

Student Attendance Parental Application Using Multi-biometric System

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Abstract-In this paper we present solution to propose an attendance monitoring System based on the notion of web services which also can be implemented as an Android mobile application too. We are going to use the “Multi Biometric System” like face detection, voice detection & thumb impression to match the database with log provided and mark the attendance of the student. The web services which have database of attendance entries maintain the records of attendance and that can be shown by the browser, after entering the permitted user id and the roll no. Parents also can get the notice which is uploaded on the browser. This technology has been applied for controlling access to high-security facilities, but it is now being widespread developed in information systems such as network, e-commerce, and retail applications. In these technologies, fingerprint becomes the most mature and popular biometrics technology used in automatic personal identification.

Index Terms- Multi Biometric, Parental application, High Security, Attendance System.

1. INTRODUCTION

We have seen over the years that the process of manual attendance has been carried out across almost all educational institutions. The process is not only time consuming but also sometimes inefficient resulting in the false marking of attendance. Today, we need not maintain pen and paper based attendance registers. While the move towards the digital era is being accelerated every hour, biometrics technologies have begun to impact people’s daily life more and more. Biometrics technologies verify identity through characteristics such as fingerprints, faces, irises, retinal patterns, palm prints, voice, hand-written signatures, and so on. These techniques, which use physical data, are receiving attention as a personal authentication method that is more convenient than conventional methods such as a password or ID cards. Biometric personal authentication uses data taken from measurements. Such data is unique to the individual and remains so throughout one’s life.

2. LITERATURE SURVEY

In “Bambizo” application which were used earlier, in that we can post messages, ask questions and share information. The “ClassDoJo” application which was generated shows that parents really want to be involved with their children’s education. It captures and generates data on behaviour that teachers can share with parents and administrators. All application which was created is to make the parent alert by

review information of their child at the touch of a button, making teacher-parents meetings more about exploring options than reviewing levels. It gives the general ideas of student’s performance in the school/colleges.

In our working system, we have tried to propose the application using web services which consist of database system of attendance using multi-biometric system for authentication of student for determining whether the student which is marking the attendance is the only person having unique name and roll no. This will helpful to the parents for getting the right information of their child whether he/she is attended the school/ colleges.

If the parent wants to see the attendance list, they can login into the system by provided login Id and password from school/college. We are using face detection, thumb impression and voice for authentication purpose to mark attendance in the database.

3. EXISTING SYSTEM

Due importance shall be given to experimental setups, procedures adopted, techniques and methodologies developed and adopted. The process is not only time consuming but also sometimes inefficient resulting in the false marking of attendance. The whole session attendance is stored in register and at the end of the session the reports are generated. We are not interested in generating report in the middle of the session or as per the requirement because it takes

more time in calculation. This takes much time consumption to complete this attendance and to declare the students whether he is in defaulter or not. At the end of session the students who don't have 75% attendance get a notice.

4. PROPOSED SYSTEM

As we are using student attendance parental multibiometric system, in this attendance can be viewed from anywhere to parent as well as teacher conveniently. It decreases the work of teacher as they are maintaining lots of paper and registers. This app is time consuming as it consist of records maintain by the web browser. In this, teacher can post notice regarding college as well as regarding student's behaviour which can view by the parent and can reply if they have any query.

4.1. Scope

The primary purpose of this application is to help parents, students to get attendance notification and get the notice by teacher. This application uses multibiometric for authentication and useful for verification of students attendance. login Id and password is provided by college to teacher and parent for verify the details of student.

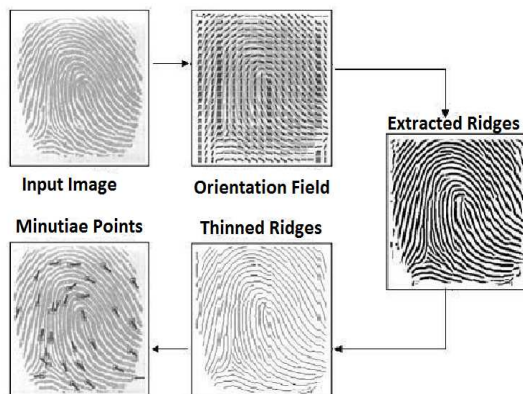


Fig.1 Steps for extraction of minutiae points from input fingerprint image

4.2. Thumb recognition

Subsystem for thumb geometry recognition uses an image of thumb to verify an identity. In the first step the image is preprocessed to obtain only the area information of the thumb. Filter function is used in next step to remove these pixels and to justification the edges of the thumb. The distances is measured using linear binary pattern to count the patterns of thumb.

