Fingerprint Based License Checking System for Vehicles

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Abstract:- Maintaining manual driving licence system is very difficult task for the government agencies to monitor as the number of vehicle users are increasing day by day, so for agility plus perfection we need something advance than convetional way of maintenance. In this seminar, we are going to maintain record of driving licence number attached to vehicle with the help of electronics scanning of human body parts(BIOMETRIC). According to ancient Greek scripts BIOMETRIC means study of life. Biometrics studies commonly include fingerprint, face, iris, voice, signature and hand geometry recognition and verification. Among these available biometric features Finger Print suits to be one of the best traits providing good mismatch ratio and also it is reliable. The scanner is interfaced 8051 microcontroller through max232 serial communication. By using this controller we will be controlling the scanning process. After the scanning has been completed the result is stored in the microcontroller. By simply pressing a switch a we can get the details. For this purpose we are combining biological and electronics streams with the help of two different technologies viz. EMBEDDED SYSTEMS and BIOMETRICS.

Keywords: Authentication, Fingerprint, License, Matching, Minutiae, Sensor.

I. INTRODUCTION

Recently while us discussing about Biometrics we are concentrating on Fingerprint scanning. For this we are using FIM 3030N high voltage module as a scanner. This module has in-built ROM, DSP and RAM. In this we can store up to „n" no of users fingerprints. This module can operate in 2 modes they are Master mode and User mode. We will be using Master mode to register the fingerprints which will be stored in the ROM present on the scanner with a unique id. When this module is interfaced to the microcontroller, we will be using it in user mode. In this mode we will be verifying the scanned images with the stored images. When coming to our application the images of the citizens will be stored in the module with a unique id. Citizens have to scan their image on demand by police, which is then verified with the image present in fingerprint module and their record will be updated. This scanner is interfaced to 8051 microcontroller through max232 enabling serial communication. By using this controller we will be controlling the scanning process. After the scanning has been completed the result is stored in the microcontroller. By simply pressing a switch we can get the details of the polling. This paper uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary of 230/12V step down transformer

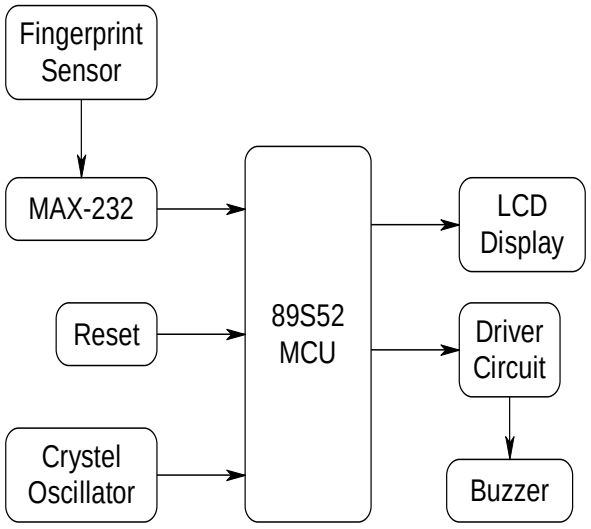

Fig : Block Diagram

Section 1 basically is an introduction of the system. In this chapter, the discussion is all about the background, need and objectives of the project. The overall overview of the entire system is discussed in the section. Next section discusses about the Proposed system. Last section concludes the paper. This section also discusses about total costing involved and potential of the system for commercialization.

II. PROPOSED SYSTEM

During the *enrollment phase*, the sensor scans the user's fingerprint and converts it into a digital image. The minutiae extractor processes the fingerprint image to identify specific details known as *minutia points* that are used to distinguish different users.

By using this system all the previous system are avoided the most important drawback that the person which is under age can't ride the vehicles. As for the license it is mast that it is above 18. By using this module the fingerprint that can identify the stored image that is stored at the time of initialization.

Fig : Process Of Recognition And Storage

Minutia points represent locations where friction ridges end abruptly or where a ridge branches into two or more ridges. A typical good-quality fingerprint image contains about 20-70 minutiae points; the actual number depends on the size of the sensor surface and how the user places his or her finger on the sensor. The system stores the minutiae information—location and direction—along with the user‟s demographic information as a template in the enrollment database. During the identification phase, the user touches the same sensor, generating a new fingerprint image called a query print. Minutia points are extracted from the query print, and the matcher module compares the query minutia set with the stored minutia templates in the enrollment database to find the number of common minutia points. Due to variations in finger placement and pressure applied on the sensor, the minutia points extracted from the template and query fingerprints must be aligned, or registered, before matching. After aligning the fingerprints, the matcher determines the number of pairs of matching minutiae—two minutia points that have similar location and directions. The system determines the user‟s identity by comparing the match score to a threshold set by the administrator.

A. Matching

A fingerprint matching module computes a match score between two fingerprints, which should be high for fingerprints from the same finger and low for those from different fingers. Fingerprint matching is a difficult pattern-recognition problem due to large intraclass variations (variations in fingerprint images of the same finger) and large interclass similarity (similarity between fingerprint images from different fingers). Intraclass variations are caused by finger pressure and placement— rotation, translation, and contact area—with respect to the sensor and condition of the finger such as skin dryness and cuts. Meanwhile, interclass similarity can be large because there are only three types of major fingerprint patterns (arch, loop, and whorl). Most fingerprint-matching algorithms adopt one of four approaches: image correlation, phase matching, skeleton matching, and minutiae matching. Minutiaebased representation is commonly used, primarily because • Forensic examiners have successfully relied on minutiae to match fingerprints for more than a century, • Minutiae-based representation is storage efficient, and• expert testimony about suspect identity based on mated minutiae is admissible in courts of law. The current trend in minutiae matching is to use local minutiae structures to quickly find a coarse alignment between two fingerprints and then consolidate the local matching results at a global level. This kind of matching algorithm4 typically consists of four steps, as Figure shows. First, the algorithm computes pair wise similarity between minutiae of two fingerprints by comparing minutiae descriptors that are invariant to rotation and translation. Next, it aligns two fingerprints according to the most similar minutiae pair. The algorithm then establishes minutiae correspondence—minutiae that are close enough both in location and direction are deemed to be corresponding (mated) minutiae. Finally, the algorithm computes a similarity score to reflect the degree of match between two fingerprints based on factors such as the number of matching minutiae, the percentage of matching minutiae in the overlapping area of two fingerprints, and the consistency of ridge count between matching minutiae.

