International Journal for Modern Trends in Science and Technology
Volume: 03, Issue No: 03, March 2017
ISSN: 2455-3778
http://www.ijmtst.com

Smart Attendance Monitoring System to Avoid Fraudulence by Synchronizing Results of RFID and Face Recognition System

Prof.M.Ramalingam[1] | Prof.A.Jeevanandham[1] | Keerthana P[2] | Indumathi D[2] | Nithyashree M[2] | ThilakRaj S[2] | Naveenkumar N[2] | Harish R[2]

[1] Assistant Professor, Department of Information, Kongu Engineering College, Perundurai, Tamil Nadu, India
[2] Final Year Students, Department of Information Technology, Kongu Engineering College, Perundurai, Tamilnadu, India

To Cite this Article
Prof.M.Ramalingam, Prof.A.Jeevanandham, Keerthana P, Indumathi D, Nithyashree M, ThilakRaj S, Naveenkumar N and Harish R, "Smart Attendance Monitoring System to Avoid Fraudulence by Synchronizing Results of RFID and Face Recognition System", *International Journal for Modern Trends in Science and Technology*, Vol. 03, Issue 03, 2017, pp. 11-14.

ABSTRACT

Regularity of student's attendance is prior in the administration of all the Educational Institutions during the recent decades. Poor attendance leads to detention which affects the overall academic performance of the students. Even in this hi-tech century, student's attendances are marked on attendance sheet delivered by the faculty members in the classroom, which leads to consumption of time and the process is also completely manual. Although RFID based and face recognition based implementation have been proposed, but they are separately implemented. The proposed system for student's attendance system includes a RFID reader combined with Face recognition system. RFID readers would be installed at different locations in campus and also in classes alongside cameras for face recognition. When student enters the campus, reader sends that location to the server and the student is tracked easily. Server checks the timetable of that student if he/ she is unable to attend lecture according to timetable then notification will be directed to the admin. This system guarantees that attendance record of the students would be preserved appropriately and efficiently. The system will accordingly generate detention list of the students. It is minor scale automated application, which is easy to govern as well as time redeemable and trustworthy.

KEYWORDS: *RFID, Face Recognition System*

I. INTRODUCTION

Attendance of each and every student during working hours has to be maintained by the academic institutions. The faculty who are handling the classes should maintain the relevant record of the attendance. The current existing traditional system is completely manual work and also time consuming process. Hence there is a need for a system that should automate this process and also to identify the actual strength of the students who came to college out of the strength who left hostel.

In traditional method, lots of difficulties exist which includes lost of attendance book, fake attendance and so on. If the book is lost, faculty has to create the new attendance book and therefore absented students get an opportunity to mark their fake presence in the new log book.

This procedure is hectic and also time consuming. Therefore, there is a need for an automated system that should replace all these traditional human work which would help the faculty members to maintain and mark the attendance easily.

II. NEED FOR RFID

RFID is a combination of radar and radio

broadcast technology. Among various solutions of available to monitor the log entries that exist in the market, RFID is the most emerging one that infrared, Ultra sonic and WIFI. Infrared requires line of sight property where ultra sonic is costly to deploy when compared to RFID. As all RFIDs are essentially originated for wireless sensor technology, their localization granularity and precision are similar so that performance comparison on them is unnecessarily addressed.

III. NEED FOR FACE RECOGNITION TECHNOLOGY

Now-a-days, unique person identification is one of the most important building blocks for attendance system. If we use purely RFID based system for automation, then there will be a possibility of fake records i.e., proxies may increase just by using his/her tag.

Biometric based techniques show better results in identifying an individual instead of authenticating people and providing them access to physical and virtual domains based on passwords, PINs, smart cards, tokens, keys, and so forth. These methods inspect a person's behavioural and physical characteristics to identify his or her unique identity. But the main drawback of this mechanism is passwords and pins which are difficult to remember and can be predicted easily or stolen.

So, the motive is to identify the person who plays a vital role. Amongst all the recognition methods currently in the market, face recognition is well known as the face modality is used to identify people in daily life.

Although other approaches like finger print identification which gives better performance but the time it takes to recognize a person is high compared to other techniques. Hence, face recognition provides best performance for identifying individual because it does not need to liaise or take any specific action.

IV. WORKING PRINCIPLE OF RFID

In general, RFID system has a structure as depicted in figure 1. RFID reader scans tags and then forwards the information to the backend database. In the backend, a well defined interface with appropriate database can be used for storing information.

When backend receives new information it adds it to the database and if necessary it performs some computation on certain fields. Finally the data is returned from database. In most cases, the application is collocated with reader itself for eg., in market barcodes are used instead of RFID tags. They are more common but the system would behave as if tags were used. When the reader scans the barcode, the application uses the identifier to lookup the details of the person in the database.