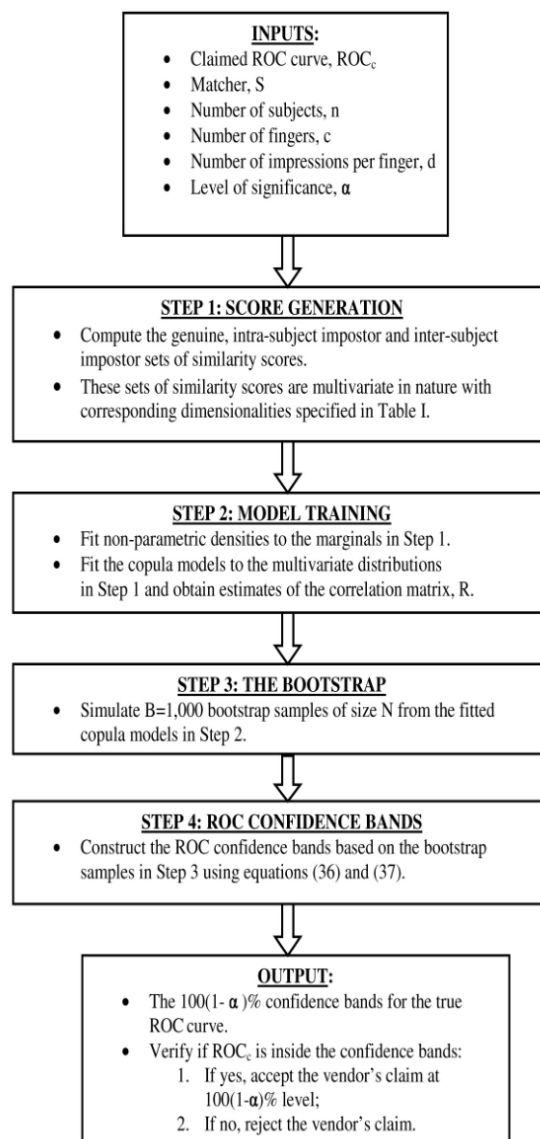


Fig. 2. The main steps involved in constructing the ROC confidence bands for validating the claim of a fingerprint vendor.

4.3. Face detection

- **Segmentation:** Image segmentation is the process of dividing an image into multiple parts. This is typically used to identify objects or other relevant information in digital images.
- **Chamfering:** The distance transformation converts a binary digital image into a gray level image with pixels having value of the distance to the nearest feature. It can be achieved using only local operations of a small neighborhood of a pixel.

- **Canny:** The algorithm runs in 5 separate steps:
 - Smoothing: Blurring of the image to remove noise.
 - Finding gradients: The edges should be marked where the gradients of the image has large magnitudes.
 - Non-maximum suppression: Only local maxima should be marked as edges.
 - Double thresholding: Potential edges are determined by thresholding.
 - Edge tracking by hysteresis: Final edges are determined by suppressing all edges that are not connected to a very certain (strong) edge.
- **Detection:** The cascade object detector uses the Viola-Jones algorithm to detect people's faces, noses, eyes, mouth, or upper body.
- **Recognition:** recognition is a process for identifying a specific object in a digital image.
- **Verification:**

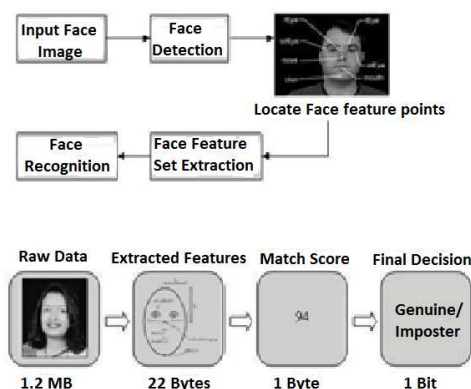


Fig.3 Amount of information available at four modules in a biometric system

To recognize human faces, the prominent characteristics on the face like eyes, nose and mouth are extracted together with their geometry distribution and the shape of the face. There are differences in shape, size and structure of these organs, so the faces are differ in thousands ways, and we can describe them with the shape and structure of these organs in order to recognize them. These feature points and relative distances between them make some patterns in every input signal. These characteristic features are called eigenfaces in the facial recognition domain (or principal components). Once the boundary of the face is established and feature points are extracted (see Fig.3), the eigenface approach can be used to extract features from the face.

4.4. Voice Recognition

Subsystem for speaker recognition works as text independent, in which there is no prior knowledge of the text to be spoken to gain access. For voice recognition we use MARF Library.

Steps:

- Sine transformation
- Feature Extraction

This creates a process that us more flexible in that a speaker can say whatever he wants. System is based on GMM-UBM classifier. Given a segment of speech **O** and a hypothesized speaker **S**, the task of speaker verification, is to determine if **O** was spoken by **S**. The speaker verification task can be stated as a basic hypothesis test between two hypotheses:

H_0 : **O** is from the hypothesized speaker **S**,
 H_1 : **O** is not from the hypothesized speaker **S**.

