iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** VI **Month of publication:** June 2021

DOI: https://doi.org/10.22214/ijraset.2021.35518

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue VI Jun 2021- Available at www.ijraset.com

Academic & Attendance Monitoring System using RFID, Face Recognition & IoT

Anakha Sachin[1], Aprem George[2], Gency Mary George[3], Dr. K. Karunakaran Nair[4]
[1, 2, 3, 4]*Department of Electronics & Communication Engineering, A.P.J Abdul Kalam Technological University*

Abstract— Attendance monitoring is an important task in the part of education. Attendance monitoring can be done using several methods. Among that, RFID proves to be an efficient and easiest method. Along with RFID, the use of face recognition also provides more accuracy and reliability by avoiding fake attendance. If a student bunks his/her class, then the use of GPS tracker attached to the tag enable the teachers to find the student. The purpose of IOT allows parents, teachers etc. to know the attendance and academic details of each and every student which gets stored in the database.
Keywords— RFID, Face Recognition, GPS Introduction

I. INTRODUCTION

Traditionally attendance of students was taken manually, which was considered as a time-consuming event. Moreover, verifying students in a large classroom and computing attendance percentage manually can result in errors. An automatic attendance management system using face recognition makes this job easier. For this purpose, raspberry pi with a pi cam is used. When a student enters the campus his RFID tag and face are scanned. If the two input matches, he is allowed to enter the campus. If the student entering the campus did not arrive to classroom, teachers can track the student standing wherever in the campus using GPS module.

Attendance will be marked only if the student enters the classroom. So that the attendance and academic details of each student cand be obtained from the database which allows the third parties to view these details using IOT. This method is an efficient and reliable method which reduces the effort of teacher as well as reduce the chance of proxy attendance.

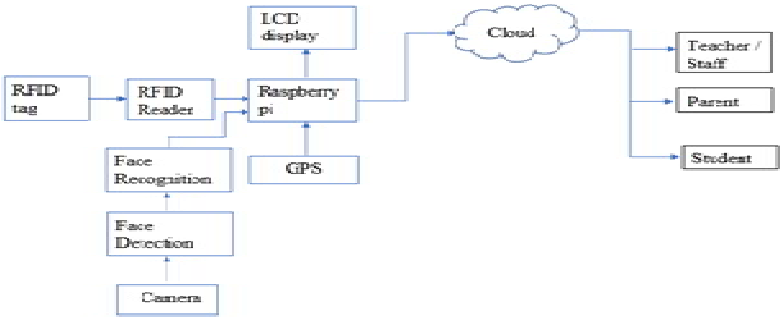


Figure 1. 1 Block Diagram

A. Raspberry pi 3B+

The Raspberry Pi is the most powerful device, which can be used as a personal computer. Not only as a computer, but it is actually a power pack hardware. Here we use Raspberry pi 3 model in fig 1, which is quad tone 64-bit CPU, Bluetooth, and Wi-Fi. It is the 3rd generation pi. It was the first member of the pi family which comes with 256MB RAM.

Figure 1. 2 Raspberry pi 3B+

B. RFID Tag

Radio frequency identification tag is an integrated circuit that uses radio frequency waves to identify objects. An RFID tag consists of an antenna and a microchip which are used to transmit and receive information. The microchip in the RFID tag stores whatever information the user wants in digital form.

Figure 1. 3 Paper Tag

Figure 1. 4 Key Tag

C. RFID Reader

This device consists of antenna, transceiver and a detector. RFID reader send the radio waves and respond back after the tag detects this wave. Antenna used in this reader is used to convert electrical signal into electromagnetic signal. The transceiver part can be used either as a transmitter or receiver. When the antenna detects the RF signal from the tag, the data is retrieved with the help of decoder.

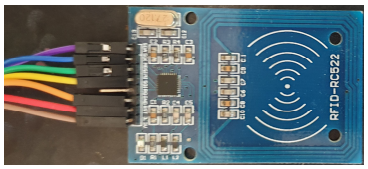


Figure 1. 5 RC522 Reader

D. GPS

GPS stands for Global Positioning System and used to detect the Latitude and Longitude of any location on the Earth, with exact UTC time (Universal Time Coordinated). This device receives the coordinates from the satellite for each and every second, with time and date. GPS module sends the data related to tracking position in real time.

Figure 1. 6 NEO-6M GPS module

II. PROPOSED ALGORITHM

A. Haar Cascade Classifier

This is an effective way for object detection. This method was proposed by Paul viola and Michael Jones. It is a machine learning based approach where a lot of positive and negative images are used to train the classifier. With this, negative and positive images features are extracted. Each feature is a single value obtained by subtracting sum of pixels under the white rectangle from sum of pixels under the black rectangle.