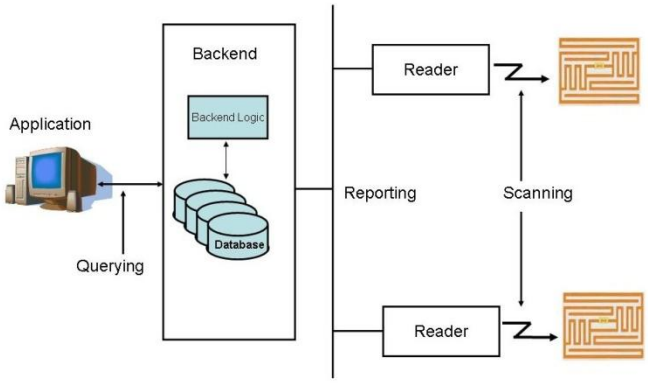

Figure 1: Simple RFID system

This section describes how RFID tags work in general.

There are three types of tags used by RFID. These are the energy sources of RFID. They are classified as

- Passive Tags
- Semi Passive Tags
- Active Tags

Passive Tags do not have an internal power source. Hence, they always rely on the power induced by the reader. This means that reader wants to keep up its field until the transaction gets completed. Because of battery, these tags are smallest and cheapest tags available in market. However it also restricts its reading range between 2mm and few meters.

The second type of tags is semi passive tags. Those tags have an internal power source that keeps the micro chip powered at all times. There are many advantages since the chip is powered, it can respond to requests faster so that number of requests to be resolved per second will be increased. The antenna is not required for collecting power so that it can be used for back scattering which increases the reading range. Due to the above two reasons, semi passive tags work with larger range.

The third type is active tags. Like semi passive tags they contain an internal power source but they use the energy supplied for both i.e., to power up the micro chip and also to generate signal on the antenna. An active tag generating a signal

without any request is called beacon. It works with the range of 10 meters and life span is 5 to 6 years.

Frequency Bands:

- Low frequency bands (30-500 KHz)
- High Frequency bands (10-15 MHz)
- Very High Frequency bands (860 – 960 MHz, 300 MHz – 3 GHz, 900 MHz – 915 MHz)

Low frequency tags:

These are cheaper than any of the higher frequency tags. This is more than enough for most applications. But, the time needed for a tag to stay in a sender will increase to load large amount of data. These tags are least affected by presence of fluids or metals. Major disadvantage is short range of reading and the most common frequencies used will be 125-134.2 KHz, 140-148.5 KHz.

Higher frequency tags:

These tags have higher transmission rates and works for larger ranges which operate at 13.56 MHz. It is costlier compared to low frequency tags.

Ultra frequency tags:

Ultra frequency tags have the highest range of all existing tags. It works with range of 3-6 Meters for passive tags and 30 + meters for active tags. In addition, the transmission rate of an UHF tag is very high and allows reading more number of tags in short time even the tagged entities move faster. UHF are very expensive and also sensitive to fluids and metals.

V. FACE RECOGNITION SYSTEM

3D facial recognition technology helps in identifying a person and also to point out the different nodal points of a human being and it is proven with high accuracy. Since it works for 3D method so that it removes the disadvantage of correct lighting concepts. Thus the photo of the person can be taken even in improper lighting and that too in any angle.

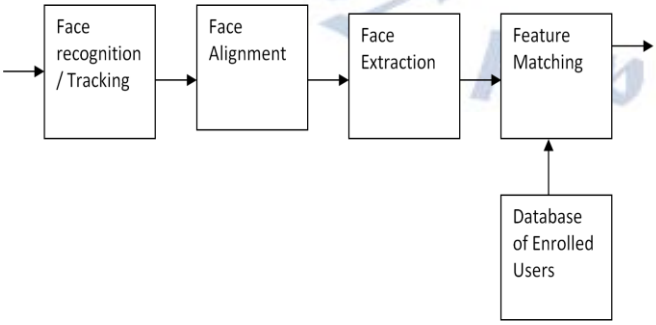

Figure 2: Block Diagram of Face Recognition

are the steps which explain the process of face recognition.

Detecting the person:

To know the proper working of this process, take a look at the image shown below.

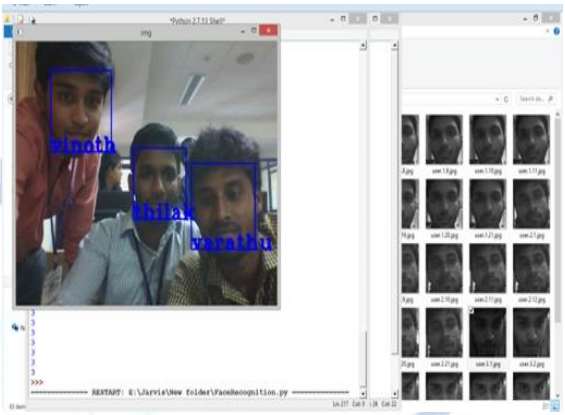

Figure 3: Face Recognition Process

Alignment of image:

For a 2D image, the system can be accurate only if the angular position of the face towards the camera is at least 35 degrees. But for a 3D Image, the system can be accurate even if the angular position of the face towards the camera is at 90 degrees. The size and pose can affect the accuracy.

