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Combined RFID-Biometric based MIS forStudent Information

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***Abstract*— RFID (Radio Frequency Identifier) and Biometric now a days are one of the most popular technologies in use today. This paper focuses on creating a MIS (Management Information S ystem) system of student using both RFID and biometric (face-detection) technology. With the increasing number of students managing the attendance manually becomes a tedious and risky job. With the evolution in technology we propose a system which will take the attendance of s student, record it in the data base along with the other information. The system will provide the S MS alerts service which will give information about students attendance, marks etc.**

***Keywords*— RFID reader,RFID tag,Face-detection, MIS , S MS**

INTRODUCTION

Most educational institutions administrators are concerned about student irregular attendance; along with maintenance of their academic record. Truancies can affect students overall academic performance. The conventional methods of taking the attendance (like by calling names or signing on paper), handling the students data though on computers manually, informing the parents about their wards performance (test marks, attendance, etc.) through letters, informing the companies about the students fulfilling their criteria by manually short-listing the students, is very time consuming, insecure and hence inefficient.

Thus, there is a need to bring about some changes in the current technology to manage student information. The objective of the paper is to provide a secure, easy & fast way to calculate the attendance of student, informing the parents about their ward, & short listing the students according to companies' requirements.

For this we are using combination of RFID and Biometric technology of face detection to mark the attendance of students. RFID is considered to be the most easy and fast way of detecting the physical object like humans, products etc as it has an ability to detect the objects using radio frequency. This makes RFID most efficient, easy, secure, and safe hence more advantageous with low overhead as compared to conventional method. But as [2] RFID can only help us to answer the question ―who I am? but not ―am I really the person who is entering? i.e. we cannot completely identify the person so, we are going to use a combined RFID-Biometric system to take the attendance. This attendance along with the academic report (if any) will be send to parents through message; the application will itself short-list the students according to the requirements send by companies for campus recruitment.

I. RELAT ED WORK

Various methods and techniques are being carried out so far to improve the attendance taking system and maintaining the records. This section describes some of them.

Zatin Singhal, Rajneesh Kumar Gujral [1] describes Remote Monitoring of attendance system based on RFID using GSM Network. In a test, it was found that it reduces time, manpower, cost (printing and paper), and eases the attendance record procedures

Noureddine Chikouche, Foudil Cherif, Mohamed Benmohammed, An Authentication protocol based on Combined RFID-Biometric System,[2] which uses biometric hash function and robust hash function, ultimately providing the secrecy, authentication and privacy.

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In the propose system author [3] uses figure prints technology to successfully take attendance both during lecture & examination by dividing process of identification in two stages of enrollment and authentication. In enrollment figure print registration is done and in authentication it will get compare with figure stored in database.

This paper [6] describes a techniques used in an iris recognition verifying system and wireless transmission. This system possesses the functions of iris recognition. In Propose system, Eye Scan sensor extracted minutiae from eye and it will be matched with template which is stored in database. System is designed and implemented using Daugman's algorithm. It can make attendance more easily and effectively.

II. SYST EM DESIGN

The system design of the system can be clearly understood from figure 1. As shown in the figure RFID reader and web-camera are connected to the server through RS232 and usb cable respectively. Both reader and camera will take their inputs (tag no and face image respectively) and compare it with the data stored in the database of the server, if correct match is found then appropriate action is taken.

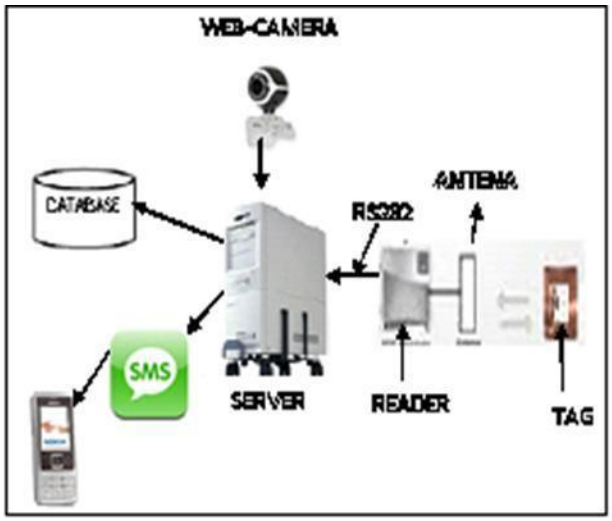

Fig 1: Structure of the system

A. Radio Frequency Identification

A system comprises hardware shown in figure 4.3 known as readers and tags. RFID tags are of two major types, which include Active Tag and passive Tag .

Fig 2: RFID card and reader

RFID tags can be either pas sive, active or battery assisted passive. Passive RFID does not use a battery; they transmit low frequencies so they are detectable up to few meters of distance while an active has an on -board battery that always broadcasts or beacons its signal. A battery assisted passive has a small battery on board that is activated when in the presence of a RFID reader. Active tags are active in nature i.e. they do not require any external source, they have their own in-built battery. It can transmit high frequencies so it can be detectable to a longer range.