B. Local Binary Pattern Histogram (LBPH)

The LBPH algorithm is a simple solution on face recognition problem, which can recognize both front face and side face. LBPH is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. Using LBPH the face images can be represented with a simple data vector.

C. Python IDE

Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms. The Python interpreter is easily extended with new functions and data types implemented in C or C++ (or other languages callable from C). Python is also suitable as an extension language for customizable applications.

III. EXPERIMENT & RESULT

The process involved is divided into some phase that are described as follows

A. Phase 1- Face Recognition

When a student approaches towards the camera, face detection is done using Haar cascade Classifier. Through face detection the images of the student are captured and stored in database. After training the image face recognition is done.

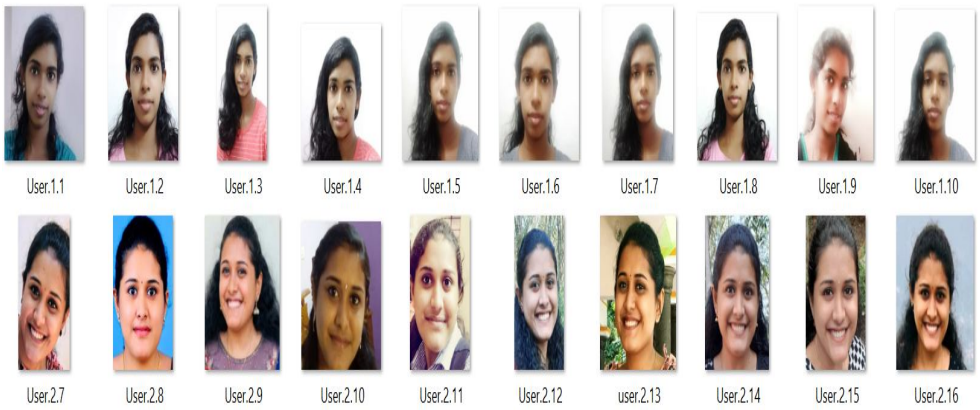


Figure 3. 1 Dataset

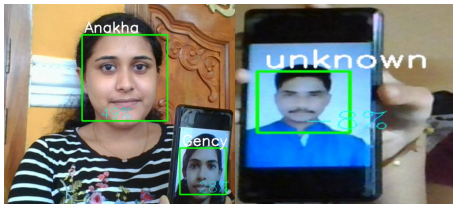


Figure 3. 2 Face Recognition

B. Phase 2- RFID Reading

Place the RFID tag near RFID reader RC522. The reader reads the tag and store the information contained in tag in Database.

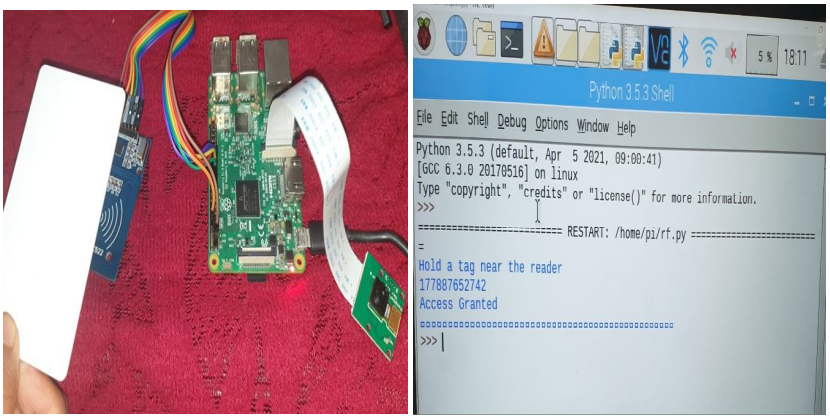


Figure 3. 3 Tag Scanning

C. Phase 3-Database Updation

A realtime database called firebase is used for storing the attendance and academic performance of the students. When the attendance is taken using face recognition face flag set to 1 & when the RFID tag is scanned RFID value is also set to 1.