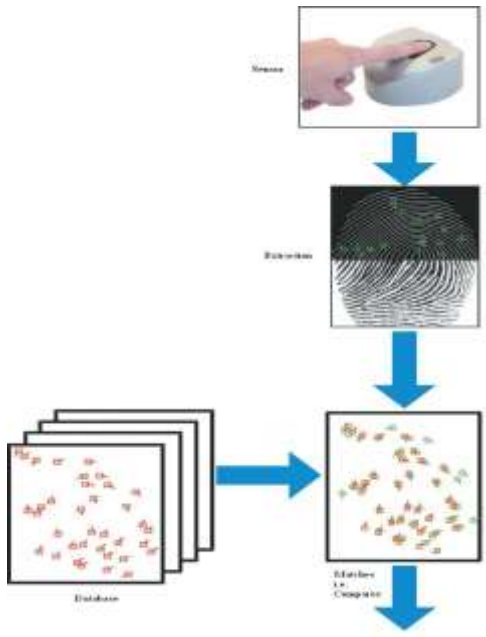

Fig : Process Of Fingerprint Based License Checking System For Automobiles

B. Matching With Stored Image

Matching stages show big differences according to their types although they are based on the same minutiae. Here, the most well-known matching algorithm will be briefly explained. The matching process consists of four main stages.

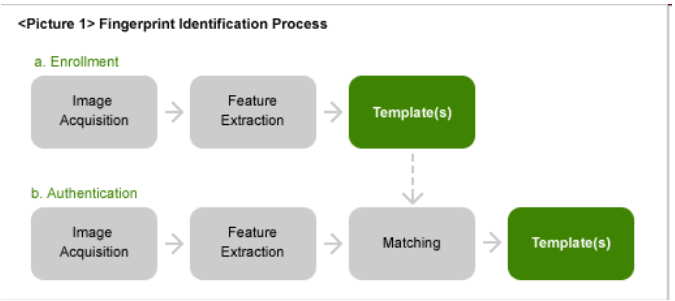

Fig : Sensor's Identification

First of all, the minutiae analysis stage analyzes the geometric characteristics such as distance and angle between standard minutiae and its neighboring minutiae based on the analysis of the image-processed feature data. After the analysis, all the minutiae pairs have some kind of geometric relationship with their neighboring minutiae, and the relationship will be used as basic information for local similarity measurement.

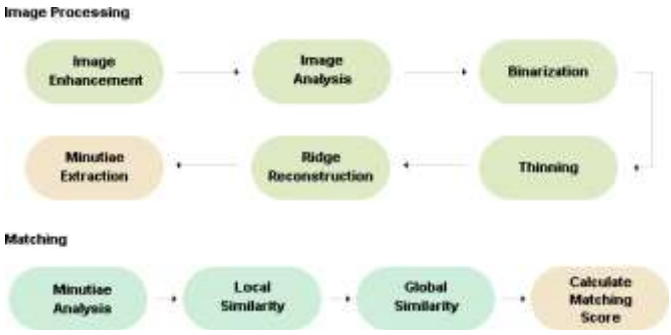

Fig : Recognition Algorithm

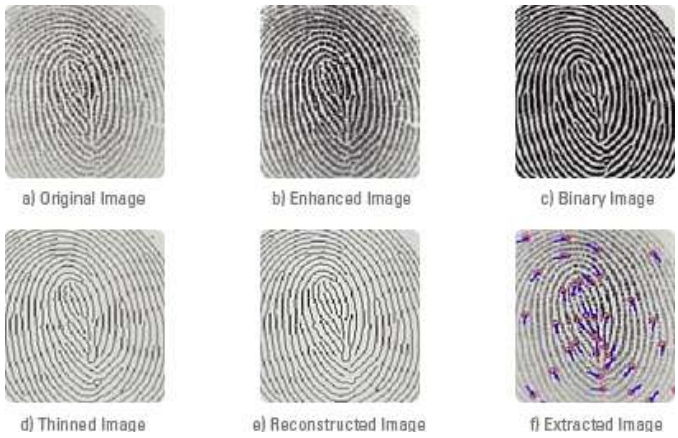

Fig: Image Processing

III. CONCLUSION

Automated fingerprint identification systems have been successfully deployed around the globe for both law-enforcement and civilian applications, and new fingerprint matching applications continue to emerge. The fingerprint will continue to be the dominant biometric trait, and many identity management and access control applications will continue to rely on fingerprint recognition because of its proven performance, the existence of large legacy databases, and the availability of compact and cheap fingerprint readers. Further, fingerprint evidence is acceptable in courts of law to convict criminals. In this paper we have proposed method based on "Minutiaebased" algorithm for efficient and more secured because of these features Universality, Uniqueness, Permanence, Collectability, Acceptability, Circumvention and Performance when compared to the existing system. The security can be further increased using some modern technologies like advanced sensors, e.g. Retina Sensors, but these increases the cost of the project.

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