

Driving License Corroborator using Internet of Things and Data Mining Techniques



P.Tamije Selvy, A.Ajay Balaji, K.Angu Selvam, R.Arun

Abstract: *Internet of Things (IoT) permits gadgets to be perceived and controlled remotely across existing community infrastructure, creating possibilities for introducing direct integration between the physical, global structures ensuring in progressed efficiency, accuracy. In step with recent statistics from the Ministry of Road Transport and Highways, 10,622 persons (past one year) below the age of eighteen lost their lives due to road crashes in Highways (India), accounting for 29 deaths every day. To disannul the shortcomings, License corroborator, the planned model assures the age of chauffeur (Driver) is above eighteen with positive authorization steps.*

Keywords: *Internet of Things, Vehicle security, Driving License Corroborator, Authorization.*

I. INTRODUCTION

IoT is the network of physical objects or "things" embedded with physics, Software programs, sensors, and community belongings that allow these objects to bring together and change information. Internet of Things allows items to be detected and controlled remotely across current community infrastructure, developing opportunities for hundreds of direct integration between the bodily global and computer-primarily based structures resulting in progressed performance, accuracy, and economic profit. The advancement at intervals the sphere of transportation finally ends up in associate passing rise at intervals the vary of road users. Yet, the danger of street injuries is speedy growing in parallel to the relies on automobiles on the avenue. One in each of the causes of road accidents is that the unauthorized drivers on road. In step with trade reports, India accounts for twelve. Five percent (over one, forty-five, 000 fatalities 12 months) of worldwide road injuries, with one avenue twist of fate going on every four mins. Alarmingly, seventy a combine of p.c of victims involved in such road mishaps unit of measurement between the folks of 15-44 years with dashing, reckless and intoxicated driving being the foremost

effective reason accounting for one.5 p.c of road traffic accidents and 4.6 p.c of fatalities. In step with information from the Ministry of Road Transport and Highways, 10,622 people underneath the age of eighteen lost their lives to street crashes in India, representing 29 deaths every day. To disannul this condition, the License corroborator is employed in such the approach that the device assures the age of chauffeur (Driver) is over eighteen with positive authorization steps.

II. RELATED WORKS

Katarzyna Bobkowska et al. [2] proposed that fingerprints and iris recognition require cooperation from the traveler to provide biometric data to the inspection terminal. This paper also describes various challenges that affect the performances in identifying individuals.

Elahi Aet al. [3] proposed fingerprint (biometric) recognition using Biometric systems; iris recognition and facial recognition. Of these, unique mark (biometric) acknowledgment and location frameworks are anything but difficult to convey, modern and people can be distinguished without their insight. This paper also describes that biometric identification primarily is based on protection systems and they are considered to be the comfiest especially because of their capability to discover humans with minimal ambiguity.

Gila Albert et al. [4] proposed that the statistics and studies are unclear regarding whether the rate of car crashes is higher for Elderly drivers in comparison to other age groups. In Israel, the rate of fatality and severe injury in road crashes among the age group 65 and above is meaningfully higher than their share in the population, especially when travel mileage (relatively Low for elderly drivers) is taken into consideration. However, more than half were pedestrians. This trend remains consistent over the years and reflects the safety problem of the elderly as vulnerable road users.

III. MOTIVATION

The advancement within the field of transportation ends up in a rise within the range of road users. Yet, the risk of street injuries is short increasing in parallel to the count of motors on the avenue. One in all the causes of road accidents is that the unauthorized drivers on road. The speed of accidents caused by unauthorized driver's on-road is found to be increasing as days elapse. Another scary issue is that drivers UN agency does not seem to be eligible to carry a license drive the vehicle area unit half a dozen out of ten. The traditional system suffers from subsequent shortcomings:

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- Transient storage facility is used to store user details which become non-permanent [4].
- Identity verification using cameras is costly and the social acceptance among the people is medium-low.
- Iris recognition fails in case of less luminous intensity This motivates us to create a planned system to beat this drawback.