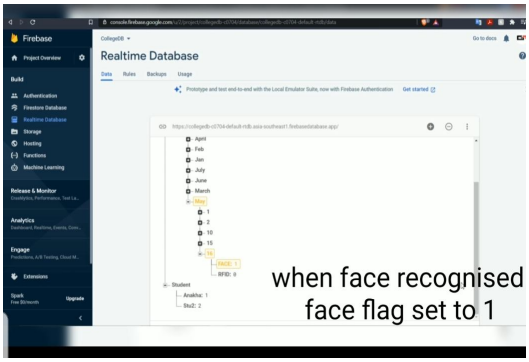


Figure 3. 4 Real time Database

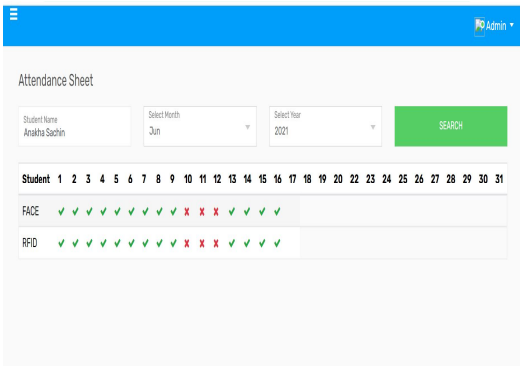


Figure 3. 5 Attendance Sheet

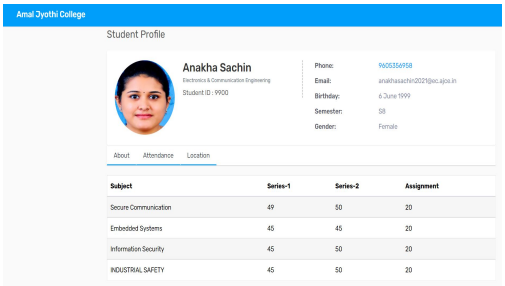


Figure 3. 6 Academic Sheet

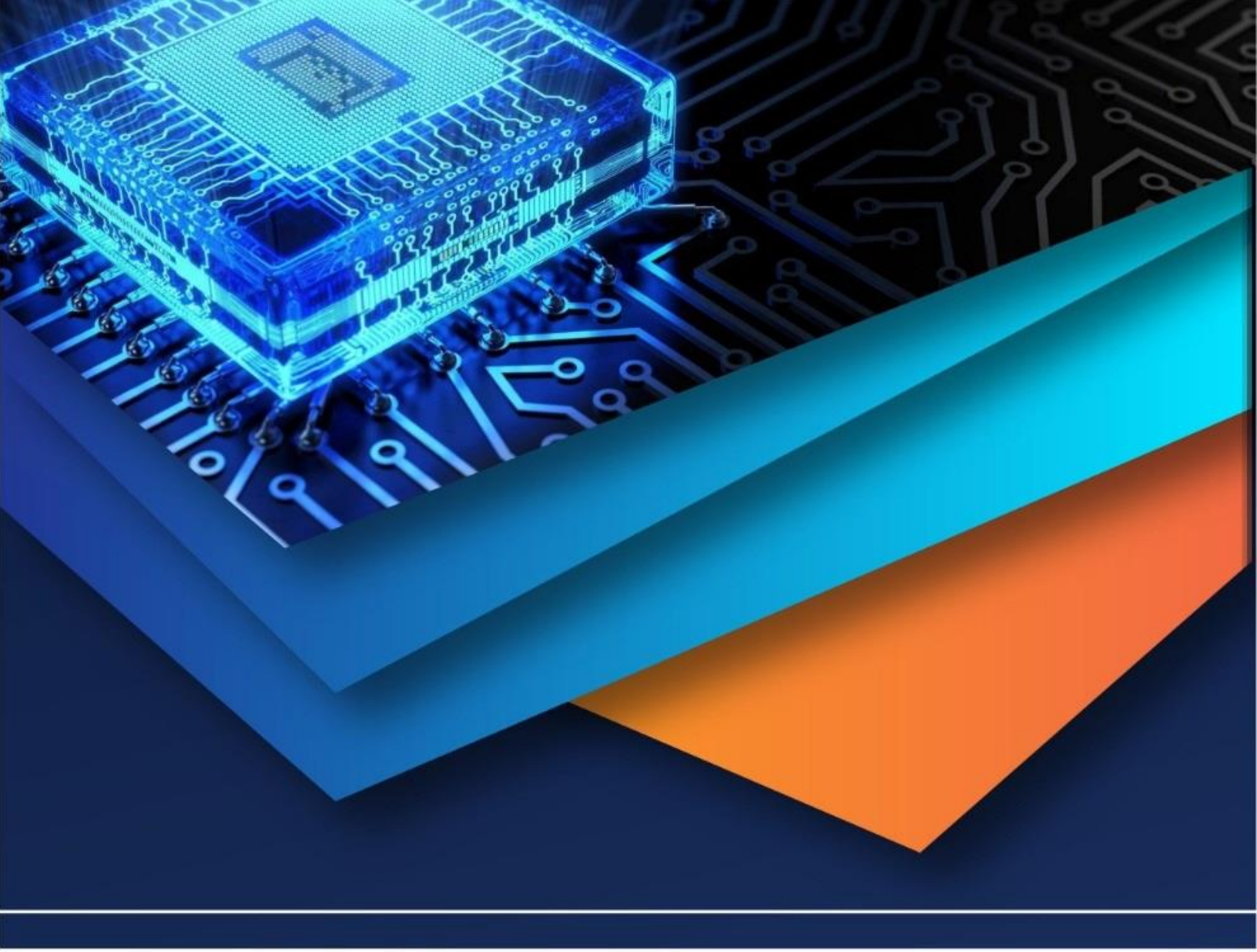
IV. CONCLUSION

An efficient automatic attendance system is introduced which replace manual efforts of attendance entry. This approach does not require specific hardware for installing. This approach provides easy computation of attendance with no errors. It enables the parents and teachers to view the academic details and attendance percentage of each student. Because of this system the number of students bunking the lectures is reduced. GPS tracking enables the teachers to find the students bunking the classes and standing wherever inside the campus.

REFERENCES

[1] B. K. Mohamed and C. Raghu, "Fingerprint attendance system for classroom needs," in India Conference (INDICON), 2012 Annual IEEE. IEEE, 2012, pp. 433–438.
[2] Taxila P. Development of academic attendance monitoring system using fingerprint identification. IJCSNS. 2009 May;9(5):164.
[3] Joseph J, Zacharia KP. Automatic attendance management system using face recognition. International Journal of Science and Research (IJSR). 2013 Nov;2(11):327-30.
[4] Okokpujie KO, Noma-Osaghae E, Okesola OJ, John SN, Robert O. Design and implementation of a student attendance system using iris biometric recognition. In2017 International Conference on Computational Science and Computational Intelligence (CSCI) 2017 Dec 14 (pp. 563-567). IEEE.

[5] Lodha R, Gupta S, Jain H, Narula H. Bluetooth smart based attendance management system. Procedia Computer Science. 2015 Jan 1;45:524-7.
[6] Apoorv R, Mathur P. Smart attendance management using bluetooth low energy and android. In2016 IEEE Region 10 Conference (TENCON) 2016 Nov 22 (pp. 1048-1052). IEEE.
[7] Lim TS, Sim SC, Mansor MM. RFID based attendance system. In2009 IEEE Symposium on Industrial Electronics & Applications 2009 Oct 4 (Vol. 2, pp. 778-782). IEEE.
[8] Preradovic S, Karmakar NC. Multiresonator based chipless RFID tag and dedicated RFID reader. In2010 IEEE MTT-S International Microwave Symposium 2010 May 23 (pp. 1520-1523). IEEE.
