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Automation and Digitalization of Roadway System using IOT

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ABSTRACT - In recent times, the rate of road accidents have increased rapidly due to lack of safety. There is also no transparency in the fine amount being paid to the traffic police by the common people. Roadway Digitalization Technique Using IOT deals with the designing of an Android Application that helps Traffic police to reduce their work burden and to verify whether all the documents are valid with the vehicle driver. The respective fine amount will also be calculated for any kind of invalid documents. We introduce a new methodology of linking the Aadhar with driving license, Vehicle Registration Certificate and Insurance. In addition to this, we also introduce a fingerprint sensor in the vehicle through which only the drivers with valid license can access the vehicles and thus accidents can be avoided. The database will contain all the details of the vehicle driver including the validity of license, Vehicle registration certificate and insurance. Once the traffic police enter into the android application, he can verify the details of the driver by entering the Aadhar card number or fingerprint along with the vehicle registration number.

KEY WORDS: Digitalization, Synchronizing cloud, Internet of Things, Linking of License etc.

I.INTRODUCTION

The rate of road accidents has increased in a rapid rate. The World Health Organization (WHO), says that the rate of traffic injuries estimated in a single year 2010 was 1.25 million throughout the world. In year 2012, the International Road Federation (IRF) surveyed that traffic clashes results in monetary loss of \$20 billion (INR 1 trillion) in India. According to the Times of India (TOI) survey in India, 1214 road collisions occurs every day and 16 people dies every hour. In a single year 2014, total 1.41 lakhs people killed in road accidents in India, which is greater than the total number people who killed in wars in India. Hence government allotted traffic inspector to avoid effect by providing some rules for keeping the license, registration certificate and vehicle insurance. Nowadays, in our country challan are done manually with pen and paper on the traffic premises. Which is often tedious and it takes lot of time and turns into the corruption because traffic police write something else on challan paper and pay the government something else. However there has been no employed system to exclude such issues in traffic. Since traffic has become an important event in the national interest. Hence, this project will overcome this issues that traffic police make fine digitally and automatically. In addition, only the person having proper driving license can able to access the roadway vehicles.

II. PROPOSED METHOD

The overall system architecture is shown in Figure -1. The system contains two phases of implementation. The former is the vehicle key ignition system and the latter is the android application exclusively designed for the traffic police to access the details stored in the cloud which will include the vehicle driver's License, Registration certificate book of the vehicle and the insurance of the vehicle along with their respective validity. The linking of all these details is done with the Aadhar number which is the public identity card all over the nation of India.

