

# **E-Cupboard System: Review on Digital License Generation using Fingerprint Authentication**

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## **ABSTRACT**

To issue driving license is a very tedious task for the government to monitor. While driving, it is very difficult task to carry all documents which required for driving purpose. E-cupboard is RTO document checking using fingerprint authentication web based system. Our system has User (requesting driving license) login, admin login and Traffic police login type. To check documents traffic police will take fingerprint, ADHAR card number as input. It will open profile of user which include issued document list. The list have document list which can be viewed by traffic police. If driver doesn't have valid document then automatically fine/penalty will be generated according to rules. On the other side RTO office have all digital document which have stored in centralized database. If person wants to generate his license then he should submit all required information, document and fingerprint on E-cupboard System. Then E-cupboard System issue digitalized license and digital image of fingerprint which is stored in centralized database. Same process is used to generate smart card and RC book.

## **Keywords**

Digital license, RTO, E-cupboard system, fingerprint authentication, fingerprint matching algorithm, digital, license, fingerprint, authentication, fingerprint recognition.

## **1. INTRODUCTION**

Because of duplicate license or driving without license the number of accidents increased. A new advanced auto license generation system is implemented. In current dates Fingerprint Identification is very important, reliable and trustful human identification method. Amongst all biometrics fingerprint authentication and identification is most trustful, popular and reliable personal biometric identification method. The E-cupboard System has centralized database, which saves the fingerprint of a particular person. The particular person's fingerprint is to be saved in the database while person login into E-cupboard System. Fingerprint is used to fetch and read data of the particular person license details.

Fingerprint is completely unique and unchangeable to an individual for lifetime. A fingerprint images of human fingerprints are consists of pattern of valleys and ridges. Nowadays, Fingerprint recognition is used in many real applications. The major problem in fingerprint recognition is poor quality of images. This results in lack of accuracy and increase error rate. In last some decade, many algorithms and model are given to improve the accuracy of fingerprint recognition system. This paper discusses on the some fingerprint model which is used to synthesize the template of fingerprints. In fingerprint recognition, after pre-processing step, we find the transformation between templates, adjust parameters, synthesize fingerprint, and reduce noises.

The fingerprint device which is used for fingerprint recognition and fingerprint matching in E-cupboard System is optical fingerprint recognition embedded module GT511C3. The device is single chip module with fingerprint algorithm and optical sensor. Simple UART (Universal Asynchronous Receiver/Transmitter) and USB (Universal Serial Bus) communication protocol is used in E-cupboard device. A Universal Asynchronous Receiver/Transmitter is a computer hardware device for asynchronous communication in which the data format and transmission speeds are configurable.

## **2. FINGERPRINT RECOGNITION METHODS**

The study conducted by Sharad Pratap Singh [1] is one of the initial studies that proposed different fingerprint recognition model. The study states analysis of different type of fingerprints. Some paper are based on security system and describe the different fingerprint matching techniques to help employment background checks, full border control, security facility access.

2.1 Woong-silk kim [2], proposed an fingerprint recognition Method, the system is proposed in more detail, the layered fingerprint recognition method. System does not only compare the minutiae or singular point, but also compare the images of detailed area for making prompt and accurate comparison of fingerprint. By utilizing the strengths of the

Multi-Stage Fingerprint Recognition Method for Fingerprint Payment Verification System, method for this paper is proposed. The result of the finger print data base test compare to the before and after algorithm improvement.

2.2 Ravi Subhan & dattatreya P. morkame [3], proposed method to identify that authentication of person who he/she claims to be finger print identification availability of ten fingers (plenty source) for data established use. In this paper the summary of all the research work out on fingerprint techniques recondition, detection & performance.

2.3 S. Revathi & T, Naveena [4] proposed an approach new algorithm used novel fingerprint matching algorithm both conventional minutiae feature and ridge feature to increases the recognition performance against nonlinear deformation in fingerprint four ridge features are proposed i.e. ridge length, ridge count, ridge curvature direction and ridge type. They proposed a novel matching scheme a breath first search to delete the matching minute pairs incrementally.

2.4 Kavita Tewari & Renu L. Kalakoti [5] proposed the work on transformation technique like discrete cosine transform, Fourier transform and discrete wavelet transform are used This feature consist of mean energy standard deviate on and Shannon entropy. The performance is evaluated on the basis of parameters like Miss Rate (MR), correct detection rate (CDR), false position rate (FFR) also comparison of all the three transformation and observed the result.

