Driver's Document Checker and Safety Precaution System (DRIVE GUARD)

Justin P George
Dept. Of CSE
Mar Baselios Christian College of
Engineering and Technology
cs- 41@mbcpeermade.com

Shirdi Vinayak
Dept. Of CSE
Mar Baselios Christian College of
Engineering and Technology
cs- 64@mbcpeermade.com

Adithyan S
Dept. Of CSE
Mar Baselios Christian College of
Engineering and Technology
cs- 04@mbcpeermade.com

Aryalakshmi R
Asst. Prof. Dept. Of CSE
Mar Baselios Christian College of
Engineering and Technology
aryalakshmir@mbcpeermade.com

Abstract

In the present scenario, the police officers to verify a driver's document, they will typically ask the driver to provide their driver's license and other documents and verify them physically. The police officer will then verify the documents visually to ensure they are valid. The police officers may also use electronic devices to check the validity of the driver's license, vehicle registration, and insurance information. In the case of safety precautions present in the vehicle, seatbelt alerts, airbags, and anti-lock braking systems are currently present in the vehicles. The proposed solution verifies the necessary documents needed for operating a vehicle on the road. This helps to ensure that the drivers are qualified to operate the vehicle they are driving and to ensure they will not cause any damage to others on the road. The driver's document checker will reduce the accidents that might cause due to the defect of the vehicle. In addition to the document checker, the safety precautions that must be followed by a driver will also be checked. The safety precautions which are checked will be alcohol detection, wearing of seatbelts by the driver and passengers, constant over speeding, and usage of mobile phones while driving by the driver.

INTRODUCTION

Transportation is one of the essential components of modern society and nowadays everyone chooses their vehicle rather than using the public transport system. Thus, it has become essential to ensure that drivers have the essential requirements to operate their vehicles on the road so that they will not cause any damage to others. According to a road survey by Indian traffic police, every year in India nearly 3 lakh major road accidents happen, which caused the death of 1,37,000 people. The main causes of these accidents are over-speeding, drunken driving, and loss of concentration of driver mainly found in truck drivers driving during the night due to sleep deprivation. From the total, 14,071 road accidents are due to drink and driving which causes the death of 13 people every day.[1]

The proposed solution will allow police officers to check if all the documents required are present and up to date. It verifies the documents such as vehicle registration, insurance, and registration certificate book, medical certificate. In addition to verifying the documents needed, the driver's document checker also helps to check whether the drivers have a clean history with no major accidents and to check the traffic violations history. The police officer will be able to view if any of the document validity had been expired easily.

On the other hand, safety precautions are the measures taken to avoid road accidents and ensure the safety of other civilians on the road. These precautions, if taken seriously, will help reduce road accidents and the risk of injury. The important precaution that should be taken while operating vehicles on the road are wearing seatbelts, avoiding driving after consumption of alcohol, avoiding the use of mobile phones while driving, and avoiding rash driving. The proposed solution will help reduce these safety violations, as it will continuously monitor if any of the traffic rules are violated. If found violated it will be recorded and will be able to view by the police officer, and further procedures will be decided by the officer.

LITERATURE SURVEY

1. Portable Alcohol Detection System for Driver Monitoring - IEEE XPLORE (Doi: 978-1-7281-1634-1/19/$31.00 2019 IEEE) Hironori Wakana, Masuyoshi Yamada -A portable alcohol detection system based on exhaled breath analysis has been developed. The system consists of a breath sensor unit, a smartphone to control the sensor unit and communicate various data, and a data cloud system. The detection system can be used to monitor a driver's status from a remote location. The breath sensor unit consists of four separate sensors. The first is a water vapor sensor that is used to verify if the applied gas is human breath. The others are semiconductor gas sensors to detect ethanol, acetaldehyde, and hydrogen, respectively. The sensors are part of a detector that is connected to a smartphone, and the driver's alcohol check results and interview data for health are automatically sent to a data cloud system. The ethanol concentration is obtained from the voltages of the three semiconductor gas sensors. From our field tests, in which we obtained data from more than 30 sensor units, we investigated the performance of exhaled breath recognition. When the field test users of our detector did not consume alcohol, their ethanol, acetaldehyde, and hydrogen concentration levels, because of natural human metabolism, were 1.8, 1.9, and 0.1 ppm on average, respectively.

