

# Fingerprint Authorization based Driving License Checking System

Guruprasad K N<sup>1</sup>, Keerthi A Kumbar<sup>2</sup>

<sup>1</sup>Department of Electronics and Communication Engineering, ATME College of Engineering, Mysuru, India

<sup>2</sup>Department of Electronics and Communication Engineering, ATME College of Engineering, Mysuru, India

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**Abstract:** Driving license checking framework is a significant issue in numerous nations. Consequently the biometric based driving permit checking framework is utilized since it is extremely simple and helpful to screen. Biometrics suggests estimations related to human characteristics. Biometrics affirmation (or reasonable approval) is used in computer programming as a kind of ID and access control. It is in like manner used to perceive individuals in bundles that are under perception. Biometric identifiers are then obvious, quantifiable characteristics used to name and depict individuals. Biometric identifiers are consistently requested as physiological versus social ascribes. Physiological ascribes are related to the condition of the body. Biometrics studies commonly include unique finger impression, face, iris, voice, mark, and hand calculation acknowledgment and check. Among these open biometric characteristics special finger impression ends up being perhaps the best characteristic giving great mismatch proportion and furthermore solid. Other characters such as face, iris, voice, signature, and hand geometry recognition varies according to ages but fingerprint remains the same as age goes on. Hence fingerprint proves to be reliable. By using this biometric based system i.e. fingerprint technology to find driving license one can eradicate more time utilization to check all vehicles.

**Keywords-** *Fingerprint, Biometrics, Driving license etc*

## I. INTRODUCTION

A driving license is an authority record allowing a particular individual to work at least one sorts of mechanized vehicles, like a cruiser, vehicle, truck, or transport on a public street. The laws identifying with the authorizing of drivers change between locales. In certain wards, a license is given after the beneficiary has breezed through a driving assessment, while in others, an individual gets a license prior to starting to drive. Various classes of license regularly exist for various kinds of engine vehicles, especially huge trucks and traveler vehicles. The trouble of the driving test fluctuates extensively between wards, as do factors like age and the necessary degree of training.

In India, the driving license is the authority report which approves its holder to work different kinds of engine vehicle on parkways and some different streets to which general society approach. In different Indian states, they are directed by the Regional Transport Authorities/Offices (RTA/RTO). Earlier license were issued by booklet which was very difficult to monitor. Next an advanced photograph driving license can likewise fill a significant number of the needs of a character card in non-driving settings (verification of personality (for example when opening a financial balance) or age (for example while applying for a portable association)).

Now with the assistance of biometrics identity card is replaced and new system introduced i.e., fingerprint based license checking for automobiles. In this system, Fingerprints are taken while distributing driving license to the eligible drivers and save in database and this information is used to identify whether the user is having license or not. Hence by using Biometric based system to find authenticated driving license one can eradicate more time utilization to check all vehicles.

Sensor (R305) is used to scan fingerprint and finger print pictures of the residents will be put away in the module with an exceptional id. Residents need to examine their picture on request by police, which is then confirmed with the picture present in unique finger impression module and their record will be refreshed.

## II. LITERATURE REVIEW

A.K. Jain[2], P. Flynn, and A.A.Ross, Handbook of Biometrics, Springer, 2007: 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. The authors describe an automated fingerprint recognition system and identify key challenges and research opportunities in the field. The skin on our palms and soles exhibits a flow-like pattern of ridges and valleys. These papillary ridges on the finger called friction ridges help the hand to grasp objects by increasing friction and

improving the tactile sensing of surface textures. The “Friction Ridge Patterns” sidebar describes the nature and origin of these characteristics

C.Lee and R.E.Gaensslen eds[3], *Advances in Fingerprinting Technology* : Gingy is a professional company with the unique technology of ‘3D fingerprint identification’. Since its inception in 2008, is committed to research and development of key technologies to complete 3D touch print, with different software algorithms combined with high performance. USB controller chip that allows Gingy fingerprint sensor can be widely used in laptops, industrial host, POS terminal, mouse, keyboard, external drives and so on. Login or internal computer system for sensitive information, those who want to prevent intrusion or theft allowed internal data, can be used. Gingy fingerprint identification products meet protection. Meanwhile, Gingy fingerprint sensor also integrates high-performance 32bit MCU controller chip.