IV. PROPOSED MODEL

The idea is to use the fingerprint sensors in the vehicles for authentication. The fingerprint sensor is mounted on the fenders of the car which constantly detects the presence of a template and the license number in the sensor. The Arduino UNO with an inbuilt Atmel microcontroller is used to read the data from the sensor.

A. Arduino Model Setup

The Arduino Uno could also be a microcontroller board supported the ATmega328.it's fourteen digital input/output pins (of that cardinal is employed as PWM outputs), cardinal analog inputs, a sixteen rate Crystal oscillator, a USB affiliation, companion diploma affect jack, Connect it to a laptop with a USB cable or strength it with associate AC-to-DC adapter or battery to urge started [5]. Figure 1 shows the block diagram of the Arduino Model Setup.

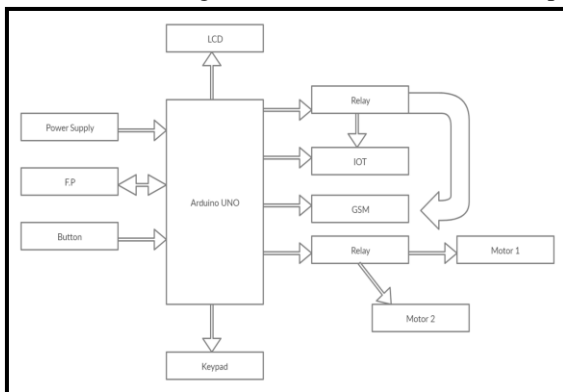


Figure 1 Arduino model setup block diagram

In proposed system, the GSM module (connected to Arduino) is used to send license and insurance expire notification details to the phone via email. Relay is connected to Arduino with GSM module. Two motors are fixed with a relay. The fingerprint sensor is placed on the board and the LCD is mounted on the top of the board to display the license details that the user has entered. Finally, the power supply will be given. The keypad is placed in the bottom of the board that consists of five buttons with each button for:

1. Entering license details.
2. Entering insurance Details.
3. Entering the number randomly in ascending order.
4. Entering the number randomly in descending order.
5. Confirmation.

B. Cloud Storage Structure for Efficient Storage and Retrieval

Thing Speak is an open-source Internet of Things (IoT) utility and API to shop and retrieve facts from matters using the HTTP and MQTT protocol over the Internet or through a Local Area Network. Thing Speak lets in the creation of sensor logging applications, area tracking applications, and a

social network of things with reputation updates [6]. Figure 2 represents the process of retrieving data from the cloud storage.

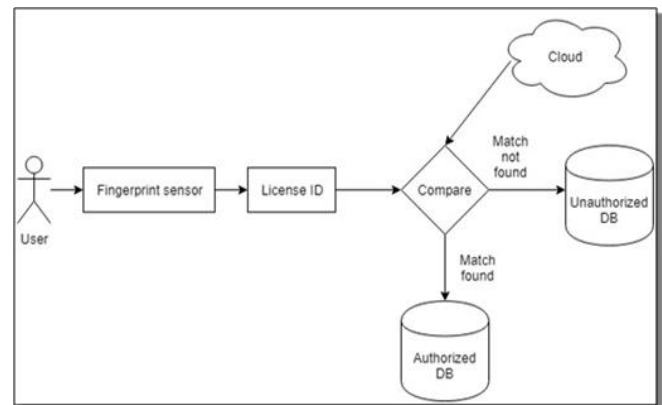


Figure 2 Retrieval of data from cloud

C. Preprocessing of User Data

As the KNN algorithm is very sensitive to noisy data, the data has to be pre-processed and smoothed out from the noise [7]. The steps in the pre-processing of the fingerprint are as follows:

Grayscale transformation - The fingerprint returned by the fingerprint sensor has to be converted into grayscale. It assists in decreasing the space utilized for recording information remembered for the picture.

D. Authorization Using KNN Classification Algorithm

KNN Algorithm is used in this system to classify people with respect to their age group to avail driving license. Figure 3 depicts the process of age limit verification using driving license corroborator.

