

Medical Kiosk

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Abstract:

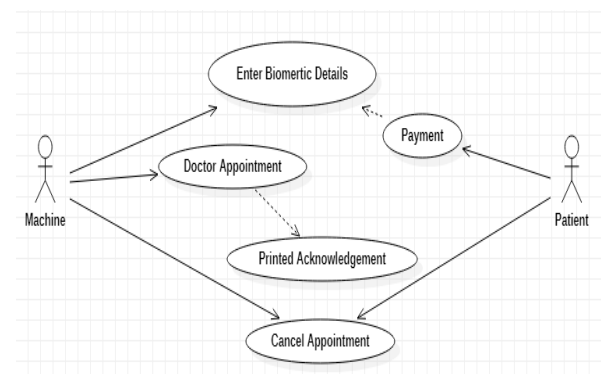
To increase operational efficiency, reduce costs, and improve customer experience kiosk will help organizations by enabling automation with self service solutions for digital transformation. This paper is implementation of MEDICAL KIOSK which is an advance approach to digital optimization using biometric recognition algorithm to overcome the complication of long patient's queue at reception for check-ups and medical test payments which is the major problem confronted by the patients and the government-hospitals, resulting in time consumption and inefficiency in workflow of hospital's management system.

Keywords — Kiosk, Fingerprint algorithm, ISO file of fingerprint, Currency recognition.

I. Introduction

Medical kiosk is an advance approach to digital optimization using biometric recognition algorithm to overcome the complication of long patient's queue at reception for checkups and medical test payments, which is the major problem confronted by the patients and the government hospitals, resulting in time consumption and inefficiency in workflow of hospital's management system. This is not an additional service which people have to buy, this is a process flaw of government hospital which can be overcome using our technology and will also make the patient's hospital experience more satisfactory. Paying the checkup fees and receipt is the first step of patient's hospital journey. As the beginning of the process in government hospital is working smoothly, with the help of this system it will also subsequently accelerate the further processes. Now as the problem of prolonged patient's queue is resolved, people who don't prefer to visit government hospitals will be attracted towards it.

In this process, the kiosk will scan patient's fingerprint and will directly print a receipt consisting their required information from the database and ward number for their respective disease and then the data will be stored for upcoming appointments. As there is basic interaction between the kiosk and the patient, so it is feasible for every age group to use it. Identity proof will not be required as biometric recognition is used.



II. Background

A. FINGERPRINT ALGORITHM

Because of high acceptability, constancy and uniqueness, Fingerprints have been in use for biometric recognition for so long. Constancy refers to the perseverance of the fingerprints above time whereas singleness is related to the uniqueness of ridge details across individuals. Fingerprint based identification has been proven to be one of the best biometric techniques used for personal identification. A fingerprint is the pattern of ridges and valleys on the fingertip. Thus the uniqueness of the local ridge characteristics and their relationships defines a

fingerprint. The local ridge characteristics that occur either at ridge bifurcations or at ridge end are termed as minutiae. The ridge bifurcation is defined as the point where the ridge separates into two or more branches and a ridge ending is the point where the ridge ends hastily. It is a difficult task to detect automatic minutiae with low quality fingerprint images where deficiency in contrast and noise leads to pixel configurations same as that of minutiae.

B. CURRENCY RECOGNITION

In currency recognition, with the help of image processing, we identify and detach the value of the currency. Here the features of the acquired image are extracted.

Image Acquisition: Image acquisition is the first step in image processing in the work flow sequence because no processing is possible without an image. Once the image has been obtained, various processing methods can be applied to the image to perform different vision tasks. There are different ways to obtain image such as with the help of camera or scanner. Acquired image should reserve all the features.

- i. *Pre-processing:* The principal aim of the pre-processing is to improve the manipulation of data sets and enhance the visual appearance of images. Image pre-processing, which is also known as image restoration, involves the correction of distortion, degradation, and noise introduced during the imaging process. Interpolation technique is mostly used for tasks such as zooming, rotating, shrinking, and for geometric corrections. When processing is being performed, removing the noise is an important step. However noise influences segmentation and pattern matching.
- ii. *Edge Detection:* A set of mathematical procedures that aim at recognizing points during a digital image at which the image brightness changes sharply or, more formally is known as edge detection. The points at which image brightness changes discernibly are organized into a set of curved line segments known as edges. It is an image processing technique for finding the limits of objects within images. It works by detecting discontinuities in brightness. Edge detection is used for image segmentation and data extraction in image processing, computer vision, machine vision, etc.
- iii. *Image Segmentation:* Image segmentation is the process of splitting a digital image into multiple Segments which can be sets of pixels, also termed as super pixels. The aim of segmentation is to ease and/or

change the representation of an image into something that is more consequential and easier to examine.

