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Wireless Medical History Tracker and Token Generator Using Finger Biometric Technology and Arm

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ABSTRACT: The work is proposed to track the medical history of a patient and hence a Finger Biometric Module is used for tracking the medical history records. The medical records are to be stored in the database server present in the hospital, organization or anywhere in the world. It is connected with the terminal of physician through LAN, Wi-Fi or internet. Whenever, the Finger of the patient is read by a Finger Biometric Module connected to the data server, the complete information of the patient will be appeared on the computer screen of the doctor. So doctor can access the previous records of patient instantly on his computer screen.

The token will be generated for providing the sequence to the patient for the respective departments where they wish to visit. The token status is updated by the doctors of respective departments by reading their own Finger on the Finger Biometric module which transmitted over the wireless network in the hospital and it will be displayed at the reception.

KEYWORDS: Authorisation,Biometric (Access control) Finger Biometric,ARM,cc2500 Transereceiver**.**

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 the co-ordination of healthcare delivery in non-affiliated healthcare facilities. In addition, data from an electronic medical record system can be used anonymously for statistical reporting in matters such as quality improvement, resource management and public health communicable disease surveillance.

Also a token system was developed which generate a token from the counter having current patient number, name of the consulting doctor, time of appointment, name of the department, name of the hospital *etc.* made that this data logging system is more useful and simple as compared to conventional storage and stock management system.

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II. LITERATURE SURVEY

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 at different locations within the hospital, so the collection of record is another time consuming process. These records are not immune to parameters such as ageing, wear and tear, fire, humidity *etc.* Handwritten paper medical records can be associated with poor legibility, which can contribute to medical errors. 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 professionals 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.

When the new patient visits any hospital, then he faces different problems in the hospital. The problems include a queue system at receipt counter which take long time, patient don‟t know the name of the department, consulting doctor, time required for check-up, queue number of the patient for treatment. To solve these problems token generator system is proposed.

III. OBJECTIVE

For solving the problem of medical history, a special access called Finger Biometric Module given at the hospital to the patient that has the basic information of the patient stored in it. The medical records of the patients were updated on the server and these records were accessed only by Finger Module. Each Finger Biometric gives information about particular patient and gives access to the medical record of that patient only. For this purpose a database is to be prepared for storing the information of the patient and update it continuously. Finger Biometric provides the access to the database system for accessing the information from the database server. A queue and receipt problem in the hospital is to be solved using the proposed token generator.

A token is generated which have different information printed on it such as current token number, name of department, name of the consulting doctor, time required for check-up, name of the hospital.

IV. SYSTEM OVERVIEW

For solving the problem of medical history, a special access called Finger Biometric Module given at the hospital to the patient that has the basic information of the patient stored in it. The medical records of the patients were updated on the server and these records were accessed only by Finger Module. Each Finger Biometric gives information about particular patient and gives access to the medical record of that patient only. For this purpose a database is to be prepared for storing the information of the patient and update it continuously. Finger Biometric provides the access to

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A token is generated which have different information printed on it such as current token number, name of department, name of the consulting doctor, time required for check-up, name of the hospital *etc.*

Medical Report/History Tracking:

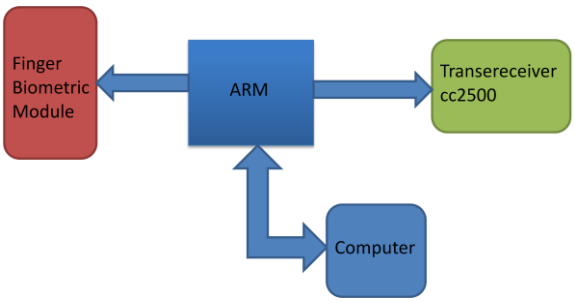

Figure shows the basic Block Diagram of the history tracker system which contains the finger biometric module attached with the ARM 7 Family Microcontroller (LPC2148). This is advanced controller nowadays.

Token Generator:

V. METHODOLOGY FOR IMPLEMENTATION

1] Medical Report/History Tracking:

The medical report tracking system is shown in figure 1. 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.

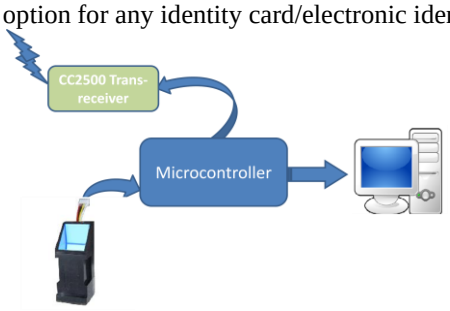

Figure 1- Medical Report Tracking System

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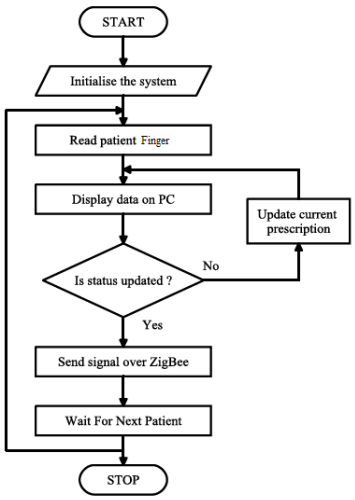


2] Token Generator:

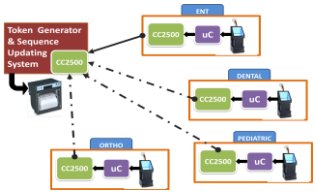
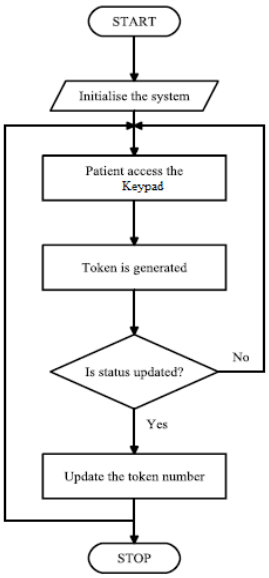


Figure2- Token Generator & Sequence Updating system

This system is designed so as to generate the particular patients token number by which he can get the appointment of the doctor but the thing is only on the access of the doctor he will get the token of the next number unless he will have to wait for the call of the doctor the access has been sent by the doctor to the token generator system using the trance receiver module which is used for the wireless communication between two systems



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At the OPD (Outdoor Patient Department)on the request of patients, the Receipt (slip) is generated by Medical Receipt Generation system which is shown in figure 2. A zigbee protocol is used to control and communicate with the network.

Receipt contains the following information:

1. It contains the current number of the patient
2. It give total no. of patients visited
3. Name of the consulting doctor in particular department
4. Evaluated time for check up
5. Name of the department
6. Name of the hospital

VI. SYSTEM DEVELOPMENT

1] Finger Biometric:

The device is basically the identification and authorisation unit devlope for Maintaining high security administration.The basic genralised biometric system has Data acquisition unit, Decision Making unit, Matcher,Feature extractor and a Database for stoaring the biometric information.Which is then used for making user to authenticate a perticular system.

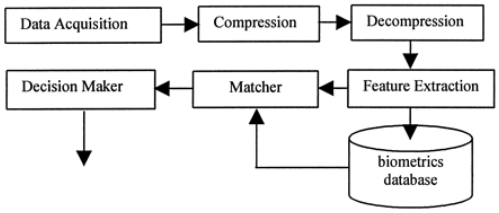

Figure: A generic biometrics-based system

There are five stages involved in finger-scan verification and identification:

1. Fingerprint Image Acquisition
2. Image Processing
3. Locating Distinctive Characteristics
4. Template Creation
5. Template Matching

Figure 3. Finger Biometric Module

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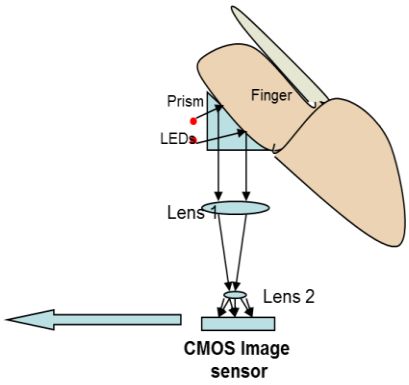
Working

In Finger 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.



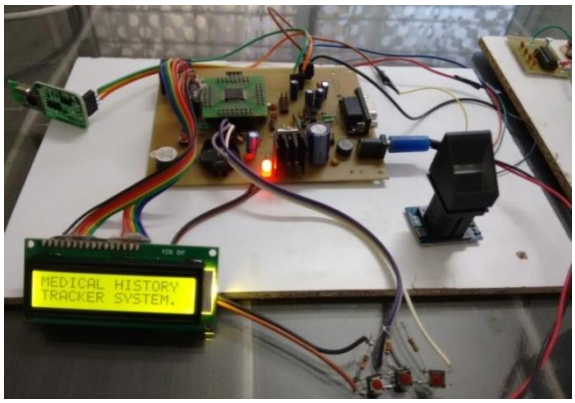


Fig: System for Tracking using Biometric module

2] Trans-Receiver CC2500 Modules:

RF data modem working at 2.4 Ghz frequency in half duplex mode with automatic switching of receive/transmit mode with LED indication. Receives and Transmits serial data of adjustable baud rate of 9600/4800/38400/19200 bps at 5V or 3V level for direct interfacing to microcontrollers. This model can work with other 2.4 Ghz models 1124(TTL 30 meters range) or 1253(RS232) or 1252(USB). RF modem can be used for applications that need two way wireless data transmission. It features high data rate and longer transmission distance. The communication protocol is self controlled and completely transparent to user interface. The module can be embedded to your current design so that wireless communication can be
set up easily.

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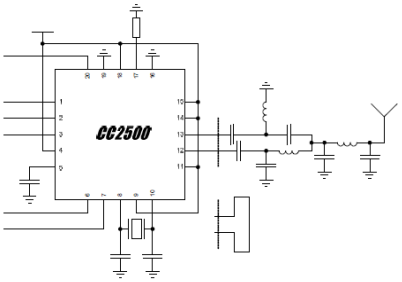
Circuit diagram



Packet Format

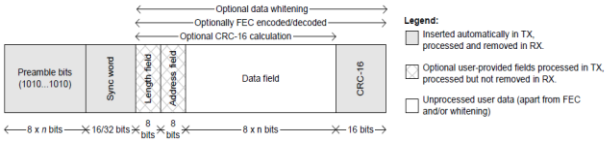


Figure 11: Packet Format

Packet format is based as per the communication protocol specified

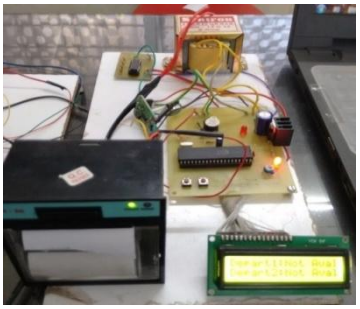


Fig : System of token generator using CC2500

3] Arm Processor/ Microcontroller

Arm7 processor will be used for interfacing the wireless cc2500 module, Keypad and printer together.

FEATURES

- 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.
- 8 kB to 40 kB of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory.
- One or two 10-bit ADCs provide a total of 6/14 analog inputs, with conversion times as low as 2.44 µs per channel.
- Single 10-bit DAC provides variable analog output.
- Two 32-bit timers/external event counters
- Low power Real-Time Clock (RTC) with independent power and 32 kHz clock input.
- Multiple serial interfaces including two UARTs (16C550), two Fast I2C-bus(400 kbit/s),SPI and SSP with buffering and variable data length capabilities

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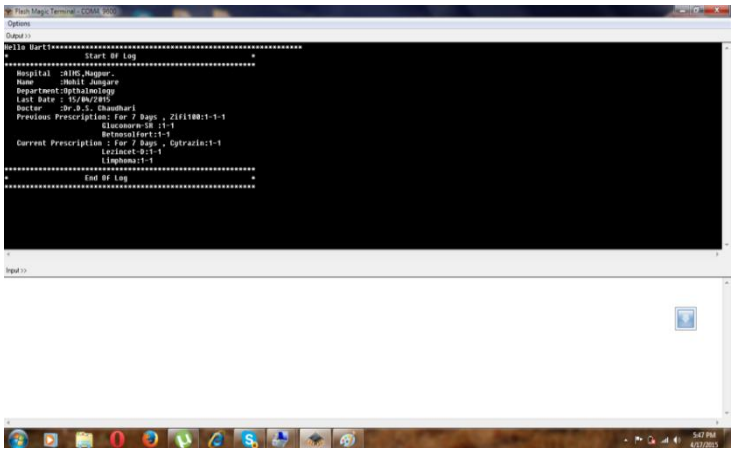
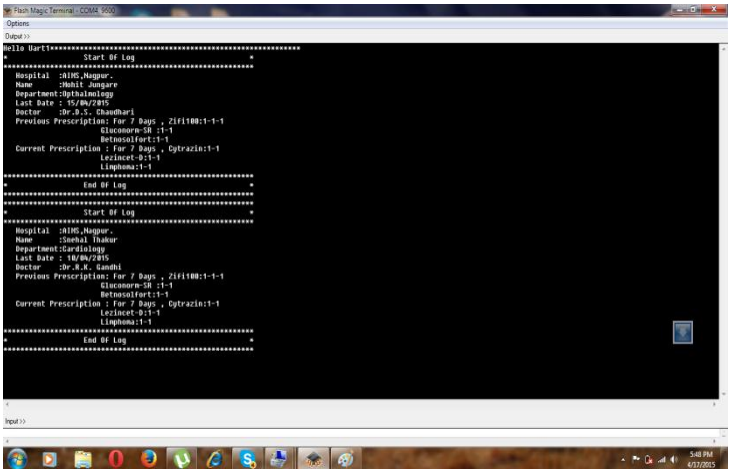
VII. RESULT OF SYSTEM

As soon as the patient access his finger on the biometric module the predefined data thet has been stored at the database created by the hospital has been traced and the total information of patient regarding the previous prescription is being displayed on the flash magic terminal ,here flash magic is used only for display operation , in future by creating a server for the hospital it can be easily access .



This result shows as per as the first patient is being accessed by the system the total information about the patient that has been already stored un the database of the hospital is displayed on the flash magic terminal.



The result based on the Flash Magic Terminal for the output of the history Tracker.

Fig 1

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This figure shows the token number of first Department.

Fig 2

Here fig 1 and 2 shows the format of token that has been generated from the token generator system which contains the current token number and total token numbers.

VIII. CONCLUSION AND FUTURE SCOPE

As per the given Assembly of Paper by creating a particular network configuration between two or more stations without any kind of internet connection we can communicate with the other users as well as send and receive the data as per the instructions given to it and which is a base of this paper.

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BIOGRAPHY

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