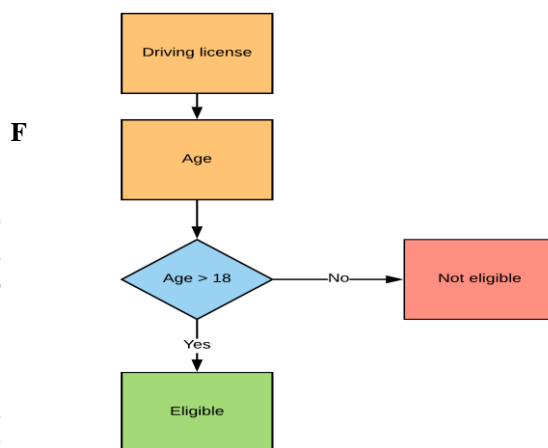


Figure 3 Age limit verification using proposed system

The KNN classifier has a faster execution time and is dominant than SVM [8].

The steps of the KNN classifier algorithm are as follows:

1. Input: All samples of the fingerprint.
2. Output: Authentication categorized into authorized and unauthorized.

3. Determine the factor K = number of nearest neighbors.
4. Calculate the distance between the given sample and training samples.
5. Sort the distances and decide the closest neighbor based totally on minimal distance.
6. The majority of the nearest neighbor is used as the prediction value.

V. EXPERIMENTATION AND RESULTS

This section presents the experimentation results after testing the proposed system. The Arduino model setup has been done. Figure 4 display the experimentation of Arduino model setup.

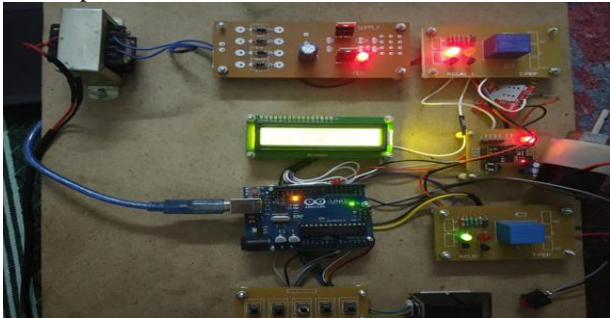


Figure 4 Arduino Model Setup

The Thingspeak cloud environment is set and figure 5 shows the home page of Thingspeak portal after login.

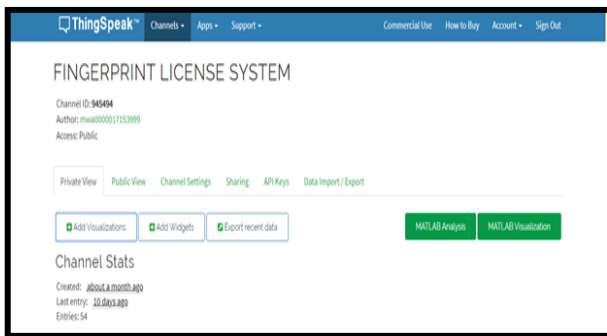


Figure 5 Setting up of Cloud environment

The fingerprint sensor scans the fingerprint and pre-processes the input fingerprint. After feeding the training data into the ThingSpeak platform, the figure 6 parade the set of all available fingerprints.

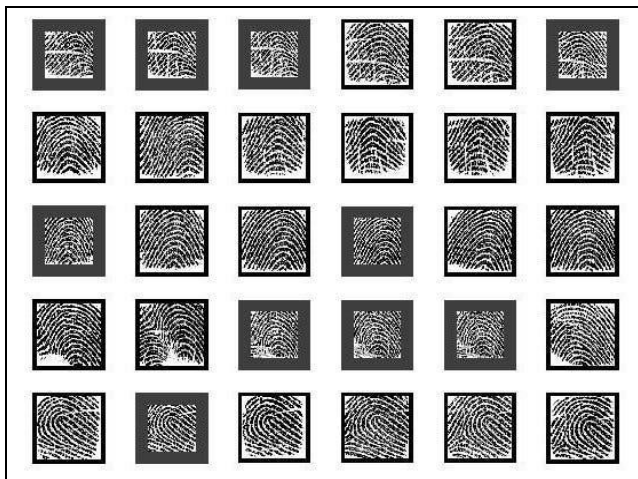


Figure 6 Human thumb images

All the images are converted into gray scale images and cropped to standard 256x256 sizes. Figure 7 exhibit the image of a pre-processed fingerprint



Figure 7 Pre-processed thumb image

Driving License Corroborator initially prompts the user to enroll them providing license id and fingerprint. The enrolled data is stored in the inbuilt memory. Figure 8 deals with the process of enrolling using license id and fingerprint. When the user wants to use the vehicle, he has to enter the license id and authenticate with fingerprint. Figure 9 demonstrates the Driving License Corroborator prototype.