2.5 Nazera khalil dakhil, Hind Rostam Mohamed & Noora Ali Mohsim [6] proposed on the lake independent ridges pattern, discontinues spot fingerprint pattern, dots island crossover. Thus image enhancement techniques are employed prior to minutiae extraction to obtain more reliable minutiae location. The algorithm is proposed to create a connected the boundaries using the local point (feature) of the minutiae point in the fingerprint image object image draw the map connect the all point so work will be able to fingerprint image finding the map of the part by boundaries algorithm.

2.6 Joset StromBarturek, Mikael Nilsson [7] proposed on the term of adaptive implies that parameter of the approach are automatically adjusted based on the input finger print image, five process block compare the adaptive fingerprint where four are updated in our proposed system. The proposed overall is novel four blocks.

- i. Global Analysis
- ii. Pre-processing
- iii. Matched filter
- iv. Local Analysis

### 3. FINGERPRINT DEVICE

The fingerprint device which is used for fingerprint recognition and fingerprint matching in E-cupboard System is optical fingerprint recognition embedded module GT511C3. The device is single chip module with fingerprint algorithm and optical sensor.

Firstly, optical fingerprint sensor will enroll fingerprint of user. Enrolment process has four tasks which are SenCapture, SenIsFinger, SenGetFeature, EnrollNthFpData. SenCapture means it capture fingerprint of finger. SenIsFinger function decide is it fingerprint or not? SetGetFeature function extract feature from fingerprint. Lastly EnrollNthFpData enroll fingerprint in memory. This task iteratively execute three times. After all three successful iteration fingerprint enrolment process complete successfully.

High-accuracy and high-speed fingerprint identification is major function of device. Device contain ultra-thin optical sensor. Device has 1:1 verification and 1:N identification. Image of fingerprint can be downloaded from device. By using device fingerprint templates read or write from/to the device. Simple UART (Universal Asynchronous Receiver/Transmitter) and USB (Universal Serial Bus) communication protocol is used in implemented device. A Universal Asynchronous Receiver/Transmitter is a computer hardware device for asynchronous communication in which the data format and transmission speeds are configurable.

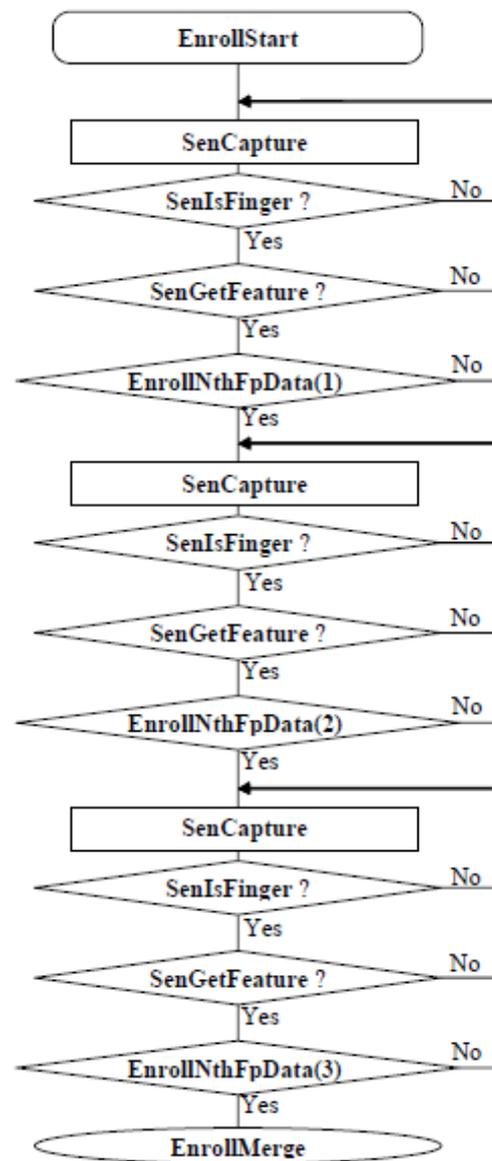


Fig 1.Fingerprint Enrolment Flowchart

The electric signaling levels and methods (such as different signaling etc.) are handled by a driver circuit external to the UART. UARTs are commonly used in conjunction with communication standards such as TIA (formerly EIA) RS-232, RS-422, RS-485. A UART usually an individual (or part of an) integrated circuit used for serial communication over a computer or peripheral device serial port. UARTs are now commonly included in microcontrollers. A dual UART, or DUART, combines two UARTs into a single chip. Similarly, a quadruple UART or QUART combines four UARTs into

one package, such as the Exar XR16L788 or the NXP SCC2698. A related device, the Universal Synchronous/Asynchronous Receiver/Transmitter (USART) also supports synchronous operation.

loopholes for usage of fake certificates/ documents. Anyone with same name can indeed misuse someone else's document, because of nature of these documents not having strong identity attach to it.