2. 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, to alcohol detection and simplified the existing system thus making it less complex, adding a real-time message-based confirmation system

3. Nitesh Mandal, Abhishek Sainkar, Omkar Rane, Mahesh Vibhute Vehicle Tracking with Alcohol Detection and Seat Belt Control System. In this paper, they have focused on linking the ignition control of the vehicle with the alcohol-checking mechanism and seat belt. In this paper, we referred, to alcohol detection and seat belt status.

4. Vehicle Document Verification Using Vehicle Number (VCOP-App) International Journal of Engineering Research & Technology (LJERT) Abstract: Police forces around the world use vehicle number plates for

207

legal vehicle authorization purposes, to check if a vehicle is registered or licensed. An application that will facilitate the user to not worry about carrying the documents of their vehicle. We can digitalize all documents which are taken care of with so much effort and hard work. The aim is to design an app that takes the vehicle number manually, then the details retrieved from the number plate in text format are used to extract all the important information of the vehicle like, the name of the owner, address of the owner, date of registration of the vehicle, etc. from the database. The police can verify whether the documents are fake or not. This application will make sure you have all the documents like PUC, RC Book, and Insurance papers that can be easily handled. This app can help you not to carry all the documents with you every time you drive a vehicle, which is used by the police only. If he breaks any rules of driving the fine can be added. Applied fine details and insurance dues will be sent as a message to the owner. If any other person except the owner drives the vehicle, then a message alert will be sent to the owner of the vehicle. For us, it is useful as we do not have to carry our documents to every place with the fear of losing them. The user app can be used by the owner of the vehicle which extracts information about his vehicle and the user can pay the fine through it.

5. Published in: 2022 IEEE International Conference on Data Science and Information System (ICDSIS) Abstract: The verification of vehicle documents is a significant role of the transportation department that is becoming more important as the number of vehicles registered grows. This process can be made more efficient by using an automated vehicle document verification system. IoT-based vehicle document verification system based on RFID technology is in proposed this paper. As a result, the manual vehicle inspection that is currently performed can be replaced by automation. When normal vehicle checks are performed manually, a significant amount of time is lost. The proposed system will automate this process. The current verification method employs inductive loops installed in a roadbed to detect vehicles as they pass through the magnetic field loop. Similarly, sensing devices installed along the road can detect passing vehicles using the Bluetooth mechanism. Fixed audio detection devices that can identify the type of vehicle on the road. Other measurements include fixed cameras installed at strategic points along roads to categorize vehicles. However, none of these mechanisms can verify the vehicles' documents and certificates. In this work, the algorithm is proposed that uses RFID technology to automate the document verification process of vehicles with the help of an RFID reader and alcohol sensor to detect alcohol consumption by drivers to avoid road accidents

PROPOSED WORK

The primary responsibility of the driver's document checker and safety precaution is to ensure that the drivers possess all necessary legal documents to operate the vehicle on the road and to ensure that all the traffic rules have been followed by the drivers. The proposed solution checks:

1. Check vehicle registration: The proposed solution checks if the vehicle registration is valid and the document is up to date.

2. Check insurance: The proposed solution verifies if the drivers have valid insurance policies which will cover the vehicle they are operating on the road. It also verifies if the document is up to date.

3. Pollution emission certificate: The proposed solution verifies if the vehicle has a pollution emission test at an authorized testing centre and it is up to date. The certificate should include the vehicle identification number, the date of the test, and the results of the emission test.

4. Background record: The proposed solution maintains a background record on drivers to ensure that they have a clean driving record and to ensure that they have not violated any traffic rules.

5. Alcohol detection: The Proposed solution uses monitors the driver the whole time while driving to ensure that the driver is not under the influence of alcohol.

6. Seatbelt detection: The proposed solution gives a warning to the driver and co-passenger if the seatbelt is not worn while driving. And if the seatbelt is not worn for a long duration it will be recorded in the proposed solution.

7. Rash driving: The proposed solution monitors the speed of the vehicle during the whole journey. If found the vehicle is being driven at high speed it will give a warning to the driver and will be recorded.