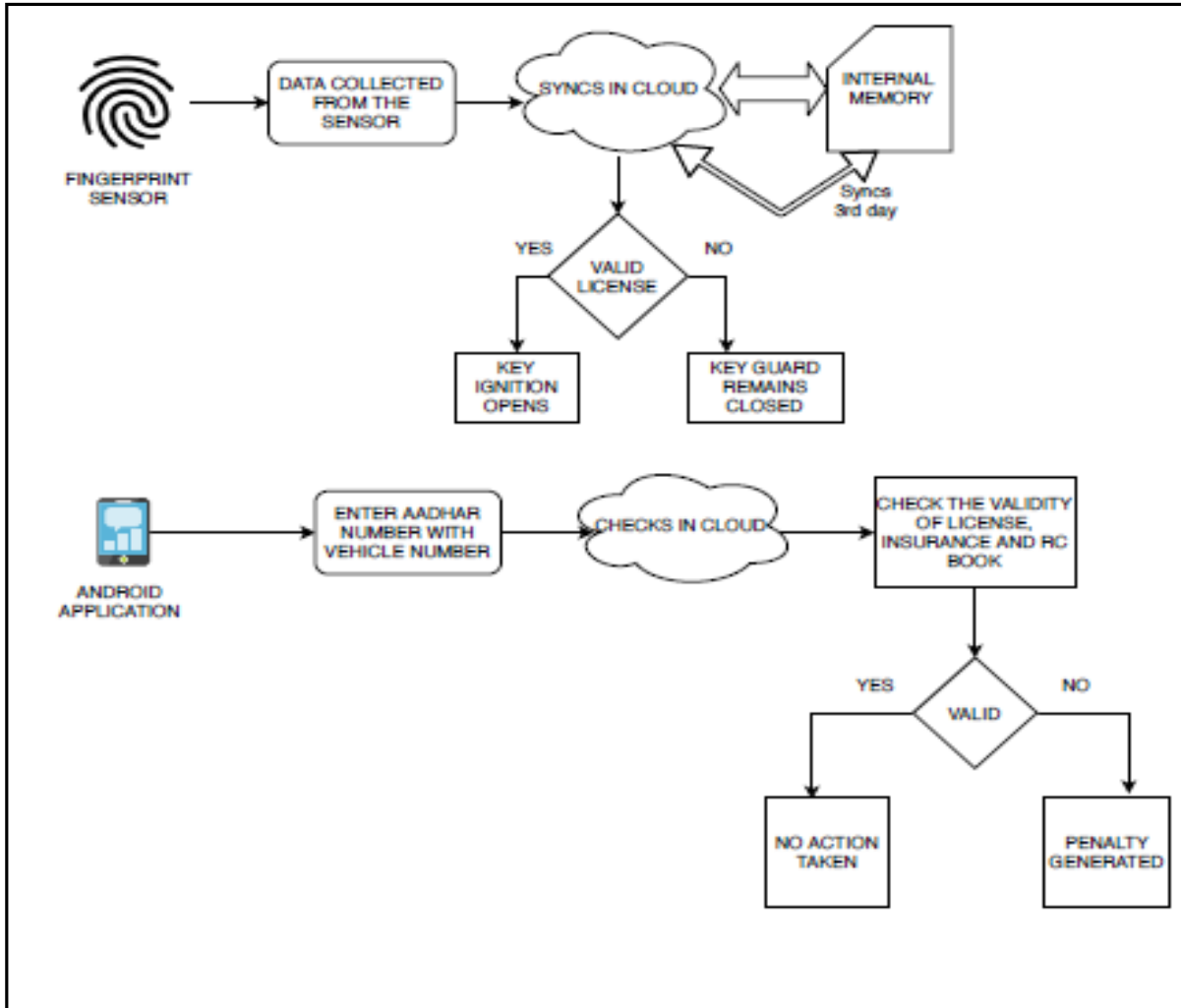


Fig. 1 Architecture diagram

FINGERPRINT RECOGNITION AND VALIDATION IN VEHICLE

This phase aims the revocation of rights to the non-licensed drivers from accessing the vehicle. The fingerprint sensor is placed on the vehicle along with the Arduino Uno, dc motor and an ESP Wi-Fi module. The user must keep his fingerprint in the fingerprint sensor placed in the vehicle. The sensor takes the input and converts into binary format and checks in the cloud whether the user has linked his license with the Aadhar card by accessing the database. If the user has linked the license with the Aadhar card and it is valid, then the key guard will open in the vehicle. The user can use the key and start his vehicle. If the license is not found or invalid, then the key ignition will remain closed. An internal memory chip is also placed with this setup so that it synchronizes every 3rd day. Every time a new user keeps his fingerprint, it first checks in the internal memory for the respective fingerprint and if present, it opens the key guard immediately. If a new user keeps his fingerprint, the data is fetched from the cloud and then stored in the internal storage. Next time when this user keeps his fingerprint, the sensor first checks in the internal memory itself.



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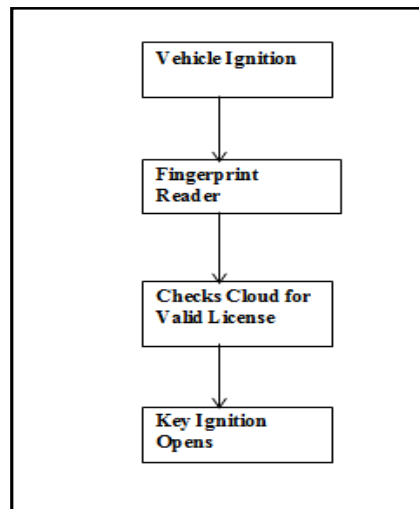


Fig .2 Key Ignitions

ANDROID APPLICATION FOR THE TRAFFIC POLICE

The second phase of the project deals with the android application exclusively designed for the traffic police for checking of the driving license of the drivers and penalty generation. When a traffic policeman stops any driver for checking, he needs to get either the fingerprint or the Aadhar number of the vehicle driver. By entering the Aadhar number along with the vehicle registration number, the police can get the information about the license validity, Insurance validity and RC book validity of the driver. If the insurance is not renewed or the RC book is not found or the license has expired, then the penalty is also generated automatically in the application. This system helps in digitizing the whole process for the traffic police and reduces the burden of manual work. The non-transparency of the amount being generated as fine amount is also a drawback in the existing system. A vehicle driver cannot carry all the documents like the Driving license, Insurance and RC Book with him all the time. If the vehicle is lost, all the original documents are lost, which is a practical danger. This system overcomes these drawbacks by implementing digitalization.