J. Feng, [4] “Combining Minutiae Descriptors for Fingerprint Matching”: *Pattern Recognition* A novel minutiae-based fingerprint matching algorithm is proposed. Minutiae matching algorithm has to solve two problems: correspondence and similarity computation. For the correspondence problem, we assign each minutia two descriptors: texture-based and minutiae-based descriptors, and use an alignment-based greedy matching algorithm to establish the correspondences between minutiae. For the similarity computation, we extract a 17-D feature vector from the matching result, and convert the feature vector into a matching score using support vector classifier. The proposed algorithm is tested on FVC2002 databases and compared to all participants in FVC2002. According to equal error rate, the proposed algorithm ranks 1st on DB3, the most difficult database in FVC2002, and on the average ranks 2nd on all 4 databases.

### III. HARDWARE REQUIREMENT

#### A. Piezoelectric buzzer

A bell or beeper is a sound hailing device, which may be mechanical, electromechanical, or piezoelectric. Customary livelihoods of signs and beepers consolidate ready devices, tickers, and assertion of customer data, for instance, a mouse snap or keystroke.

Piezoelectricity (moreover called the piezoelectric effect) is the presence of an electrical potential (a voltage, all things considered) across the sides of a valuable stone when you subject it to mechanical pressing factor. As shown by British Telephones, an alluring effect is conveyed when a battery is related with a sign’s equipment and the catch is pressed. This makes power course through the twists, which pulls in the armature and produces a sound.

In this technique, a piezoelectric buzzer is used indicate whether the fingerprint of an individual is placed on the fingerprint scanner. If the fingerprint is placed on scanner then the piezoelectric buzzer gives the buzzer sound, otherwise buzzer generates no sound.



Figure 1: Piezoelectric buzzer

### B. ARDUINO UNO Board

Arduino Uno is quite possibly the most well-known and generally utilized Arduino processor board. It is an open source, PC equipment and programming organization. The Arduino board makes it extremely simple to utilize the ATMEGA328 processor by giving simple admittance to a large portion of the pins by means of the header.

Arduino Uno designed to utilize an assortment of microchip and regulators. The sheets are outfitted with sets and computerized and simple information yield sticks that might be interfaced to different development sheets and different circuits. The board highlights sequential interchanges interfaces remembering USB for certain modems which are likewise utilized for stacking programs from PCs. The miniature regulators are normally customized utilizing vernacular highlights from the programming dialects C and C++.



Figure 2: Arduino UNO Board

### C. LCD

LCD (Liquid Crystal Display) screen is an electronic grandstand module and tracks down a wide extent of employments. A 16x2 LCD show is fundamental module and is by and large used in various contraptions and circuits. In this endeavor LCD is used to show endorsed and unapproved driver.

These modules are loved in excess of seven sections and other multi partition LEDs. The reasons being: LCDs are judicious; successfully programmable; have no hindrance of showing excellent and surprisingly custom character sun like in seven bits.

A 16x2 LCD infers it can show 16 characters for each line and there are 2 such lines. In this LCD each character is appeared in 5x7 pixel organization. This LCD has two registers, explicitly, Command and Data. The data is the ASCII worth of the character to be appeared on the LCD.



Figure 3: Liquid Crystal Display

#### D. R305 Fingerprint Sensor

In the present secure world biometric wellbeing is on the top. Not in any manner like various strategies which use passwords and numbers, that are ought to have been reviewed, biometric systems use human body parts like fingerprints or even iris of our eyes and these things are novel to all. Hence it makes biometric systems the best over others. In this endeavor, an amazingly renowned remarkable finger impression scanner R305 is interfaced with ATMEGA 16 microcontroller. This module bestows over UART show with microcontroller, and it uses Rx and Tx pin of microcontroller to interface with it..

This module is preloaded with scanner similarly as area section and has 4 pins: VCC, GND, Rx and Tx. It works over 3.3 to 5V stock and its Rx and Tx pin is related with Tx and Rx pin of the microcontroller separately.

The mode is semi duplex nonconcurrency sequential correspondence and the default baud rate is 57600bps however it tends to be changed between 9600~115200bps.

R305 module imparts over UART convention with microcontroller for example it utilizes collector and transmitter pin of microcontroller to connect with it. The client can store the finger impression information in the module and can arrange it in 1:1 or 1: N mode for distinguishing the individual.

In this project, R305 fingerprint sensor is used to scan the fingerprint image of an individual for two phases namely enroll phase and access phase where the fingerprint image is scanned and captured and converted from JPEG to ASIIC.