[9] Sharma T, Aarthy SL. An automatic attendance monitoring system using RFID and IOT using Cloud. In2016 Online International Conference on Green Engineering and Technologies (IC-GET) 2016 Nov 19 (pp. 1-4). IEEE.
[10] Madhu BS, Kanagotagi K. IoT based Automatic Attendance Management System. In2017 International Conference on Current Trends in Computer, Electrical, Electronics and Communication (CTCEEC) 2017 Sep 8 (pp. 83-86). IEEE.
[11] Akinduyite CO, Adetunmbi AO, Olabode OO, Ibidunmoye EO. Fingerprint-based attendance management system. Journal of Computer Sciences and Applications. 2013 Nov;1(5):100-5.
[12] Patil A, Shukla M. Implementation of classroom attendance system based on face recognition in class. International Journal of Advances in Engineering & Technology. 2014 Jul 1;7(3):974.
[13] Singh N, Singh L, Gaur G. A Review of IRIS Recognition Method. International Journal of Computer Science Trends and Technology (IJCST).;2(6):97-101.
[14] Olanipekun AA, Boyinbode OK. A RFID based automatic attendance system in educational institutions of Nigeria. International Journal of Smart Home. 2015 Dec;9(12):65-74.
[15] Raj R, Das A, Gupta SC. Proposal of an efficient approach to attendance monitoring system using Bluetooth. In2019 9th International Conference on Cloud Computing, Data Science & Engineering (Confluence) 2019 Jan 10 (pp. 611-614). IEEE.
[16] Kaur M, Sandhu M, Mohan N, Sandhu PS. RFID technology principles, advantages, limitations & its applications. International Journal of Computer and Electrical Engineering. 2011 Feb 1;3(1):151.
[17] Ilie-Zudor E, Kemeny Z, Egri P, Monostori L. The RFID technology and its current applications. InConference Proceedings of the Modern Information Technology in the Innovation Processes of the Industrial Enterprises (MITIP) 2006 Nov (pp. 29-36).
[18] Patel UA, Priya S. Development of a student attendance management system using RFID and face recognition: a review. International Journal of Advance Research in Computer Science and Management Studies. 2014 Aug;2(8):109-19.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY