Interfacing of Finger Biometric Module with Arm-7 for Medical Application

Mohit M.Jungare
Department of Electronics and Telecommunication Engg.
Priyadarshini College of Engineering
Nagpur, Maharashtra, India
mohit.jungare123@gmail.com

Prof.V.G.Giripunje
Department of Electronics and TeleCommunicationEngg.
Priyadarshini College of Engineering
Nagpur, Maharashtra, India
vyenktesh1973@gmail.com

Abstract—There are number of technologies or modules available for personal identification. Here we want to make a personal identification system using finger biometric module with ARM-7 i.e. LPC2148. The basic idea of making this interfacing happens so as to use it in any of the personal identification applications. Here in this paper we want to make a medical application i.e. tracking of the patients Medical Records usingfinger biometric module and ARM-7. The medical records are stored in the database server by the hospital with patient's information. This work is proposed for making the system easier, reliable, security of patient's personal medical information.

Keywords: *Medical Records, Finger Biometric module, ARM-7 LPC2148.*

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I. INTRODUCTION

The medical records are very much important for the patients suffering from severe diseases as they have to take care of each and every prescription and test results for future reference and treatment. This problem is also observed in case of huge organizations or hospitals where these records are to be preserved. The work was developed to avail the medical history of the patient anytime and anywhere in the hospital for the reference of doctors. The previous information of the patient like when the patient visited for last check-up, information about his medicinal course *etc.* will be made available in fraction of seconds on computer screen. Here the medical history tracking of the patient was done using Finger Biometric Module and the record was stored in the database server. It was continuously updated after every visit of the patient to the hospital. It has the ability to exchange records between different organizations or hospitals (interoperability) that would facilitate co-ordination of healthcare delivery. In addition to data from an record system is to be used for statistical reporting in matters such as quality improvement, resource management & public health surveillance.

Today the world is compacting as the numbers of technologies are replacing the older methods of operations. From different engineering application fields, medical field is the critical one as it deals with the life of human beings, so more attention is needed for this field. When the patient visits any hospital, doctor or consultant needs a previous medical record of the patient for proper treatment. But sometimes, patients were unable to produce these records on time to the doctor due to some reasons like forgetfulness, unavailability of records and some mishaps. Mentioned reasons may create problem for the doctor for proper check-up and treatment of the patient. Paper-based records are still by far the most common method used for recording patient information in most hospitals and practices worldwide. The medical record is to be preserved for number of years based on the treatment. The records are stored on the server of hospital. These records are not immune to parameters such as ageing, wear and tear, fire, humidity *etc.* Handwritten records can associated with poor legibility, which contributestoerrors. Hence a medical history tracking system is proposed. The system is a computer based medical record created in hospital that provides care in hospital or medical professional's office. Electronic medical records tend to be an integral part of health information system that allows storage, retrieval and modification of records.

The fields such as animal husbandry and defence healthcare need more attention, as the collection and storing of medical record is a very tedious job for patients in such cases. The electronic medical record system will solve this problem. The problem is to maintain the physical record of pets and animals by its owner and it is also difficult for the medical staff of veterinary hospitals. These records are important for proper treatment of such animals. Similar problem is observed in case of defence persons as they have to work in different border areas of countries, so their medical record will not be available every time with them. The medical history tracking system will help to solve these critical jobs of handling record.

II. MEDICAL REPORT TRACKING

A. *Finger Biometric Module*

The main interfacing module of medical report tracking system is shown infigure. Finger Biometric is used as unique user ID. The Finger Biometric Module can only give the access to the doctor to read the data of that particular patient to whom it belongs to. The Finger Biometric is the best option for any identity card/electronic identity modules. There are five stages involved in finger-scan verification and identification:

Features:
- ✓ Easy to use
- ✓ Status LEDs
- ✓ Function Switches

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✓ Single byte response
✓ Works at 5VUART 9600bps response