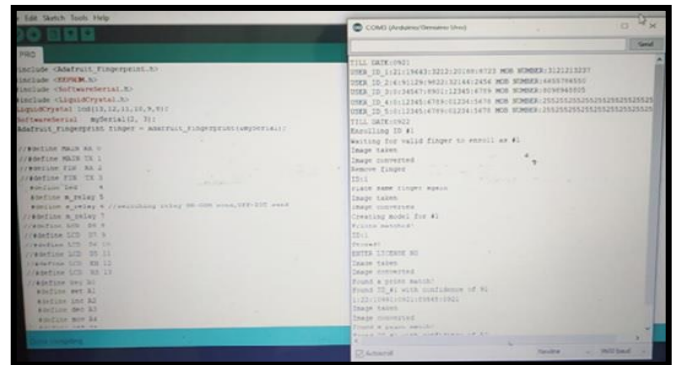


Figure 8 Deals with the process of enrolling using license id and fingerprint.

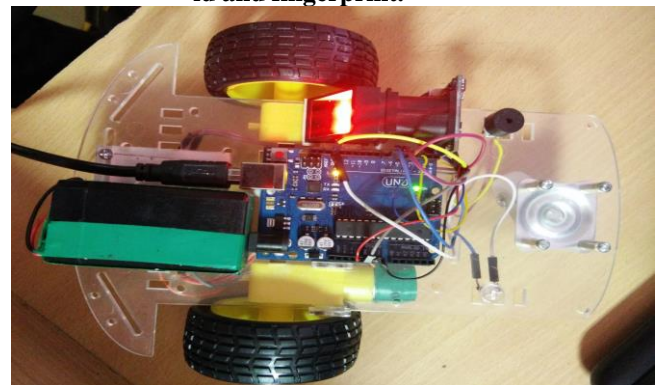


Figure 9 Driving License Corroborator – Prototype

VI. PERFORMANCE ANALYSIS

The performance outcomes have revealed that proposed KNN accomplish better than existing SVM in terms of performance metrics such as accuracy and execution time. Table 1 displays the classification accuracy in % and execution time in seconds for two algorithms.

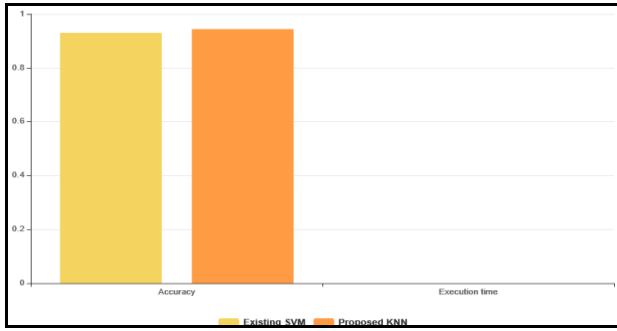


Figure 10 Graphical representation of performance Analysis

Table I

Classification accuracy in % and execution time in seconds for two algorithms.

Performance metrics	Existing SVM	Proposed KNN
Accuracy	93%	94.35%
Execution time	0.85 s	0.75 s

VII. CONCLUSION

In this paper, the proposed model ensures high security of vehicle and prevents individuals. It includes the efficient usage of fingerprint recognition for authentication of the drivers driving the vehicle and helps to automate the existing manual vehicle ignition system based on biometric authentication. The KNN algorithm is implemented in this model to determine verification of driving license by permitting validated license holder above the age of 18 and results are better when compared to existing system in terms of accuracy (94.35%) and execution time (0.75s).

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