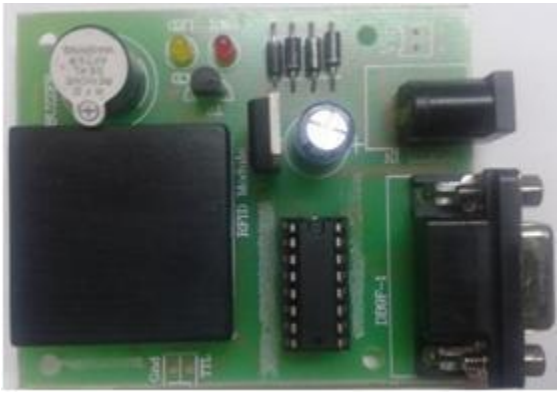

Fig 3: RFID reader RS232

Most RFID tags contain at least two parts: one is an integrated circuit for storing and processing information, modulating and demodulating a radio -frequency (RF) signal, and other specialized functions; the other is an

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antenna for receiving and transmitting the signal. RFID Reader is a system which transmits and receives the data to the tag or key by radio waves. Depending on mobility, RFID readers are classified into two different types: fixed RFID and mobile RFID. If the reader reads tags in a stationary position, it is called fixed RFID.

These fixed readers are set up specific interrogation zones and create a "bubble" of RF energy that can be tightly controlled if the physics is well engineered. This allows a very definitive reading area for when tags go in and out of the interrogation zone. On the other hand, if the reader is mobile when the reader reads tags, it is called mobile RFID. In our system we are using RFID reader RS232, which Supports EM410x Series Unique Tags works at industry-standard 125 KHZ Frequency. It's Range up to 8-12cm.

B. *Process of taking attendance:*

System takes the attendance using the combination of both the outputs of RFID and face detection. The same is shown individually for better understanding:

1. *RFID Attendance System:* Following fig. gives details about System. RFID Reader and Web camera both are connected to Server. User or student Scan RFID Tag on Reader At the same time image of student will be captured by web camera. Both Reader and Camera take their individual inputs and send to server. Server extracts values from RFID reader and web Camera and check values in database. If match will be found then it mark attendance and update Database. The System uses internet message Gateway system to send attendance report and class test marks on mobile phone.

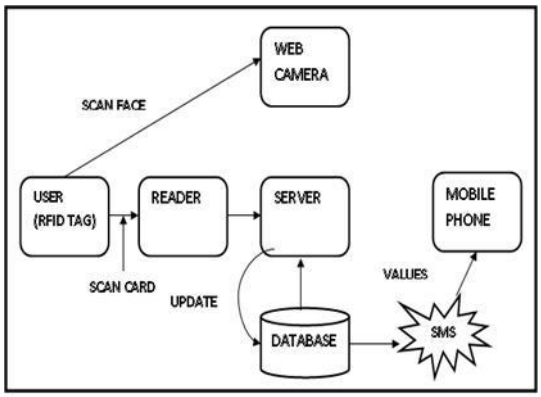

Fig 4: Block diagram of RFID attendance

2. *Face Detection:* Face detection technique used for student authentication. Following fig. gives details about face detection technique for student authentication. Camera will capture image of student then it send to server .server match this image with template image which is stored in student database. If match is valid then system performs action and update database.

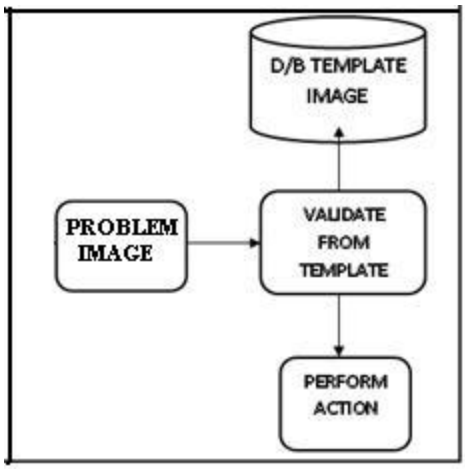

Fig 5: Block diagram for face detection

The face detection systems have to detect every human face in an input image, no matter the lighting conditions or race of people in the image. These systems are usually based on an experimentally estimated skin -color model. Skin-color model uses an idea that color distribution of skin-color of different people is clustered in a small area of chromatic space.

The skin-color model should be adaptable for any skin color at any lighting conditions. The common RGB representation of color images is not suitable for characterizing skin-color. In the RGB space, the triple component (r, g, b) represents not only color but also luminance. Luminance may vary across a person's face due to the ambient lighting and is not a reliable measure in separating skin from non-skin region. Luminance can be removed from the color representation in the chromatic color space and that can be defined by a normalization process.

