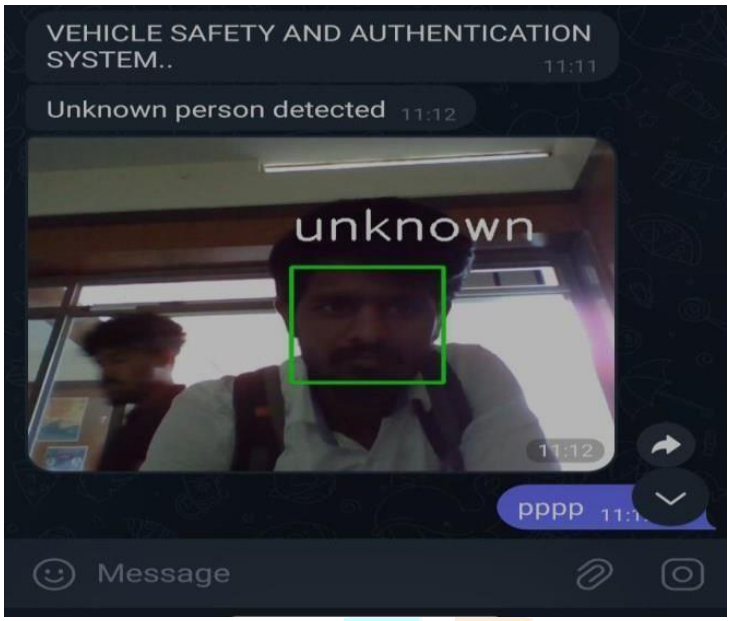


Fig 5.3. Unknown person detected message send to owner

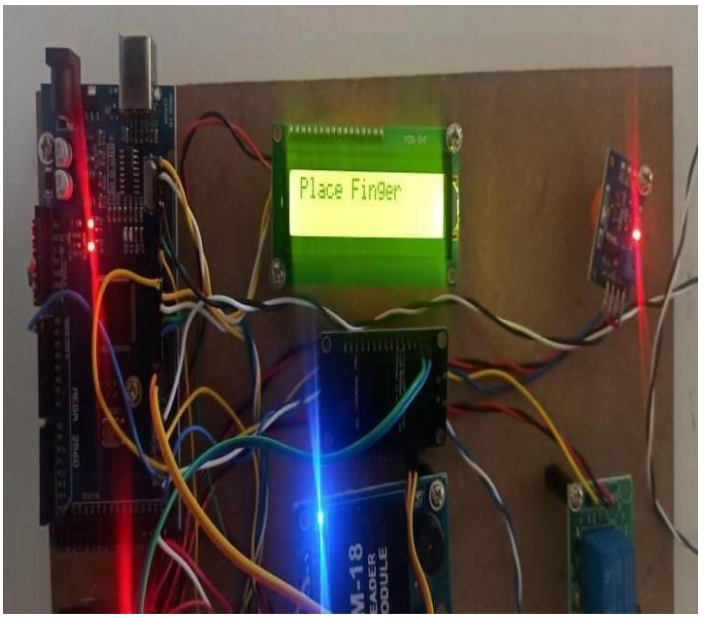


Fig 5.4.Waiting for finger authentication

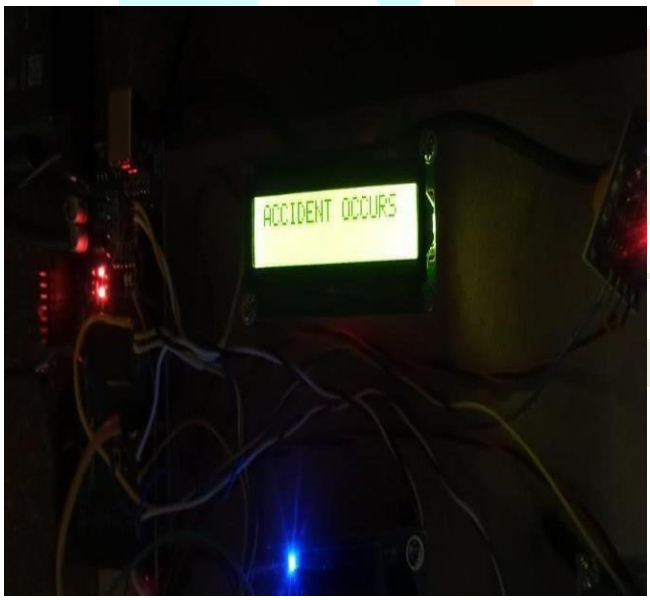


Fig 5.5. Accident Occurs Indication

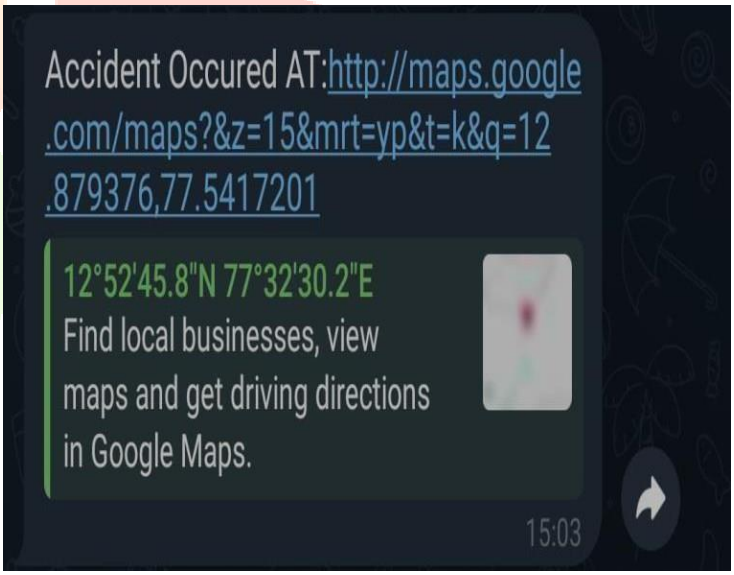


Fig 5.6. Accident occurred message sent to Owner with location

VI. CONCLUSION

A vehicle ignition system by driver's license and fingerprint technology was developed using IoT. By using this system, no one can drive the vehicle without driving license and also no one can use the others driving license. In this method, the system will also alert the user about the validity period of the driving license. The proposed system also ensures that the helmet is worn by the driver and also detect if any person was drunk, by alcohol detector. This increases the security of vehicles and also ensures safe driving by preventing accidents. The module is interfaced with GPS and GSM module to find out vehicle location through mobile.

VII. REFERENCES

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