- iv. *Feature Extraction & Comparison:* Feature extraction is a specific form of dimensional consumption. The given input data to an algorithm will be transformed into a downsized represented set of features when it is too vast to be prosecuted as well it is doubtful to be extremely unnecessary. This transformation is known as feature extraction. The features set will extract the significant information from the input data in order to perform the desired task using this reduced representation if the features extracted are carefully chosen.
- v. *Output:* Currency recognition output will be in the form of text as well as the voice. The given text output will be in the text box of GUI .

C. FINGERPRINT TEMPLATES IN AN ISO/IEC 19794-2 FORMAT

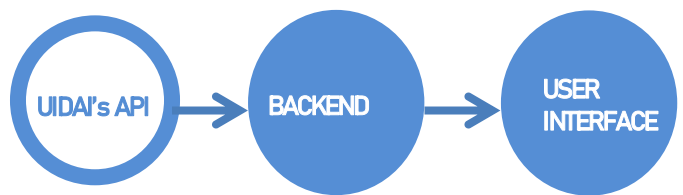
ISO/IEC 19794-2 is a world fingerprint template standard that was created so as to realize interoperability between different fingerprint recognition systems. That is, fingerprint templates generated by various vendors can be utilized in an equivalent system for fingerprint enrolment and matching. This standard specifies the situation and formatting of fingerprint minutiae template.

Interoperability is required when different subsystems from different biometric vendors are used.

- i. Let's check out an example. So as to enrol users you employ Fingerprint Scanner A. Fingerprint algorithm from vendor X are used to convert the enrolled fingerprint image into a fingerprint template and is stored within the Database. Fingerprint scanner B is used for capturing fingerprint, during fingerprint authentication. Then fingerprint algorithm from vendor Y is used to convert these fingerprint into fingerprint templates.
- ii. Now, the matter is, so as to match the authentication fingerprint (generated by algorithm Y) to the enrolled fingerprint (generated by algorithm X) you would like some kind of industry standard.
- iii. Interoperability compares the fingerprint algorithm X generated templates with the fingerprint algorithm Y generated templates. That is, albeit fingerprint templates X & Y are from different vendors as long as they're in ISO/IEC 19794-2 format we will compare them to ascertain if a match is found.
- iv. 2. You would possibly be using only one vendor's fingerprint algorithm for enrolment and

authentication. during this case you'll enrol fingerprints using the vendor's proprietary format (instead of ISO). However, if after few years you opt to vary vendors, the proprietary templates won't work with the other fingerprint algorithm. Hence the fingerprint database that you simply have created is going to be of no use and you'll need to re-register all the users again

every patient took place in day, month or year will be stored



III. Problem Definition

- One of the major problems confronted by the government medical hospitals is prolonged patient's queue at reception for checkup and medical test payments, which in turn cause difficulties for the patients irrespective of the age groups, gender and situations.
- The manual registration system is time consuming inefficient and less reliable as there are high risk of errors while registration.
- Due to inefficiency in manual work the queue keeps increasing which leads to congested atmosphere and increase the risk of spreading diseases.

IV. Real Time Implementation

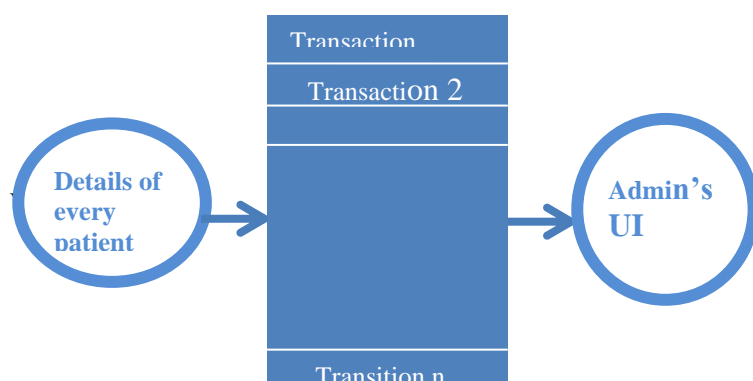
- DATABASE:** Our system will require UIDAI's API which will provide access and gateway for Aadhar's database and also will provide their prominently developed fingerprint matching algorithm which is already implemented in API. . The UIDAI's API will give all the information of user from database. The system is not actually accessing the database, it is just taking an output provided and processing it ,hence making the system very secure.
- BACKEND:** The matching algorithm provided by Aadhar's API will match the fingerprint of the user and will give all the information about the users which is stored in Database as an output. Then the system will fetch the required information from the output provided and will print it in general format of a receipt which we programed.
- USER INTERFACE:** The first aspect of our system UI are directional templates and the second aspect of our system UI will be UI for administration which can access the database in which all the transaction of

V. System Advantages

- The system is feasible for every type of users as there is basic interaction between the kiosk and the users. This will enhance patient's service by providing unique experience.
- There is no chance of error while registration as the data will be fetched from UIDAI's database. Therefore the process will be completed with accuracy.
- The time consumption will be very less as compared to manual registration process which will reduce the length of queue and chances of spreading diseases
- This system is flexible and can be customized according to hospital's requirement

VI. Scope

- Medical Kiosk is just not a machine which is used to print receipts but it also produces a huge amount of transactions data of many patients visiting the hospital every day. This data of every transaction will be stored in the system's database and can be used for many more processes in the hospital. Example: - If a patient has taken the receipt from the Kiosk and he got diagnosed by the doctor and is required to be admitted then the patient will not have to fill the admit form the data of the patient will already be available in the database.
- Hence this system has a potential to become a full-fledged Digital Hospital Management System with a pre-acquired Database.



The Process of the system is as follows;

Step 1: The System will display a message to insert money.

Step 2: System will initiate the Currency recognition system

Step 3: If the money is recognized the system will move to next step else will go back to the start

Step 4: Scanner will be initiated and will display a message to place the thumb on the scanner.

Step 5: If the thumb is recognized the system will go the next step else it will again initiate the fingerprint scanner again.

Step 6: The system will capture the fingerprint and will search it in the database. If the Search is successful the data of the patient will be fetched. Else the it will again initiate the scanner 3 times the will get back to start state.

Step 7: The Fetched data of the patient will be allocated a formatted location on the receipt.

Step 8: The receipt will be printed using a printer.

In this paper we have proposed a Medical Kiosk using biometric recognition algorithm to overcome the complication of long patient's queue at reception for checkups and medical test payments, which is the major problem confronted by the patients and the government hospitals, resulting in time consumption and inefficiency in workflow of hospital's management system. The kiosk provides a simple and efficient way for registrations in government medical hospitals.

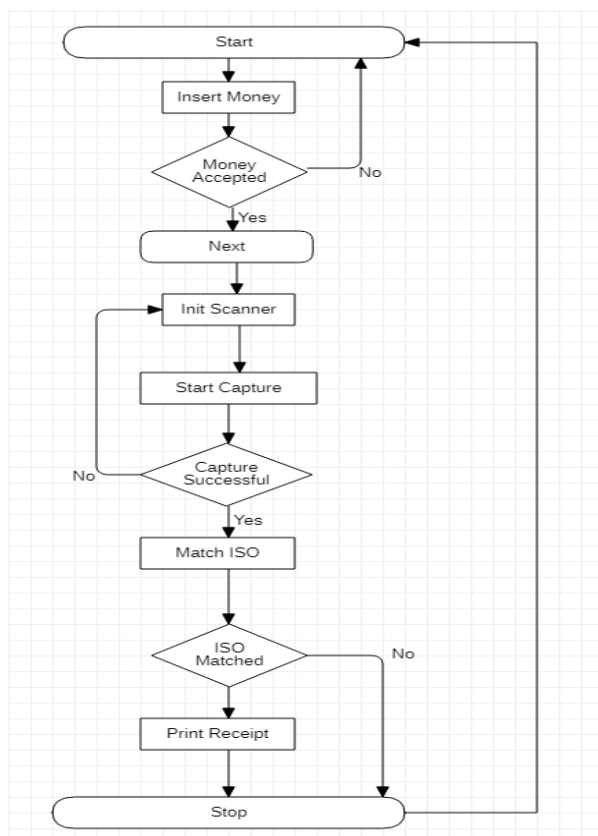
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VIII. Conclusion

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