Transfer of measurement:

The system then measures the curves of the face on a submillimeter scale and creates a template.

Representation:

The system translates the template into a unique code. This code gives each code with a set of numerals to represent the features on a subject's face.

Database Matching:

If the image is 3D and the database contains 3D images, then matching will takes place without any changes being made to the image. However, there is still a challenge in facing databases that are having 2D images. 3D images provide a live moving variable face being compared with flat, stable image. When a 3D image is taken, different points are identified. For example; both the eye balls, nose tip location and so on. Once those measurements are in place, algorithm will be applied to the image to convert it to a 2D image. After comparison the software will then compare the image with the 2D images in the database to find a potential match.

Verification or Identification:

In verification, an image will be compared with anyone of the images within the database. In this instance, one can take an image and compare it to a database of shots to identify who is the subject.

In our system, face identification is done on the premise of still pictures i.e, frontal face catching. Generally face recognition for static images can be classified as following groups.

1. Holistic Approach

In this, the entire face is taken as information in face identification framework to perform face acknowledgement.

2. Feature Based Approach

Local features of face like eyeballs, nose, and lip corners are used for identification.

3. Hybrid Approach

This derives the properties of above which uses both the features and also shape of a face.

VI. PROPOSED SYSTEM

In our proposed system, the major disadvantage of traditional system will be replaced. The purely RFID system cannot be applied completely to monitor the student attendance. As discussed in section 1, the probability of fraudulence to occur is very high. Other students can easily make fake records just by using other's cards. So, to avoid fraudulence we have combined both the technologies. So, the class room attendance can be monitored and also we can easily identify those students who came to the college out of those who left the hostel.

In our approach, the RFID reader will be placed in hostels and the students can register their presence and in and out logs in the RFID device.

The classroom attendance will be taken from the face recognition system implemented in the class room. By synchronizing both the results of class room and hostel attendance, we can easily identify the actual strength that came to college out of the students who left the hostel after breakfast and lunch.

Face recognition system is trained with different sample images of each student at various angles so as to improve the accuracy of face recognition. In a class some random group images will be taken at randomly and the image will recognize each student based on trained images and the attendance will be marked as present.

Each day the results of both the system will be compared and report will be generated to identify the fraudulence.

VII. CONCLUSION

This paper proposed a student attendance system by combining RFID and face recognition technologies. In traditional mechanism it takes more amount of time to mark the attendance and the probability of fraudulence to be happen is high. Thus by implementing the proposed framework helps in identifying the actual attendance of the class and also to identify the fraudulence activities in the campus.

REFERENCES

[1] Arulogun O. T., Olatunbosun, A., Fakolujo O. A., and Olaniyi, O. M (2013), "RFID-Based Students Attendance Management System",International Journal of Scientific & Engineering Research Volume 4, Issue 2, February-2013, ISSN 2229-5518.

[2] Chitresh, S and Amit K (2010),"An efficient Automatic Attendance Using Fingerprint Verification Technique", International Journal on Computer Science and Engineering (IJCSE),Vol. 2 No. 2,pp 264-269.

[3] Mohamed A.B, Abdel-Hamid A and Mohammed K.Y.,(2009), "Implementation of an Improved secure system detection for E passport by using EPC RFIDtags", World Academy of Science, Engineering and Technology Journal, Volume 6,pp1-5.

[4] Liu C.M and Chen L.S (2009), "Applications of RFID technology for improving production efficiency in an Integrated-circuit packaging house," International Journal of Production Research, vol 47, no. 8, pp. 2203-2216

[5] Sounderpandian J., Boppana R. V., S. Chalasani, and A. M. Madni, "Models for Cost-Benefit Analysis of RFID Implementations in Retail Stores, Systems Journal, IEEE, vol. 1, pp. 105-114, 2007.

[6] Ricardo Tesoriero, José A. Gallud, María D. Lozano, Víctor M. R. Penichet "Tracking Autonomous Entities using RFID Technology", IEEE Transactions on Consumer Electronics, Vol. 55, No. 2, MAY 2009

[7] Nai-Jian Wang "A Real-time Multi-face Detection System Implemented on FPGA", 2012 IEEE International Symposium on Intelligent Signal Processing and Communication Systems (ISPACS 2012) November 4-7, 2012

[8] M. H. Yang, N. Ahuja, and D. Kriegmao, "Face recognition using kernel eigenfaces," IEEE International Conference on Image Processing, vol. 1, pp. 10-13, Sept. 2000.

[9] Yugandhara M. Bhoge and Surabhi S. Deshmukh,"A Survey Paper on Automated Attendance Monitoring System using Face Recognition", International Journal For Research In Emerging Science And Technology, vol.1 , Special Issue-1, March-2015.

[10] Nirmalya Kar, Mrinal Kanti Debbarma, Ashim Saha, and Dwijen Rudra Pal," Study of Implementing Automated Attendance System Using Face Recognition Technique", International Journal of Computer and ommunication Engineering, Vol. 1, No. 2, July 2012.