B. Working and Interfacing

InFinger biometric module when the person scan his finger on the lens .by capturing the image of the finger print it saves it to the memory allocated in the module, by comparing it with the already stored finger print images it will gives the authentication or identification of a particular person.
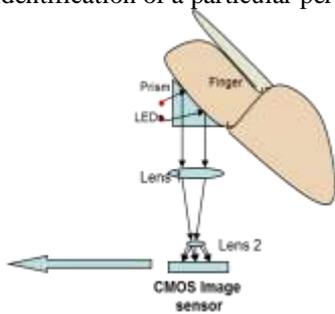
*C. General Biometric Based System*
Following block diagram is of Finger Biometric acquisition system.
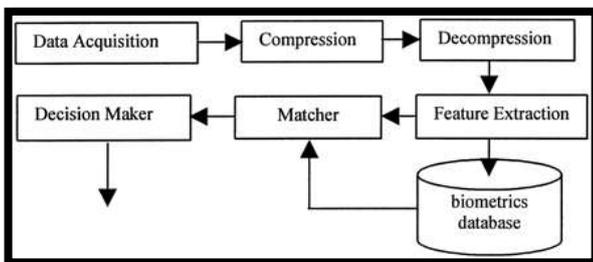
1. Data Acquisition
Data acquisition is nothing but the finger print scanning technique that is we are using with the help of finger biometric module. Here Data means the images that are taken by the finger biometric module when the person put the finger on the lens of module. As he put his finger on the module it will take a picture of finger print and store it to the database of hospital. The quantifiable physiological characteristics method is being used for verification of a particular patient.
There are two methods of Finger print scanning 1. by taking the visual image and 2.Uses a semiconductor generated electric field to image a finger.
2. Fingerprint features extraction
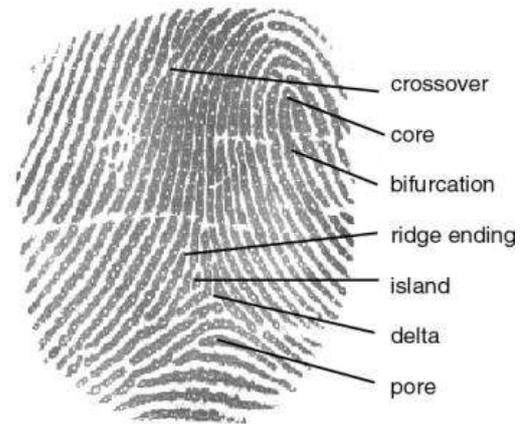
. A fingerprint is made of series of ridges and furrows on surface of finger. The uniqueness of a finger-print can determined by the pattern of ridges and furrows and the minutiae points as well.

In most of the finger Authentication system The discontinuities in the flow of the ridges over the finger are basis for Authentication of the particular Person called as minutiae .. Many types of minutiae exist, including very small ridges known as Dots, ridges slightly longer than dotsknown as islands,, spurs, ponds or lakes, and crossoversbridges
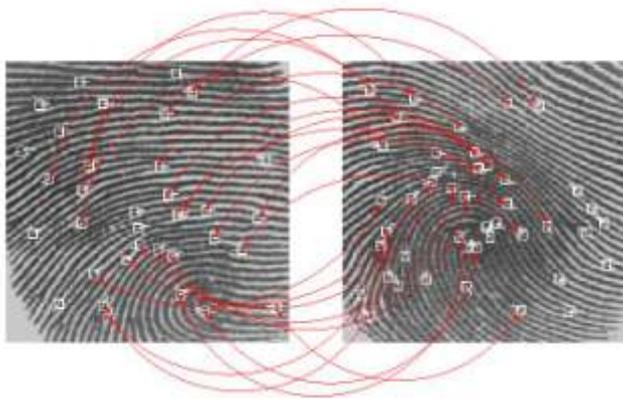
3. Fingerprint Matching
A fingerprint is madeupof series of ridges &furrows on surface of finger. Minutiae pts are local ridges characteristic that occurs at on a ridge bifurcation or an ending of a ridge.

Finger-print matching can placed in 2 categories: minute& based on correlation. Minutiae based technique finds minutiae points & then map them in the finger on their respective place. As there are some difficulties inthis approach. Itsvery difficult to extract all the minutiae points accurately when finger-print is of low quality. Also this method doesn'tconsider the global pattern. The method based on correlationwhich overcomes some difficulties in minutiae-based approach. As it has some shortcomings. Correlation based techniques require, precise location of registration pt and they are affected by image translation and rotation.

According to the original images given below shows the particular image taken by the image sensor over the finger module.

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4. Fingerprint classification

As per the given images of fingerprints given all are being matched with the database images As per the input Finger is being matched with the database images leads to reduce the searching the identity of person in large number of images in the database server. as per the given commands that are given by controller it will classify the images

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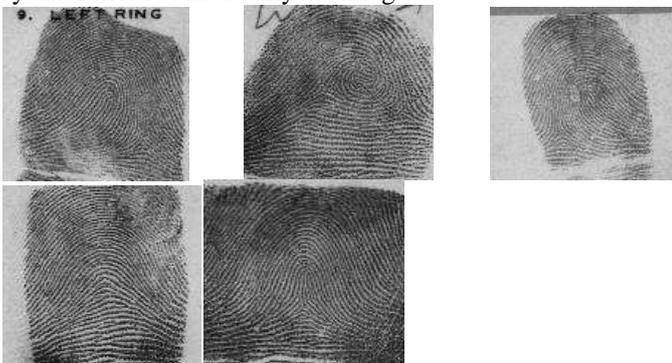
We developed an algorithm to classify finger-prints into five classes i.e.whirl, right-loop, left-loop, arch, tented arch. The algorithm separates number of ridges by filtering central part of a finger-print with Gabor filters. This information is quantized for generation of a Finger print Code which used for classification. Wedo classification based on two stage classifier which uses K nearest neighbor classifier in the 1st stage&in the second stage they are set of neural networks.