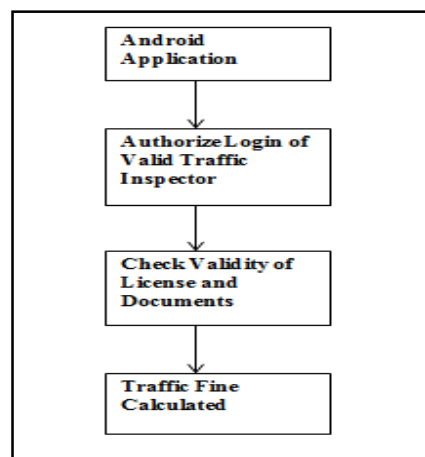


Fig.3 Android Application



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III. EXPERIMENTAL RESULTS

The implementation of the web page designed for the traffic police is done and the screen shots have been shown from figure 4.1 to 4.4. In figure 4.1, the traffic police can register himself by providing his name, batch number, and password, address and phone number. The admin control of this web page can be given to any higher authority of the police (say DSP). He can verify the details of the registered policeman and can control the enable or disable functions. By default, the login setting will be disabled for any newly registered user until the admin verifies and changes the setting to 'enable'. In figure 4.1, the policeman registers by providing his details. In figure 4.2, the registration is successful and he logs in to his page. In figure 4.3, the policeman enters the Aadhar number and the vehicle registration number of the vehicle driver. In figure 4.4, the details of the driver including the license validity, insurance validity, RC book details along with the fine amount is generated.

The screenshot displays a web browser window with the following elements:

- Browser tabs: "Inbox (3,076) - priyaofficials9@...", "PDF to DOC - Convert PDF to...", "New Tab", "Downloads", "Digital Smart Police".
- Address bar: "Not secure | digitalmartindia.000webhostapp.com/register.php".
- Page content:
 - Header: **// MAKE RESERVATION ONLY FOR POLICE**
 - Sub-header: YOUR ACCOUNT IS ACTIVATED AFTER VERIFICATION
 - Form fields:
 - Name (with user icon)
 - Batch_No (with user icon)
 - Station (with envelope icon)
 - password field (with dots and user icon)
 - phone number (with user icon)
 - Buttons: Register, Reset
- Footer: Powered by 000webhost
- Windows taskbar: Search bar, taskbar icons (e, folder, shopping, globe, mail, W, S), system tray (9:57 PM, 1/27/2019).

Fig. 4.1 Main Screen of Application



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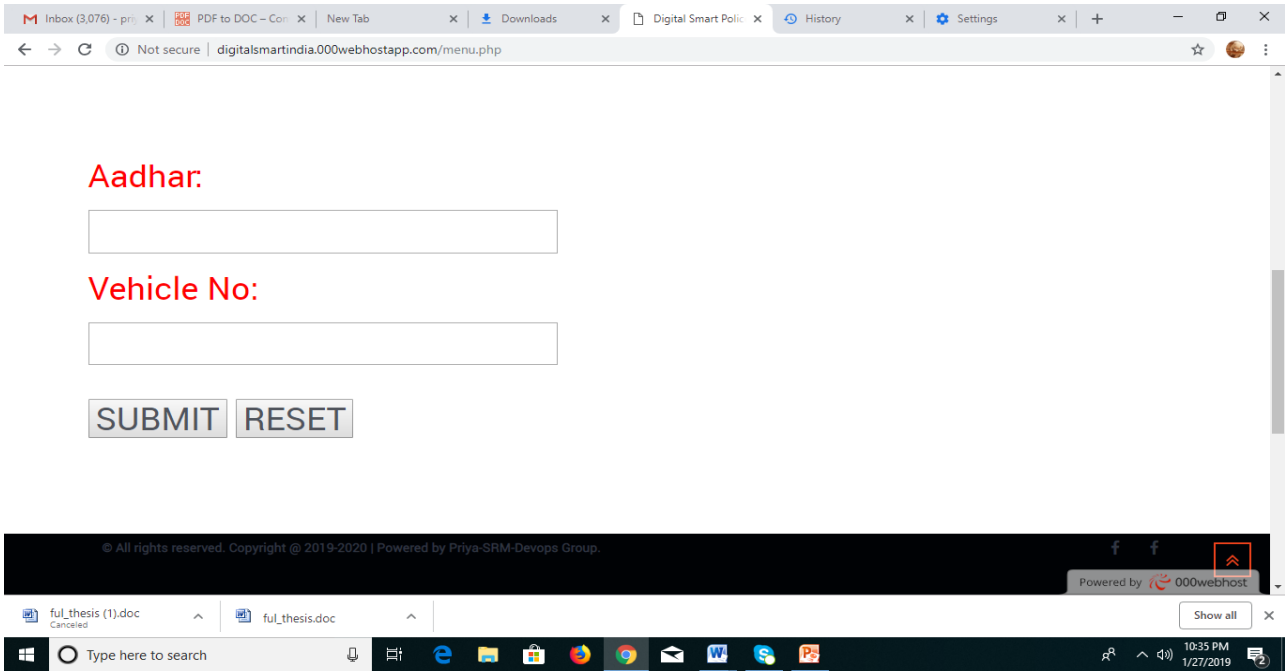