The optimum test to decide between these two hypotheses is a likelihood ratio test (LR) given by

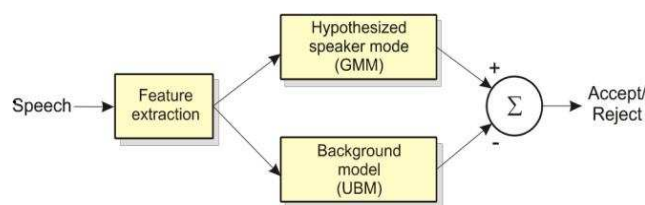


Fig. 4. Likelihood-ratio-based speaker verification system

4.5. Raspberry Pi

The model we used for raspberry pi is B+ 512MB with 8 GB SD card. Raspbian OS is favor of linux which is loaded in SD card.

Features :

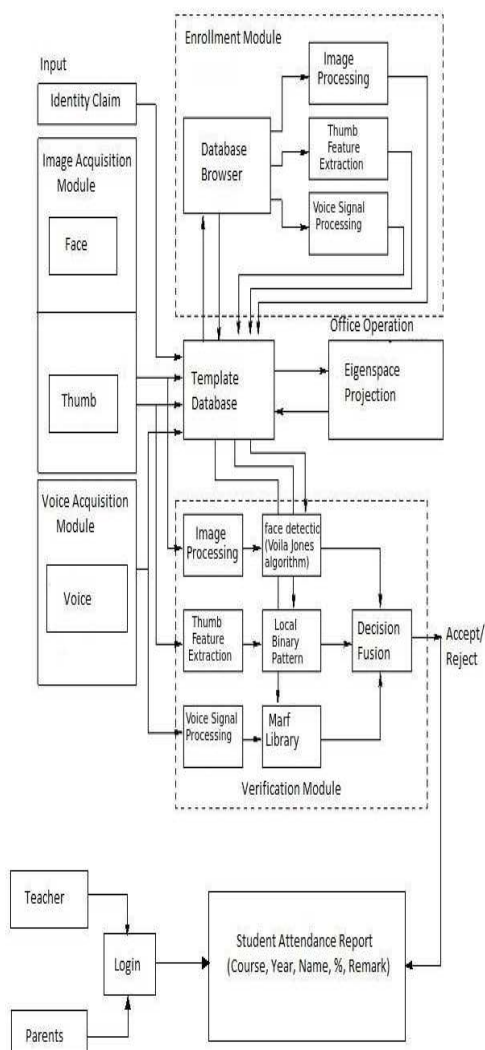
- 700 MHZ Broadcom BCM2835
- 40 pin external GPIO
- Full size HDMI
- 4 USB ports
- Micro SD slots



4.6. System Requirements

Pentium II 350MHz CPU
 One free USB Port
 32 MB Ram
 At least 50MB Hard Disk space
 16 bit VGA card, sound card
 USB interface, CD - ROM drive/VGA Monitor
 XP, Windows Microsoft system: Operating
 Vista, Win7, Win8, Linux

4.7. System Flow



Steps:

- 1) The input is given by the image acquisition module i.e face, thumb and voice acquisition module i.e voice to template database.
- 2) Template database stores the data taken from the input and verify whether he/she is old or new student.
 - a) If the student is new then it goes to the database browser to store the data.
 - b) If the student's details are already present in database then it directly moves to verification.
- 3) The enrolment module stores the database by database browser having Image Processing, Thumb Feature extractor and Voice signal Processing.
- 4) This enrolment module again feed the data to the template database which then perform offline operation i.e eigenspace projection for converting images into a matrix form.
- 5) Template database input is given for the verification of the student as he/she is authenticated person or not.
- 6) The verification is done by matching the face through Voila Jones algorithm, thumb through Local Binary Pattern and voice through Marf Library.
- 7) After verification it takes decision whether the student is authorized person or not.
 - a) If student is authorized then he/she is accepted and mark the attendance of the student in a student attendance report.
 - b) If student is not an authorized then he/she is rejected then attendance is not marked.
- 8) Login id and password given by the college/school to the teacher as well as parents to see the students report of attendance instead of checking the status of attendance or any information regarding students again and again in college/school.
- 9) Teacher can give the message to the parents by same login id and password.

5. CONCLUSION

We are coming up with our "Student Attendance Parental Application" which have faster, reliable, less time consuming, more secure approach with the involvement of parents, teachers and students. This system can be implemented in academic institutes for better results regarding the management of attendance.

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