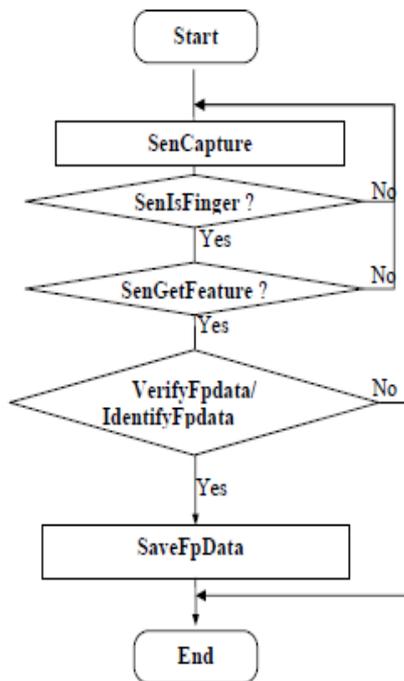


Fig 2.Fingerprint 1:1/1:N matching Flowchart

### 3.1 Capture of the fingerprint image

IsPressFinger checks whether a finger placed on the sensor. This function is used especially while enrollment. CaptureFinger captures a fingerprint image (256x256), if a finger isn't placed on the sensor, it returns with error. In this function returns with success, the device's internal RAM keeps valid fingerprint image for the subsequent commands. If the host issues other command, the fingerprint image will be used and destroyed.

GetRawImage captures a raw live image (320x240), it doesn't check whether a finger placed on the sensor, this function is used for debug or calibration.

### 3.2 Identifying and Verifying

Identify and IdentifyTemplate perform 1:N matching operation. Verify and VerifyTemplate perform 1:1 matching operation. Just before calling of image-related functions (Identify, Verify), the host must call CaptureFinger.

## 4. E-CUPBOARD SYSTEM

To issue driving license is a very tedious task for the government to monitor. While driving, it is very difficult task to carry all documents which required for driving purpose. Now days, in India, almost all of the government issued documents are in physical form across the country including all RTO related documents. This means every time a resident needs to share the document with an agency to avail any service, an attested photo copy in physical form is shared which is hectic task. Use of physical copies of document creates huge overhead in terms of paper storage, manual verification, manual audits, etc. incurring high cost and inconvenience. This creates problem for various agencies to verify the authenticity of these documents, thus, creating



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LEGEND FOR CLASS OF VEHICLES (COV)

S.No	COV	DESCRIPTION	S.No	COV	DESCRIPTION
1	MCWOG	M.C W/o Gear	13	MCWGT	M.C W/o Gear TR
2	MCWG	M.C With Gear	14	MCWGT	M.C With Gear TR
3	LMV	LMV-NT-Car	15	LMV-PVT	LMV-Private
4	3W-NT	LMV-3 WheelerNT	16	PSVBUS	TRV-PSV-Bus
5	TRACTOR	LMV-Tractor	17	PVTBUS	TRV-Private Bus
6	LMV-TR	LMV-Transport	18	LDRXCV	OTH-Loadr/xcvtr
7	3W-TR	LMV-3 WheelerTR	19	CRANE	OTH-Cranes
8	TRANS	Transport	20	FLIFT	OTH-Fork Lift
9	INVCRG	Inv Carriage	21	BRIGS	OTH-Boring Rigs
10	RDRLR	Road Roller	22	CNEQP	OTH-ConstEquipmt
11	LMV-TT	LMV-TractorTrl	23	INVCG2	INV-Carriage-2
12	OTHVEH	Others	24	INVCG3	INV-Carriage-3