Figure 4: R305 fingerprint module

### IV. DESIGN METHODOLOGY

#### A. Block diagram

The block diagram of fingerprint based license checking system has ATMEGA-328P, R305 sensor and LCD and these components connections are explained in the block diagram.

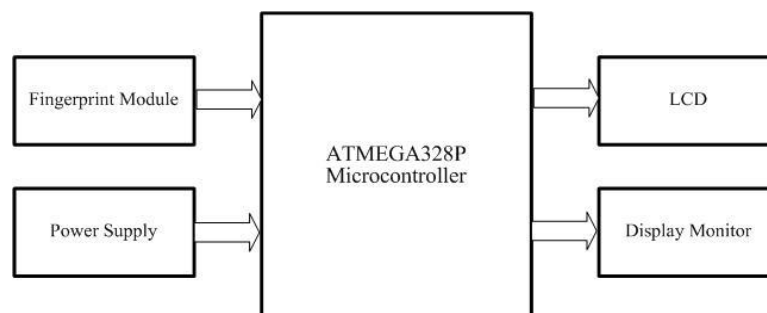


Figure 5: Block diagram of Fingerprint based driving license checking system

If the finger is placed on finger sensor, it check for authorized license by RTO with the help of server. If the license is authorized LCD will show the fingerprint found, if not authorized LCD displays fingerprint not found.

*B. Modes of biometric system*

The block diagram illustrates the two basic modes of a biometric system: a) Verification Mode, and (b) Identification Mode

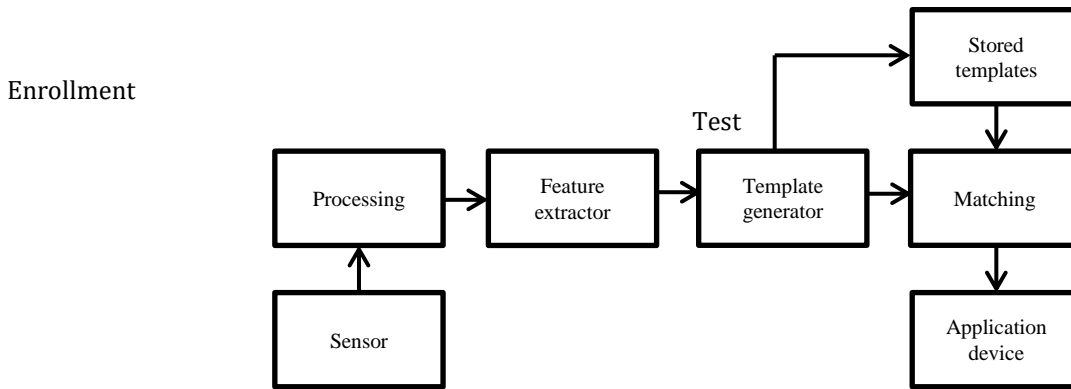


Figure 6: Block diagram of a Biometric system

**a) Verification Mode**

First, in verification (or authentication) mode, the system performs a one-to-one comparison of a captured biometric. Three steps are involved in the verification of a person.

1. In the first step, reference models for all the users are generated and stored in the model database.
2. In the second step, some samples are matched with reference models to generate the genuine and impostor scores and calculate the threshold.
3. Third step is the testing step. This process may use a smart card, username or ID number (e.g. PIN) to indicate which template should be used for comparison. 'Positive recognition' is a common use of the verification mode, "where the aim is to prevent multiple people from using the same identity".

**b) Identification Mode**

In identification mode the system performs a one-to-many comparison against a biometric database in an attempt to establish the identity of an unknown individual. The system will succeed in identifying the individual if the comparison of the biometric sample to a template in the database falls within a previously set threshold. Identification mode can be used either for 'positive recognition' (so that the user does not have to provide any information about the template to be used) or for 'negative recognition' of the person "where the system establishes whether the person is who she (implicitly or explicitly) denies to be". The latter function can only be achieved through biometrics since other methods of personal recognition such as passwords, PINs or keys are ineffective.

The first time an individual uses a biometric system is called enrollment. During the enrollment, biometric information from an individual is captured and stored in the database. In subsequent uses, biometric information is detected and compared with the information stored at the time of enrollment and checks for the matching of the fingerprint.

