Driver Authentication System

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Abstract – *One of the most leading cause of fatality are vehicle accidents. Majority of these accidents are caused due to improper driving of vehicles by non-licensed persons. So, to avoid non-licensed drivers to drive a vehicle and help to accelerate judicial proceedings related to the accidents caused on road, a new system is proposed. It aims at authenticating the driver's license using an automated method. To check non-licensees as of driving, the very unfailing person recognition system is biometric verification. Amongst all the biometric traits, fingerprint is the most popular, reliable and non-imitable biometric authentication scheme. The ignition system of the vehicle will start only after the successful authentication process of the driver. The system will also consist of a web page accessed by the owner and authorities which provides information of the vehicle and its driver.*

Key Words: Driver Authentication, Safe Driving, Minor Driving Prevention, Vehicle Tracking, IOT

1. INTRODUCTION

"Driving to save lives, time, and money in spite of the conditions around you and the actions of others."- This is the slogan for Defensive Driving. In today's world vehicle sales i.e. the use of vehicles is directly proportional to the population growth, thereby increasing the rate of accidents. Out of 43 lakh cases pending in High Courts, over 8 lakh are a decade old [4]. These cases include thefts, minor Drivers i.e. un-licensed population, hit and run to name a few. Unlicensed driving is a matter of concern for several reasons. It is possible that drivers who have not undergone appropriate training and testing may be deficient in some aspect of the knowledge and skills required to drive safely and efficiently. Also, Hit and Run cases are occurring more frequently these days, these are typical examples of getting involved in a road accident and then eloping from the accident site. Over 30 percent of all road accidents fall under this category, but only 10 percent are actually booked [5].

The proposed system concentrates on securing the vehicle to be driven by un-licensed drivers and keep a track on who was driving the vehicle at any instance. A person who is going to drive the vehicle, should slide his license in the device which will do the processing on the card and then keep his thumb on the fingerprint scanner which will capture the fingerprint and compare to the fingerprint mapped with the license number. If it matches then and only then the ignition system will allow the vehicle to start, also a database is updated with the timestamp and license number is created on the owner's profile which will be reflected on their portal to keep a track. Incase a vehicle is stolen, the owner can check the website to see who is driving the vehicle and locate it using the GPS tracker installed and do the needful.

2. LITERATURE SURVEY

Based on physical or behavioral traits, biometrics is described as the science of recognizing an individual. It's beginning to gain acceptance as a legitimate method to determine an identity of the individual. A biometric overview was provided and discussed by Jain et al (2006) which needed to be addressed to make biometric technology as an efficient tool to provide the security for information. The main contribution of the overview included the applications where the biometric scan can solve the issues pertaining to secure information and the challenges faced by a biometric system in real-world applications. In spite of these challenges the biometric technology is emerging as a secured alternative to traditional authentication schemes like passwords, smart cards etc [3].

Of all the existing biometric technologies, fingerprint biometric system has several advantages which include high accuracy, ease to use, highly economical, etc. Fingerprint matching has been successfully used by law enforcement for more than a century. The technology is now finding many other applications such as identity management and access control. Jain et al (2010) described an automated fingerprint recognition system and identified key challenges and research opportunities in the field.

India has a very huge population of road travelers such as two wheelers and four wheelers on roads. In many cases the culprit often runs away. In India, hit and run cases occur frequently. Quoting from TOI "Shockingly, errant drivers have been traced and booked in only 10% of the Hit and Run cases. 30% of the road fatalities reported were Hit and Run case" according to DP. Also recently 55 parents were jailed for minor children's vehicle driving in Hyderabad. The verification of drivers on road individually is not an effortless

process, rather on scanning the globalization process; it is quite a hard-hitting process.

This data is taken from the annual report given out by the Road Authority of India. The data highlights the Hit & Run cases throughout India which we would like to focus on and increase the number of the culprits taken to the court.

