

AUTOMATED VEHICLE DOCUMENT VERIFICATION SYSTEM

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ABSTRACT

To ensure road safety and ultimately the safety of citizens and resources different security services checkouts the vehicles and drivers, but many times these check points leads to wastage of time, resources, lack of transparency and also leads to corruption. Thus, there is an urgent need to update the current check points and procedure of checking vehicle documents. Also, there is a need of automatic thief recognition system in case of vehicle theft. So, system proposed is to stop only vehicles with drivers not having valid documents. The RFID tags as already mandatory on vehicles has been used to scan Via MFRC522 scanner and than generating challans on check points. The system needs to be in-built into the vehicle in front of driver seat near steering for proper functioning and there will be attached functioning with the opening of driver seat door according to time and vehicle halt.

Keywords: Automatic vehicle document verification, Thief recognition, RFID, MFRC522, Challan.

I. INTRODUCTION

The project can be a revolutionary idea in order to resolve the problems associated with the current vehicle check points and can act as an accurate thief recognition system in case of vehicle theft.

The project idea came by the observation of current scenario. As the roads are well developed and vehicles are able to move swiftly then there is no need to stop at check points if driver is carrying all documents and are legally correct. Also, there is an urgent need to develop a system which can eradicate the corruption caused by some corpse at check points. Also, there is an urgent need of a system which can accurately recognize thief in case of vehicle theft.

Problems addressed from this project idea:

- Time wastage of legal drivers at check points.
- Lack of transparency in creating challans.
- Enormous corruption by corpse at check points.
- No accurate system to correctly identify a vehicle thief.
- The drivers sometimes deny to pay challan amount which creates chaos.
- Large number of security personals are required for manual check points.
- Wastage of fuel.
- Every year many security personals gets seriously injured at check posts in attempting to stop vehicles.
- Current system is very old and needs to be updated according to vast growing population and available technology.

Related Work

1. **Title:** Optical recognition of motor vehicle license plates.
Publication: Comelli et al. 1995
2. **Title:** Face recognition application

Author: Igor De Souza,2019

3. **Title:** Arduino RFID Reader/ MFRC522 Tutorial
By Sooncheng in Circuits > Arduino
4. Komal Chorghade, Piyush Dahiwele, Saurabh Deshmukh, Prof. Prajakta Pise, "RTO Automation using QR code", in IRJET, April 2018[1]

II. METHODOLOGY

To develop an automated checkpoint and in order to resolve the issues related with to current system. The system will implement the RFID technique along with machine learning to differentiate between legal and illegal drivers. The vehicle registration card and insurance play an important role in terms of recognition.

We come up with following objectives:

1. To develop a transparent challan generation system which will provide a sense of equality among all the drivers.
2. To reduce the requirement of manpower at the checkpoint so that security services can focus on other security matters.
3. To develop a thief recognition system for identifying the culprits which is owing some others vehicles.
4. To ensure punishment to illegal driver and provide comfort to the legal drivers.

III. PROCEDURE

3.1 Vehicle Module:

When vehicle start the driver will provide the license number by scanning a QR code present on license. The RC will be read though an encrypted QR code present on RC.

A camera provided in front of driving seat will be used for scanning QR's and to match the face of driver with the photo associated with the provided license number through face detection technique.

The encrypted QR code will be read to get the details of registration card and details will be matched with the number of vehicles to check whether the registration card is of the same vehicle or not.

The vehicle number provided by the QR code will be used to check the insurance details of the vehicles.

High Speed Internet Connectivity is one of the major requirements for the proposed project.

The details of **license verification, registration card and insurance details** will be fed into a centralized database.

Whenever a door of vehicle opens with ignited engine or the vehicle remains in same geographical coordinates for more than 10sec the face of driver will be re-verified and database will be updated at real time.

3.2 RFID Detection Point

When the vehicle will approach the detection point a high frequency RFID reader, will be a handy tool with kind of console, which will detect the **Fastags**, embedded on the wind shields of vehicles.

The information obtained from each **Fastag** will act as a primary key to distinguish each vehicle exclusively in database.

After the vehicle is found in database the latest entry regarding license, registration card and insurance will be analyzed:

1. If any one or more credentials from the three are missing:
 - A security personal on upcoming check post will be notified about the **registration number, model name and color of the vehicle**, this notification system will work according to real time updates in database.
 - An e-challan will be generated according to the norms and rules of government and owner will be notified about the same through email.

2. If all the credentials are verified correctly:
 - Vehicle will not be charged
 - Driver will not have to wait at the check point.

3.3 Thief Recognition Module

If a vehicle is stolen without registration card then due to missing registration card the vehicle will definitely be stopped at the first checkpoint itself.

If a vehicle is stolen with registration card and in order to breach the checkpoint if the thief enters his/her license number along with registration card then the thief who is driving the car can be recognized with the help of database entries.

IV. REQUIREMENTS AND METHODS

4.1 Hardware requirements:

High Resolution Camera: To capture image of driver and perform face detection. Then scan the QR that will be present of RC.

Arduino Board: Arduino is an open source electronic platform which works as a bridge between the computer programs and the hardware devices. An Arduino board can be programmed to perform specific actions through hardware devices such as it can glow an LED light, open barriers, send messages etc. by commanding the respective hardware devices in response to some detections made by sensors, touches etc.