In the figure 6, The first block (sensor) is the interface between the real world and the system; it has to acquire all the necessary data. Most of the times it is an image acquisition system, but it can change according to the characteristics desired. The second block performs all the necessary pre-processing: it has to remove artifacts from the sensor, to enhance the input (e.g. removing background noise), to use some kind of normalization, etc. In the third block necessary features are extracted. This step is an important step as the correct features need to be extracted in the optimal way. A vector of numbers or an image with particular properties is used to create a template. A template is a synthesis of the relevant characteristics extracted from the source. Elements of the biometric measurement that are not used in the comparison algorithm are discarded in the template to reduce the file size and to protect the identity of the enroll.

C. Working Flow chart of Enroll phase

The Enrollment starts here. Image of the finger print is scanned from the finger print sensor and stored in the database. The sensor will correctly saves the fingerprint image.

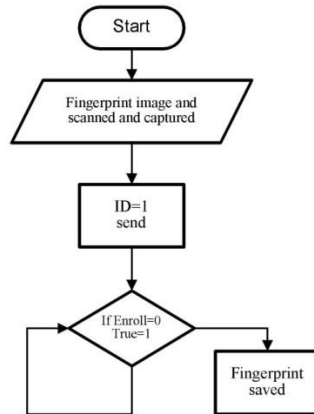


Figure 6: Flow chart of enrollment code

The above flowchart gives the details of enrolling the fingerprint using sensor. During this phase the sensor scans the users fingerprint from the fingerprint sensor and converts it into a digital image, and it is stored in the database along with their uniquely generated ID. Initialisation is done by randomly choosing any one of the uniquely generated ID from the serial monitor and it should be sent. The fingerprint is saved in the database. If the fingerprint is not properly placed then it needs to be rescanned and it is saved.

C. Working Flow chart to access code

Start the access code. Place the finger on fingerprint sensor and it captures the fingerprint image and stored as a template. The stored fingerprint image from the database of enroll phase is accessed. If the fingerprint is matched with the template the details of the individual is displayed in the serial monitor. If the condition is true LCD displays “you are authorized with name”. If false, LCD displays “you not authorized”.

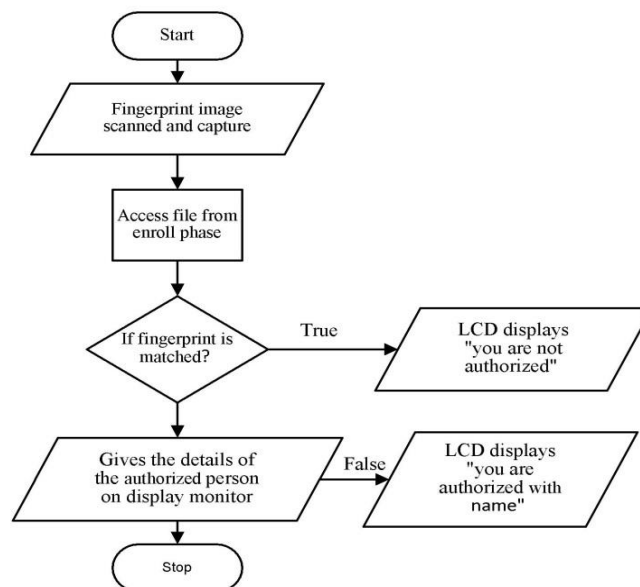


Figure 7: Flow chart to access the code

## V. RESULTS AND ANALYSIS

The implementation of this fingerprint based license checking system is successful and gives an output with no errors. When a fingerprint of an individual is placed on the fingerprint sensor it captures the image of the fingerprint and stores in the database which is done in the enroll phase. In access phase fingerprint image is scanned and check whether the fingerprint images is matched with the stored fingerprint in database, if fingerprint is matched then it gives the details of the authorized person on the display monitor and also in LCD. If the fingerprint of an individual is not matched with stored fingerprint in database then it does not gives the details of an individual and displays that the person is unauthorized on the display monitor and on LCD.

The open source Arduino uno programming makes it simple to compose code and transfer it to the board. Two phases in scanning the fingerprint image that is Enrollment phase and Access phase, where in enrollment phase fingerprint image is captured and given with unique ID and stored in the database.