Skin colors of different people appear to vary over a wide range, they differ much less in color than in brightness[7].So, the colors of human skin fit in a small

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area of chromatic color space.We collected two sets of 15 color images each with human faces from the World Wide Web. First set are images of people with white colored skin,second set of people with brown and black colored skin. Then we manually selected little rectangle samples of skin from every image of each set. These samples were filtered using a low-pass filter to reduce the effect of noise. Then we counted normalized values of red and green color for each pixel of filtered samples.Skin-color models based on some aspects such as character of an input image set,color representation of a pixel, complexity of Gaussian model.

There are a number of techniques that can successfully detect faces in wide range. System detect and recognize faces Based on Haar-like features. Simple rectangular features, called Haar features. Haar-like features are digital image features used in object recognition. Haar like feature is specified by its shape, position and the scale. A cascaded classifier Used to combine many features efficiently.

An input window is evaluated on the first classifier of the cascade and if that classifier returns false then computation on that window ends and the detector returns false. If the classifier returns true then the window is passed to the next classifier in the cascade. The next classifier evaluates the window in the same way. If the window passes through every classifier with all returning true then the detector returns true for that window. The more a window looks like a face, the more classifiers are evaluated on it and the longer it takes to classify that window. Since most windows in an image do not look like faces, most are quickly discarded as non-faces.

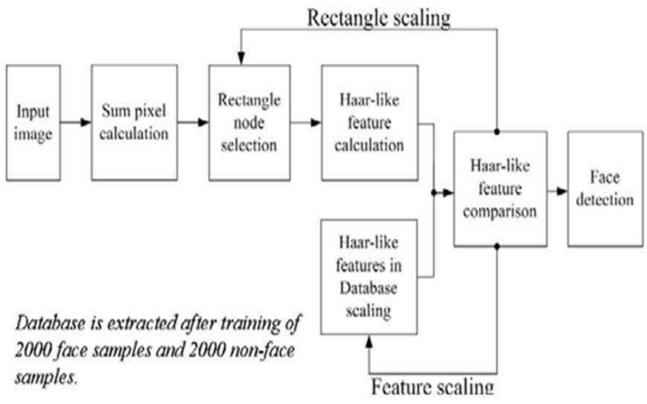

Fig 6: Flow diagram of the face detection :

Given an arbitrary image, the goal of face detection is to determine whether or not there are any faces in the image and, if present, return the image location and extent of each face.

Fig 7:Result of human face detection

Finally we achieved 75% correct face recognition rate with 15% false positive rate in less than 0.1 seconds recognition time.we have demonstrated the possibility of a unified face detection and recognition system based on haar-like features. The face detection rate is 95% with 0.1% false positive rate and the face recognition rate achieves 75% with 15% false positive rate.The execution time of the whole system takes is shorter than 0.7 seconds.

C. Database and Other Facilities:

Database consists of all the recorded data in different fields like ID, Name, Mobile No., Address, Attendance, Result, etc**.** Here, we are using My SQL as a database back end and .NET C# as front end for the user. There is main login form designed. The Login form contains labels, buttons, Textbox, Drop down list. Attendance will be stored in the database automatically through RFID face detection technology, rest of fields like marks; address, etc will have to be field manually. Test marks and attendance will be informed to students/parents via message. The system will provide the facility of short-listing the students according to company requirement.

Following are the snapshots of designed screens:

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Fig 6: Login Window

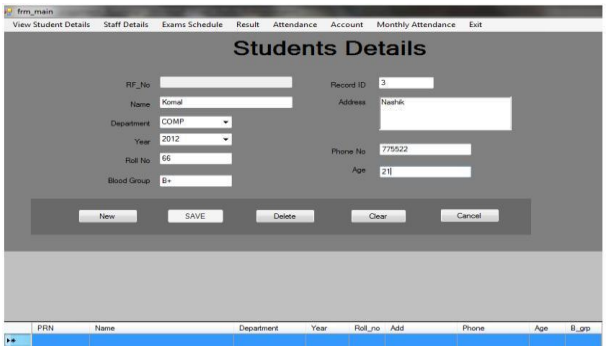

Fig 7: Student Details

Fig 8: Result Details

D. Conclusion

The system gives successful result to automatically calculate the attendance of student without doing any manual work. This proves to be lot of useful when attendance of large number of student is to be taken. The system helps to manage to student record, which in turns shortlist the student records according to the requirement of company. The system turns out to be lot of useful when there is large amount of data to be handled which become quite difficult to be handled mechanically. System reduces the overhead in the compilation of attendance, the student/parent knows average attendance and class test marks via SMS alert. Using RFID's along with biometric makes it easy to identify person correctly. They are easy to use, and save lot of time.

Hence we can say that ―Combined RFID-BIOMATRIC will act as an important tool in today's fast paced and techno-savvy world.

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