LMV - LIGHT MOTOR VEHICLE TRV - TRANSPORT VEHICLE  
● DRIVE CAREFULLY - AVOID ACCIDENTS ●

Fig 3.Generated Digital License

E-cupboard is RTO document checking using fingerprint authentication web based system. The driving license document is issued in digital form. Due to online form filling of driving license every time a resident does not needs to share the document with an agency to avail any service because soft copy are submitted while filling application. Use of physical copies of document, its huge overhead in terms of paper storage, high cost inconvenience, manual verification, manual audits, etc. all above problems are solved. Physical documents are totally hectic documents to manage them and creates problem for government agencies to verify the authenticity of these documents, thus, creating loopholes for usage of fake certificates/ documents. Due to the nature of these documents not having a strong identity attached to it, anyone with same name can indeed misuse someone else's document. But due to fingerprint based authentication and identification problems related to authenticity of document, fake certificate/documents, misuse of documents are solved.

Our system has User (requesting driving licence) login, admin login and Traffic police login type. To check documents traffic police will take fingerprint, ADHAR card number as input. It will open profile of user which include issued document list. The list have document list which can be viewed by traffic police. If driver doesn't have valid document then automatically fine/penalty will be generated according to rules. On the other side RTO office have all digital document which have stored in centralized database. The admin user which is government employee will have the authority to issue or do not issue licence on the basis of result of driving test conducted by RTO.

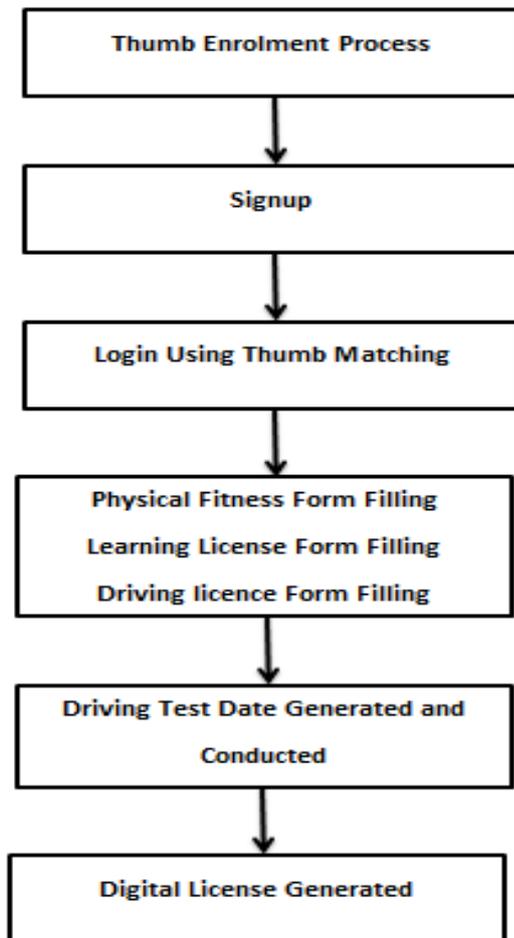


Fig 4. Flow of E-Cupboard System

If person wants to generate his license then he should sign up on website by enrolling his fingerprint and all required information E-cupboard System. Then user can login through fingerprint identification and other alternate option aadhar number. User has option to issue learning license, driving license, renewal of driving license. User has to fill application form online and after that option of probable dates for driving dates will display on computer. User should select one date from given option. On the basis of result of driving test digital license is issued. User can download anytime his Digital driving license from website. E-cupboard System issue digitalized license and digital image of fingerprint which is stored in centralized database. Same process is used to generate smart card and RC book.

## 5. CONCLUSION

E-cupboard is RTO document checking using fingerprint authentication web based system. Fingerprint Identification is very important, reliable and trustful human identification method. Amongst all biometrics fingerprint authentication and identification is most trustful, popular and reliable personal biometric identification method. Present studies carried out over fingerprint recognition methods shows each methods analysis, their pros and cons. Fingerprint is completely unique and unchangeable to an individual for lifetime

The driving license document is issued in digital form. Due to online form filling of driving license every time a resident does not needs to share the document with an agency to avail any service because soft copy are submitted while filling

application. Use of physical copies of document, its huge overhead in terms of paper storage, high cost inconvenience, manual verification, manual audits, etc. all above problems are solved. Due to fingerprint based authentication and identification problems related to authenticity of document, fake certificate/documents, misuse of document are solved.

Further, we are continuing to implement system as all other government related document like smart card, pan card, etc. should issue on same portal by applying other security methods. We would mainly be focusing on the dataset provided by Sinhgad College.

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