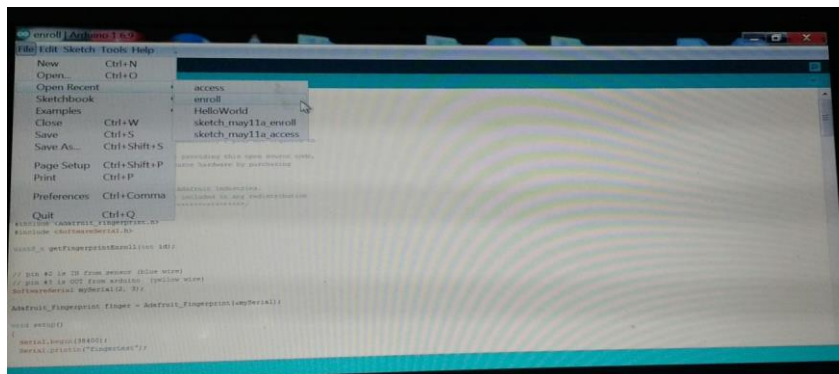


Figure 7: Fingerprint enrollment phase

The second phase in scanning the fingerprint image is access phase where the fingerprint image is scanned and matches with the fingerprint image stored in database. If the fingerprint image is matched then the person is authorized if not the person is not authorized. Fingerprint Access phase is shown in below figure no. 8

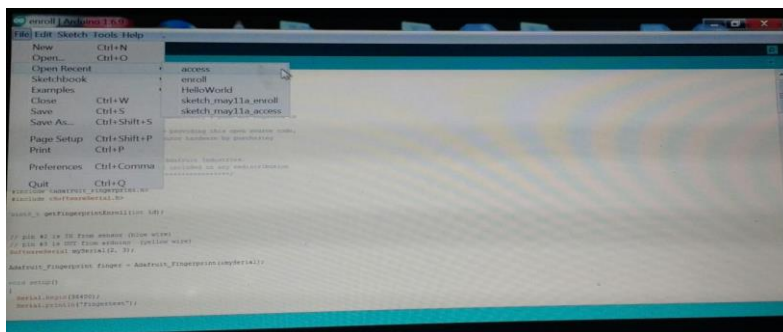


Figure 8: Fingerprint Access phase

The output was obtained for the fingerprint based driving license checking system, when the fingerprint image is placed on the fingerprint sensor and when the fingerprint image is matched with the stored fingerprint image in the database or in the enrollment phase.



Figure 9: LCD showing the output of authorized person

The below figures depicts when fingerprint of an individual is not matched with the fingerprint image stored in the database, LCD displays the person is not authorized and details of an individual will not be available.

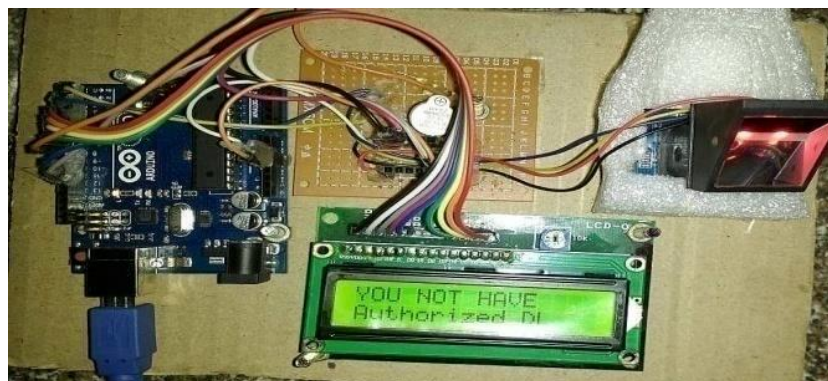


Figure 10: Output of LCD showing unauthorized

## VI. CONCLUSION AND FUTURE SCOPE

Computerized finger impression distinguishing proof frameworks have been effectively conveyed around the worldwide for both law-implementation and non military personnel applications, and new finger impression coordinating with applications keep on arising. The finger impression will keep on being the prevailing biometric quality, and numerous personality the executives and access control applications will keep on depending on finger impression acknowledgment as a result of its demonstrated presentation, the presence of enormous inheritance information bases, and the accessibility of smaller and modest finger impression perusers. Further, unique finger impression proof is adequate in courtrooms to convict hoodlums. In this paper we have proposed strategy dependent on "Particulars based "calculation for proficient and more got due to these highlights Universality, Uniqueness, Permanence, Collectability, Acceptability, Circumvention and Performance when contrasted with the current framework. The security can be additionally expanded utilizing some cutting edge innovations like progressed sensors, for example Retina Sensors, yet these expands the expense of the venture.

This project is based on fingerprint to check whether the person is authorized to drive the vehicle or not by using fingerprint image. In future this project can be implemented using iris, so that it cannot be duplicated.

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