RFID Reader: It will be a handy tool, to read the Fastags from the wind shield of vehicles. This will be the device which will be used to distinguish between various vehicles on road at same time

4.2 Software requirements:

Python IDE: As the entire backend of the system is built upon python IDE is required and packages to be installed.[5]

Arduino Studio: All the word associated with sensing devices will be done through Arduino board so Arduino studio is required.[6]

Google Collab: For working with database and for face detection.

Xampp Server: xampp server or any other local server along with database management system is need to hold the data and perform the necessary operations.[4]

4.3 Data Science

Face detection is a computer technology being used in a variety of applications that identifies human faces in digital images. Face detection also refers to the psychological process by which humans locate and attend to faces in a visual scene.

Face detection algorithms typically start by searching for human eyes -- one of the easiest features to detect. The algorithm might then attempt to detect eyebrows, the mouth, nose, nostrils and the iris. Once the algorithm concludes that it has found a facial region, it applies additional tests to confirm that it has, in fact, detected a face.

In our model, you don't actually need millions of images to train a model to recognize your set of people of interest. It suffices to just have one image per person!

Approach:

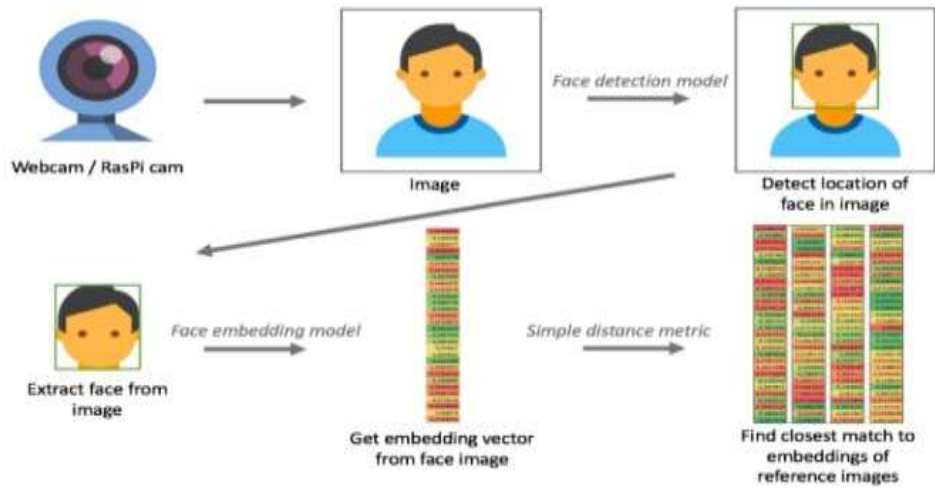


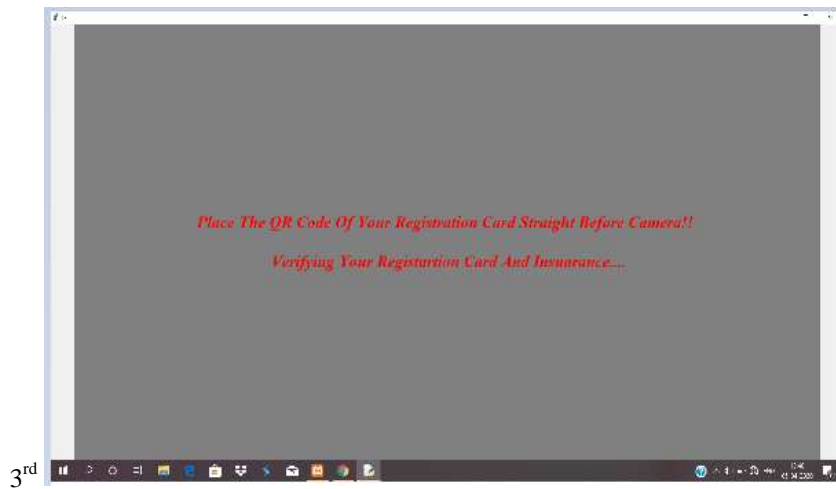
Fig-1: face detection and recognition

Table-1: Test Case

Test Case	Complete process was done.
Test Case Summary	After face and QR were matched (License QR is encrypted and already fetched through code and not scanned here manually in project) corresponding data get updated the details and panels are shown after RFID scanning.
Test Procedure	Complete running the code finally.
Expected Result	Should execute without any error and show the guided pages as well.
Actual Result	Was successfully executed and showed the respective pages.
Status	Pass

- Take a stream of images from the webcam using Open CV.
- The face detection model detects *where* in the image faces are located. It doesn't recognize whose face
- We feed the face to the face embedding model to get an embedding, or feature vector, of the face: a vector of size 128
- Now compare this vector to those already present and find the most similar one.[2]

V. RESULTS



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VI. CONCLUSION

The proposed project is a step towards the optimum utilization of technological advancements in order to reduce and resolve the problems associated with the current vehicle check points specifically in India. Specifically, the system will eradicate the problems such as wastage of time of legal drivers, corruption at checkpoints, injury of corpse in attempting to stop vehicles at check points etc. The system will ensure punishment of illegal drivers and smooth drive for legal drivers. Generation of e-challans will ensure transparency and sense of equality among citizens. The feature of thief detection will be helpful in catching the thieves and finding the stolen vehicles. This system is a complete solution to satisfy the need of hi-tech checkpoints by the application of face detection, QR scanning, Radio Frequency Identification, Internet of Things etc. Implementation of this system can be a power booster and add another star in Digital India and Skill India Campaign.

In future, it can also be made for two-wheeler, and can also use to generate the challans of traffic lights. It will be very much reliable for thief recognition of vehicles.[7]

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VII. REFERENCES

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