### 5. Fingerprint Image Enhancement

Automatically and reliably extract minutiae from the input fingerprint images Is the most critical step in the fingerprint matching as per the quality of input image of the fingerprint the minutiae extraction module performance depends. We have to developed an algorithm for improves clarity of ridge and structures of input images.

D. Interfacing with ARM-7 (LPC2148)

LPC2148 which is a ARM7 controller is a 32 bit controller works on 3.3v with inbuilt 10 bit ADC and DAC ,internal timer and a two UART ie universal asynchronous receiver transmitter use for external interfacing of finger module with the controller.As per the general overview we are going to make communication between ARM and finger module so that we have to make the ground pin common in between ARM and finger module. Here biometric module works on 5 v so we have to give it external supply from the power supply moduleAs per the communication part,

ARM has tx pin which is connect with the Rx pin of biometric module and Rx pin of ARM is connect with the Tx
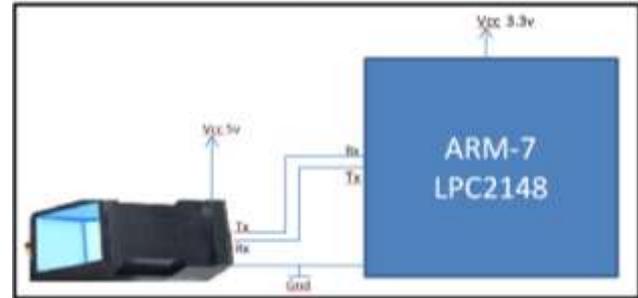

pin of biometric moduleo because of interchanging of the transmitter and receiver pin with each other the communication between the finger module and ARM controller takes place and as per the command given by the controller to the finger module the acquisition of the finger print of the patient and storing it in the database of the hospital being made.

ARM-7(LPC2148)
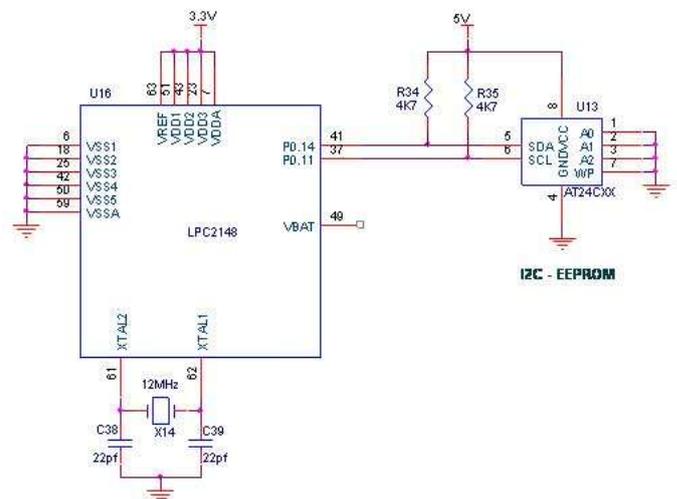
This is basic circuit diagram shows the pin configuration of the ARM. With the UART pins of the controller we have to attach finger biometric module. and other circuitry .

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III. System Flow
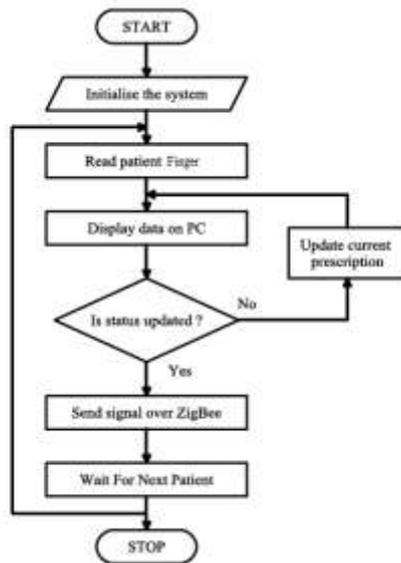
Asthe flow chart of the system first of all it will initiate a system as per the power supply provides to, then as per the patient enters he will read his finger on the finger biometric

module attached to the doctors desk,as soon as he read his finger on the module the medical records of the patient is displays on the computer screen of the doctor pc. Then he will check the status of the prescription if he wants to make any changes in the prescription he will make changes or is status is already updated then he will send a signal over the trans-receiver and wait for the next patient for his call.

III.   CONCLUSION

As per the given assembly of the paper the we can make the things happen for easy dealing with all the activities and most important we can bale to make the medical data more secured with the biometric authentication.

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