S.No	States/UTs	Hit & Run			
		Total Accdents	Persons Killed	Persons Greviously Injured	Persons Minor Injured
1	2	3	4	5	6
1	Andhra Pradesh	1273	649	311	661
2	Arunachal Pradesh	29	6	11	7
3	Assam	1515	666	1078	218
4	Bihar	3370	2237	1523	634
5	Chhattisgarh	1949	630	287	1265
6	Goa	86	17	13	26
7	Gujarat	7337	2742	2744	2927
8	Haryana	2817	1256	411	2238
9	Himachal Pradesh	672	159	259	479
10	Jammu & Kashmir	221	54	82	161
11	Jharkhand	927	775	613	101
12	Karnataka	2911	853	1654	1498
13	Kerala	333	43	317	303
14	Madhya Pradesh	11690	2437	1272	12206
15	Maharashtra	6160	2324	3256	2082
16	Manipur	16	9	2	12
17	Meghalaya	219	54	85	36
18	Mizoram	11	9	8	9
19	Nagaland	56	5	20	31
20	Orissa	2047	838	1181	1079
21	Punjab	1673	1360	777	196
22	Rajasthan	3528	1671	1372	2204
23	Sikkim	9	3	3	14
24	Tamil Nadu	5009	1698	303	4435
25	Telangana	1577	605	91	1208
26	Tripura	60	28	69	2
27	Uttarakhand	150	98	90	9
28	Uttar Pradesh	6104	3269	3055	1183
29	West Bengal	1196	713	1204	219
30	A & N Islands	1	0	0	1
31	Chandigarh	2	0	0	1
32	D & N Haveli	24	17	26	0
33	Daman & Diu	11	6	5	2
34	Delhi	2100	604	274	1611
35	Lakshadweep	0	0	0	0
36	Puducherry	103	31	32	58
	Total	65186	25866	22428	37116

Fig-2: Accidents caused because of Hit and Run during the calendar year 2017

3. PROPOSED SYSTEM

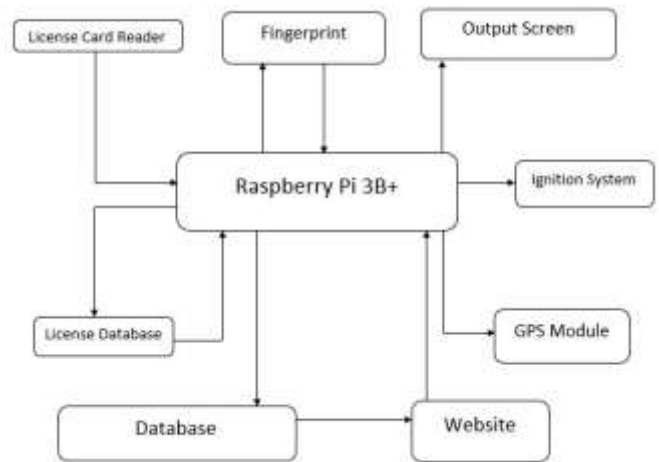### 3.1 Block Diagram

Fig -1: Proposed System Block Diagram

3.2 Hardware Requirement

    a) Raspberry Pi 3 B+
    b) Fingerprint Sensor
    c) Pi camera
    d) GPS Module
    e) LCD Screen

3.3 Software Requirement

    a) Python
    b) PHP
    c) JS
    d) HTML5
    e) CSS

3.4 Component Details

a. License detection & verification:
    This process will compel the driver to carry the driving license and hence non-licensed person will not be able to access the vehicle thus providing safety to oneself and society. If the card inserted in the system is valid license card issued by the government, then vehicle will start

b. Vehicle Tracking:
    In this process, the system will keep the track of location on the website. Global Positioning System will be used to track the vehicle.

c. Vehicle Type & Minor Driving:
    Class of vehicles such as LMV, MCWOG, MCWG will be checked to verify if the driver is allowed to drive that type of vehicle. Also, an underage person will not be allowed to drive the vehicle thus preventing minor driving.

d. Checking validity date of license:

It checks whether the license card is valid for the provided vehicle on that given date.

4. Methodology

The system architecture consists of the following four phases:

a) User Identification

b) User Verification

c) Data Fetching

d) User Authentication

4.1. User Identification:

The first step is license scanning using camera and later, extraction of Driver License number with use of image processing and grabbing the hold of the Driving License number issued by the respective authorities.

4.2. User Verification:

The verification of user i.e. driver is done by matching the previously enrolled data in the database with the newly scanned data. The vehicle type will be checked by verifying with the driver's vehicle type mentioned on license and the desired vehicle.

4.3. Data Fetching:

It includes the fetching of biometric of the desired license holder.

4.4. User Authentication:

The driver is required to provide his biometric details and if it matches with the biometrics of our database, the vehicle will start. A message will be sent to the owner's registered mobile number.

5. CONCLUSION

Driver authentication system restricts the non-licensee from driving and provides safety to oneself and society. As the system includes GPS, it will track the location of vehicle due to which if any mishap happens the police can get location of the vehicle. It checks the validity date to ensure that the driver is still eligible to drive the provided vehicle. This can reduce rate of accidents and speed up the judicial process. This system will also check suspended or expired licenses.

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