8. Mobile phone usage: The proposed solution will monitor if the driver uses a mobile phone during driving.

PROBLEM STATEMENT

Driving is an unavoidable event in modern life, and it is a necessary means of transportation. However, with the increasing number of drivers on the road, it has become imperative to ensure that only authorized and qualified drivers operate these vehicles. Many drivers are not aware of the safety precautions that should be taken while operating the vehicle on the road, which may cause damage to the property and other civilians on the road and to themselves. The drivers do not seem to be bothered about following the traffic rules and keeping their documents up to date unless there is a police check. This will also lead to legal penalties. Many drivers struggle to keep the document needed to operate the vehicle on the road up to date. They may also forget to keep the documents with them. This can cause too many legal penalties. Failure to keep these documents current and in order will lead to fines, license suspension, and even lead large legal troubles.

- PROPOSED METHODOLOGY

To resolve the problem statement found, a driver's document checker and safety precaution checker system can be used. The proposed solution uses a document scanner, image processing software, mq3 sensor, microswitch, motion sensor, GPS based speed sensor to verify the driver's document checker and safety precaution checker accurately. The system monitors the activity of the driver while driving to ensure that the driver is not violating any traffic rules and the documents are up to date and the vehicle is operatable on the road.

The system automatically scans the driver's document and verifies it to ensure that the documents are genuine and up to date. If any of the documents are invalid, the system flags the driver as ineligible to operate a vehicle. If any of the documents have been found expired, the driver will be notified. On the other hand, the system makes it easy for the police officer. The police officer would be able to view if the document provided by the driver is genuine or not and if any of the documents had expired. The police officer can check the documents anytime and anywhere. Thus, it becomes mandatory for drivers to update the expiration period of the documents so that there will be no legal fine. Thus, the drivers would be much more responsible and which will make the vehicle perfectly fit to be operated on the road.

The system also monitors the driver while driving to ensure that no traffic rules that must be followed while driving a vehicle are not violated. If found violated it will be recorded on the system. Once the traffic violation had recorded in the system it will be available to the police officer and further legal action can be taken by the police officer. Thus, the system keeps an accident and traffic violation record.

The system monitors whether the driver is under the influence of alcohol while driving with the help of an mq3 sensor. The sensor will be to detect the alcohol vapor in the atmosphere near the sensor. Thus, the sensor will be placed on the roof above the driver and at the window side of the driver. If the sensor detects the presence of alcohol while the car is in motion, it will be recorded into the system.

The system monitors whether the driver and the passengers have fastened their seatbelts by using the micro switch. The micro switch will be placed on the seatbelt buckle, thus when the seatbelt is removed the micro switch will be able to detect the removal of the seatbelt. If the seatbelt is found not worn by the driver or the passenger for some time it will be recorded into the system.

The system monitors the speed of the vehicle by using a telematics device. The telematics device can get the data from a vehicle's onboard diagnostic system, which will provide information about the vehicle's speed and rpm. This can be used to analyse driving behaviour. Over speed will be recorded into the system and the rpm data can be used to decide whether the driver is driving the vehicle recklessly.

- *SYSTEM DESIGN*

The system design includes system architecture and a dataflow diagram.

- *SYSTEM ARCHITECTURE*
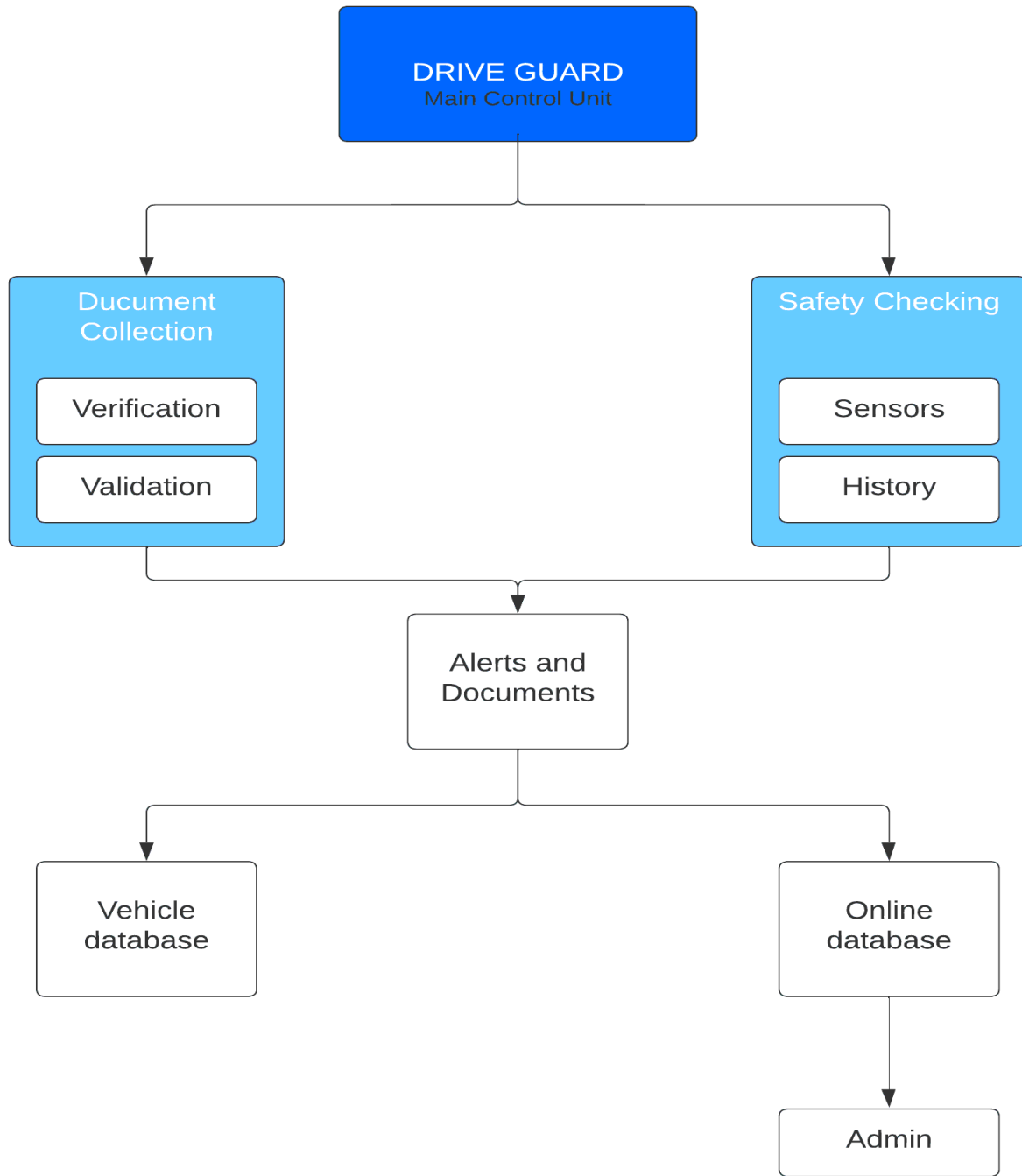
The system architecture includes the drive guard's main control unit, document collection component, safety checking component, and alert and documents component. The document collection component validates and verifies whether the document presented by the user is legit or not. The safety checking uses the sensors to detect the violation of traffic rules and keep a history of violations made by the driver. The safety violation made will be saved in the vehicle database now and it will send to the main database and will be accessed by the admin.