Fig. 4.2 Login Credentials

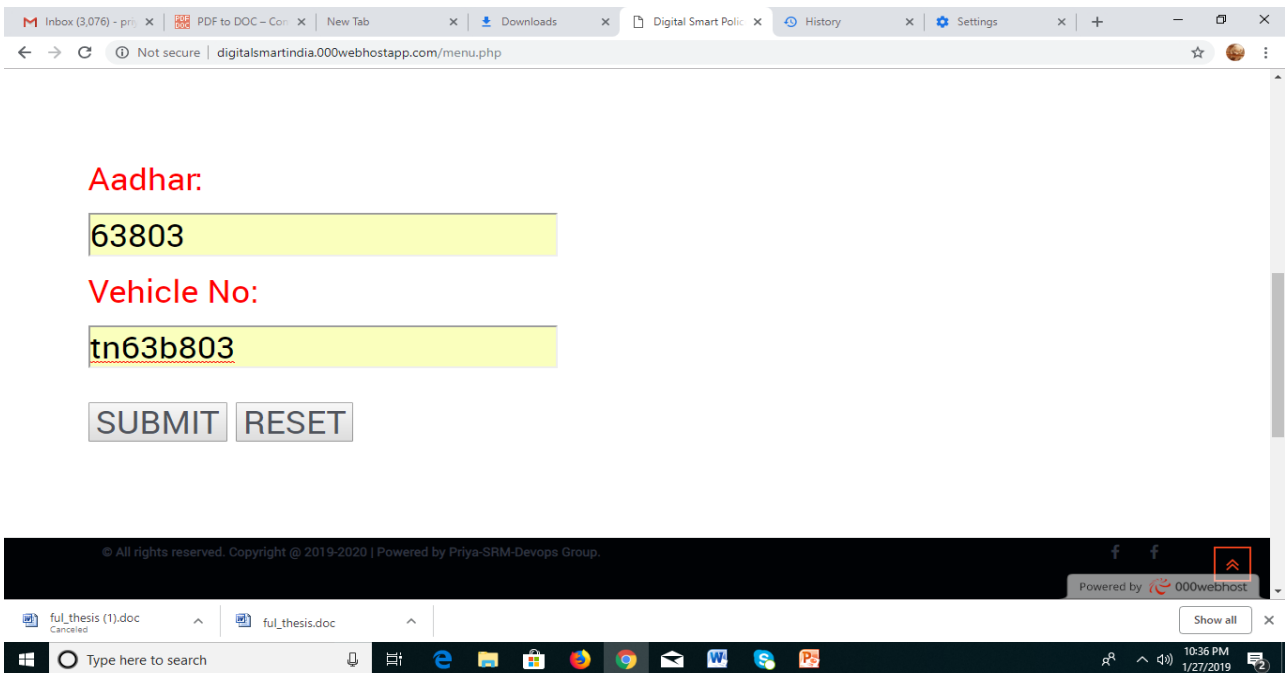


Fig. 4.3 Driver details to be entered



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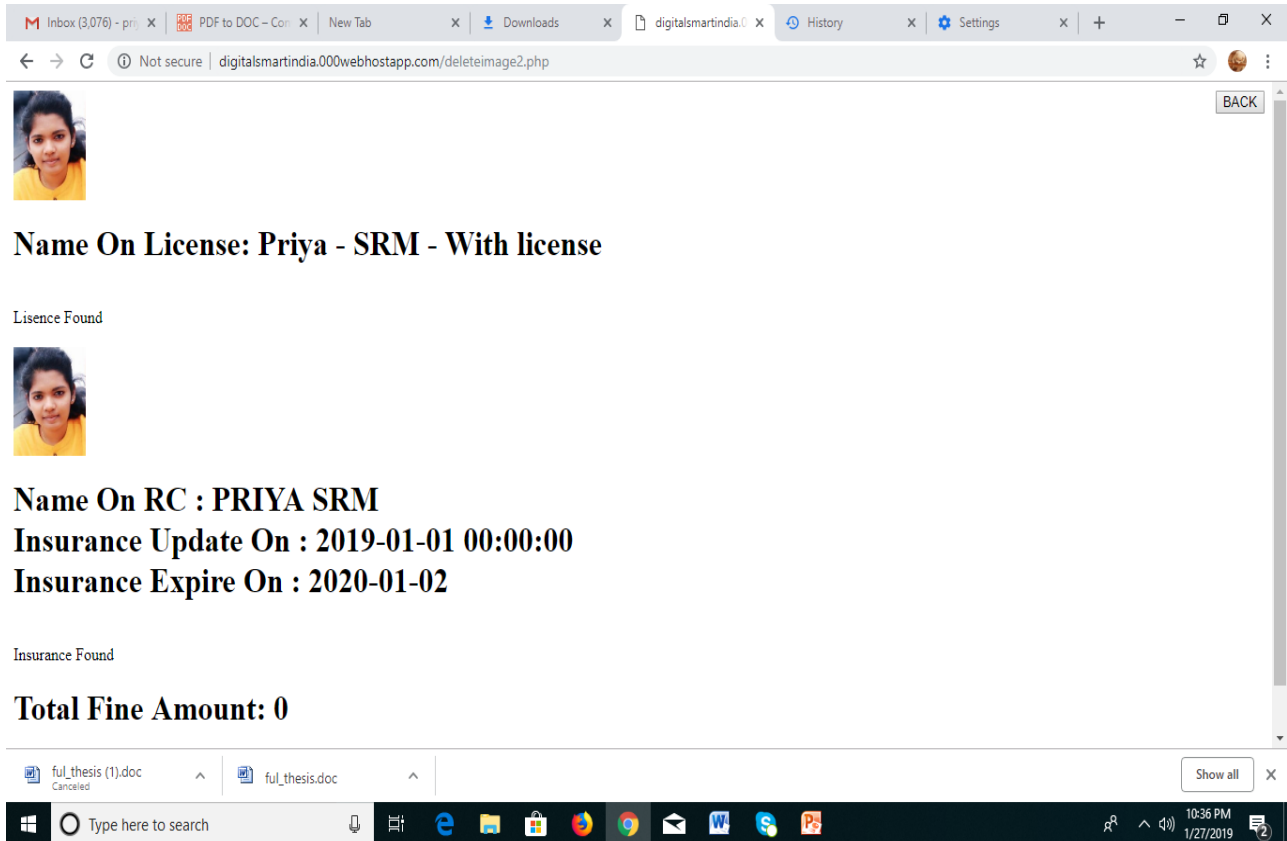


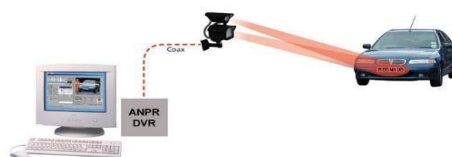
Fig. 4.4 Penalty generated

IV. CONCLUSION

As the road accidents are increasing rapidly, there needs to be revocation of rights to the non-licensed drivers from accessing the vehicles. Further, there is no transparency in the traffic fine being generated by the traffic police for any case. Hence the system employs digitalization and reduces the work burden of traffic police and improves the roadway safety. It also eliminates the need of carrying the original documents of driving license, vehicle insurance and the RC book all the time by the vehicle driver.

V. FUTURE ENHANCEMENT

In the upcoming years, this project can be enhanced to reduce the effort of traffic police. Without the influence of the traffic police, the drivers who are violating the traffic rules will be charged by the monitoring the vehicles in CCTV by using mat lab technology. The fine amount will be sent to the respective vehicle owners.





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