• *DATA FLOW DIAGRAM:*
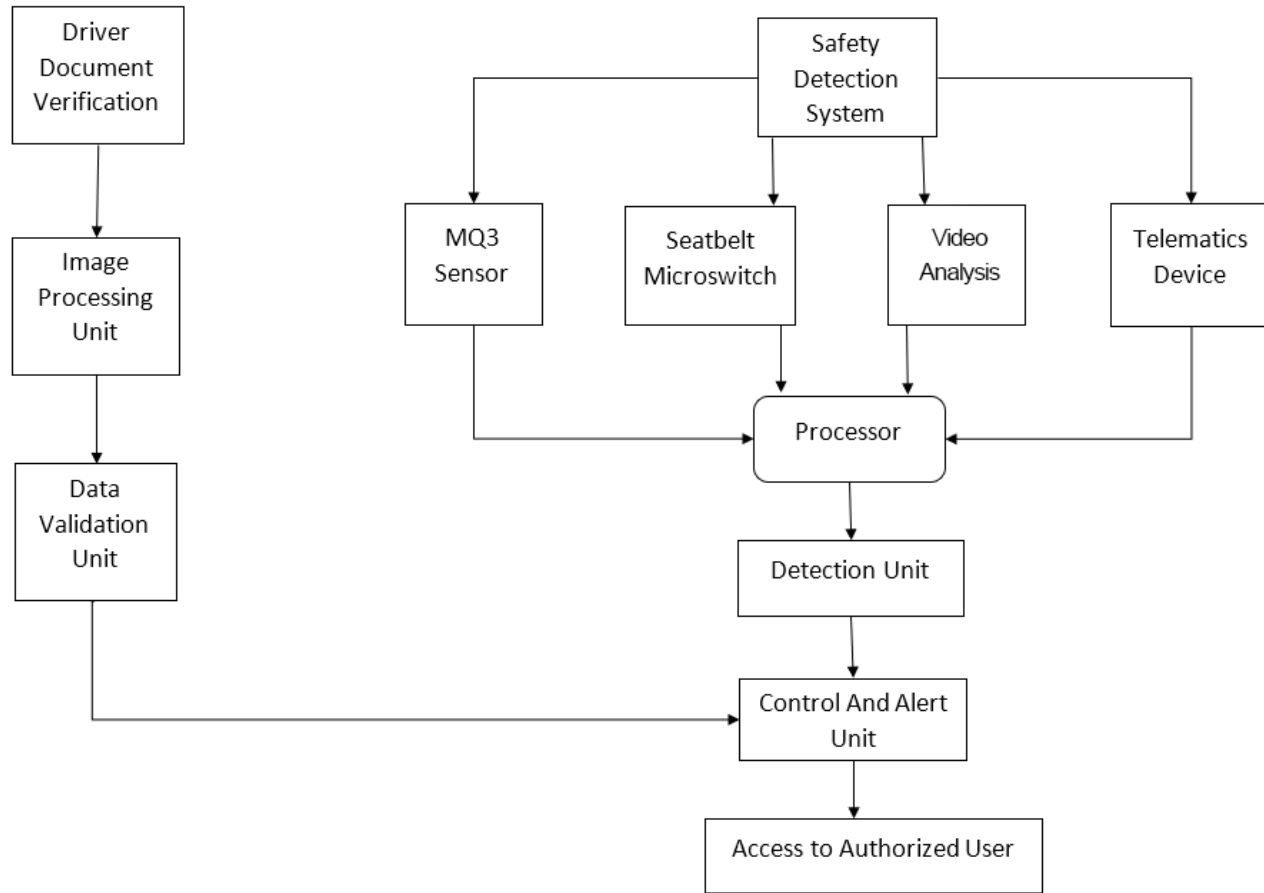
 When the driver submits the document, the documents are verified and validated by using an image processing unit after validation the document will be uploaded. The safety precaution system has four sensors and if any safety violation has been detected it will send a notification to the admin.

- USE CASE DIAGRAM
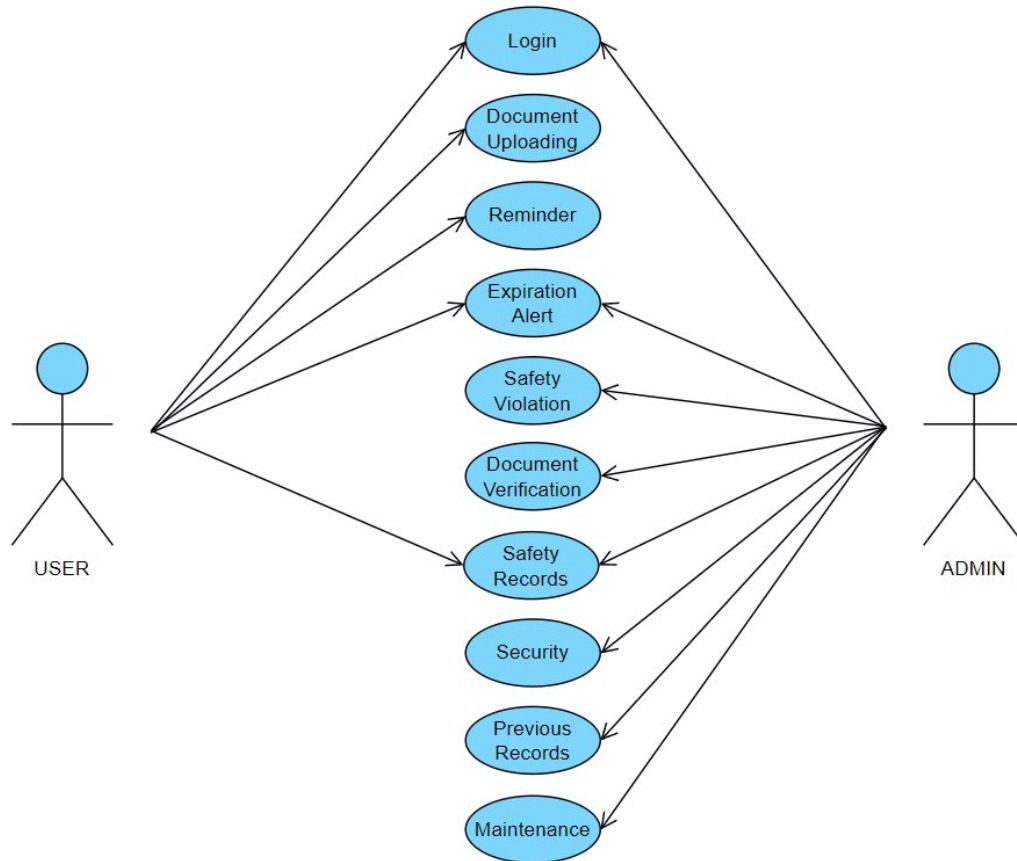
- *SYSTEM REQUIREMENTS*

The system will require hardware such as computers and software such as OCR software and database management software. It will also require a network connection for API access from Parivahan. The system will also require security features such as encryption, access controls, and intrusion detection to protect data and prevent unauthorized access.

1. Hardware Requirements: The system will require a computer to run the software.

2. Software Requirements: The system will require software components such as OCR software, image processing software, and database management software.

3. Network Requirements: The system will require a network connection to access external databases and APIs for document verification and to transmit data between the system and the cloud server.

4. Cloud Server Requirements: If the system is cloud-based, it will require a server with sufficient storage, processing power, and memory to handle user requests and store data securely.

5. User Interface Requirements: The system should have a user-friendly interface that is easy to use and navigate. It may also require additional features such as mobile apps for drivers to access their information and receive real-time alerts.

6. Security Requirements: The system should have robust security features such as encryption, access controls, and intrusion detection to protect user data and prevent unauthorized access.

7. Sensors: The system requires an mq3 sensor to detect consumption of alcohol, a micro switch to ensure the seatbelt is worn, a motion sensor to detect the usage of mobile phones, and telematic devices to detect over speeding.

Hardware Requirements:
1. Processor: A modern processor with multiple cores and high clock speed.
2. Memory: Sufficient memory, typically 8GB or more, to support the system's processing and storage needs.
3. Storage: Adequate storage, typically 256GB or more, to store driver documents and related data.
4. Network: A reliable and high-speed internet connection to support the transfer of driver documents and system updates.

Software Requirements:
1. Operating System: The system should be designed to work with the latest stable versions of popular operating systems such as Windows, MacOS, and Linux.
2. Database: A database management system such as MySQL or Oracle can be used to store driver documents and related data.
3. Programming Language: The system can be developed using a programming language such as Java, Python, or. NET.
4. Document Management Software: A document management software that can be integrated with the system can be used to manage the storage and retrieval of driver documents
5. Additionally, to ensure the security of the system and the driver documents, appropriate security measures should be implemented, such as encryption, access controls, and regular backups. The system should also be designed to be scalable, to accommodate increasing volumes of driver documents as the user base grows.

CONCLUSION

The document checker and safety precaution system will ensure safe and secure transportation. The system can help the driver to update their documents and keep their vehicle operating on the road. The system will further help to eliminate the thought of violating the traffic rules if no police officer is watching them. The system can capture and analyze data in real time, providing valuable insights into driver behaviour. Overall, a driver's document checker and safety precaution system are an essential tool to ensure a safe and efficient vehicle operation.

REFERENCES

1. Vehicle Tracking with Alcohol Detection and Seatbelt Control System - IEEE XPLORE

(Doi: 978-1-7281-6221-8/20/$31.00 ©2020 IEEE)

Nitesh Mandal, Abhishek Sainkar, Omkar Rane, Mahesh Vibhute

2. Alcohol Detection for Car Locking System - IEEE XPLORE

(Doi: 978-1-5386-3527-8/18/$31.00 ©2018 IEEE)

Shahad Al-Youif, Musab A.M. Ali, M.N Mohammed

3. Portable Alcohol Detection System for Driver Monitoring - IEEE XPLORE

(Doi: 978-1-7281-1634-1/19/$31.00 2019 IEEE)

Hironori Wakana, Masuyoshi Yamada