

ATTENDANCE MONITORING SYSTEM USING IOT

¹N.Vaitheeka, ²R.Sowmya, ³R.Divya, ⁴M.Avina, ⁵N.Sornameenakshi

¹Assistant Professor, ^{2,3,4,5} UG Student,

Department of Information Technology, Karpagam college of Engineering, Coimbatore

¹vaitheeka.p@gmail.com

Abstract: If the current setup of our education system is considered there are lot of technologies to use but still only out-dated system is being followed. In case of the attendance system in universities and schools, lecturers did that work manually. Lecturers took the attendance and kept posted it manually in the database. There are lot of tools to use and reduce the burden of lecturers. Using RFID is the one example. If the combined the RFID and IOT (Internet of Things) it automatically be done and there is no need to do it by lecturers. Here the Cloud is used as storage to enhance performance. Using IOT and Cloud we can access it from anywhere and anytime which will provide us the better ability and flexibility.

Key Terms: RFID, IOT, Cloud Computing and Attendance System.

1. Introduction

The Concept of Internet of Things was first introduced by Kevin Ashton in 1999. Nowadays, there are plenty of digital educational tools to offer extra assistance for lecturing students. Digital facilities offer eases and efficiency in making an environment dedicated to boost educational courses for academics, by turning a physical reality to a virtual reality environment using combination of hardware and software apparatus. Internet of Things (IOT) inclines to make all physical items to be connectable. It includes intelligent and self configuring nodes (things) interconnected in a dynamic network infrastructure [1]. Generally, IOT is considered by physical world small things, commonly distributed with limited storage and processing skill and including consistency, presentation, security and privacy concerns. Therefore, three major elements: identity, intelligence and communication are highlighted in any IOT solution to facilitate item management, functionality of application and data flow, respectively. Individuality of each connected item shall be unique to confirm the Accessibility from one side to the other side when vast amount of items are interconnected. Connected items offer data interchange and these data shall be intelligently processed for certain application. Each Communication between

items shall be normalized and standardized for confirming exact data streaming and interaction with all device under a secured protocol, e.g., authentication necessity for item, either sending or recovering data. After integrating IOT we can access the database from anywhere and anytime, anyone and any device. Basically The IOT allows people and things to be connected Anytime, Anyplace, with anything and anyone, ideally using any path/network and any service.

Sometimes people don't want to use technologies because of the high cost of that. After doing a lot of research that how can we use the technology at low cost we found RFID which is chipper in price and can be useful for the attendance. RFID stands for the Radio Frequency Identification. Another important quality is battery less tags system of RFID. RFID is mainly combination of tags, an antenna and IC chip which is having the Unique Identification number. To detect that we have the RFID Reader, Which will read the unique ID of the RFID card. Without using RFID, the sensor will become erroneous. RFID is also used to identify the parking space, counting the number of vehicles, sensing the speed of the vehicle, analyze the non-traffic road for ambulance and monitoring attendance.

In IOT based attendance system there are lot of tools to reduce the burden and we can automatically maintain the attendance. Here cloud is used for storage. This attendance can be checked in real time on the website or android application, where a student can check his/her attendance. The existing attendance system requires a teacher to take attendance by calling the roll number of the students, which has many drawbacks, such as fraudulent attendance, extra risk of teachers calculating the attendance percentage, even calculation errors occurs. All these problems can be avoided by using this attendance system, proxy attendance can't be marked, attendance is sent to server in real time, all the calculations are done by the server and students can check their attendance in real time.

IOT=Physical Object + Controller, Sensor, Actuators + Internet.

2. Related Work

As RFID is a low cost device so lots of area is applying different application to use it, whether it is medical field or transportation field or attendance system. Everyone is using this because of its low cost and no battery power. We are using RFID in our day to day life as:

2.1 Medical Field

In the field of medical, hospitals are using RFID in the emergency ward and operation theatre to confirm the identity of patient. Using RFID doctors can get the medical treatment of patient as well as the physical details like Name, Address, Blood Group, Contact Information, Relatives contact details etc.

2.2 Office Use

RFID is being used in the Identity card .Corporate world is using this technology. Embedding RFID in the ID card can reduce lots of work. Like Security, Restricted Area Entrance and Check in and Checkout time.

2.3 Other Areas

We can use the RFID in E-passport. We are putting some tag on passport so that authority can get the details immediately. Also can be useful for the check in and checkout work. This will reduce the burden of man power.

Sara amendola [1] discussed in the paper that how can we integrate the IOT and RFID in the medical field. They have discussed in the paper that how we can integrate the small sensors and RFID with IOT so that we can get the minute by minute activity details of patient.

Whai-De Chen [2] discussed in the paper that how we can use the RFID in the attendance monitoring system and to avoid the traffic congestion. In the paper they have discussed about the RFID and GSM message service so that parent can get to know that their child is safely reached to the school. In traffic system they put the tag in parents vehicle and when reader come in range of RFID tag it will send a message to speaker saying that this kid's parent are here to pick him. Lots of transport companies are also using the RFID for their vehicle. So that they can detect when the particular vehicle came to load goods and when it left the building. So using this they can easily track the status of particular vehicle and in a very fast manner.

Past few years attendance have been taken manually, which takes more time and it is an extra burden for the teacher to update the attendance daily. To overcome this nowadays some institutions are using biometric. Since so many fraudulent activities are being

done by students, to overcome this we proposed an attendance monitoring system using Internet of things (IOT) and RFID sensors.

3. Proposed Methodologies

3.1 Development Process

In this project we using the RFID tags embedded in the student Identity card. To detect this we are using the RFID card reader which will sense the unique identity number assigned to the students. As RFID chips are low cost device but its price varies according to the distance. If distance is more the price is higher. The parameters like distance are depends on the manufactures once the RFID tags are developed then we are not able to change the unique identity number of this tag.

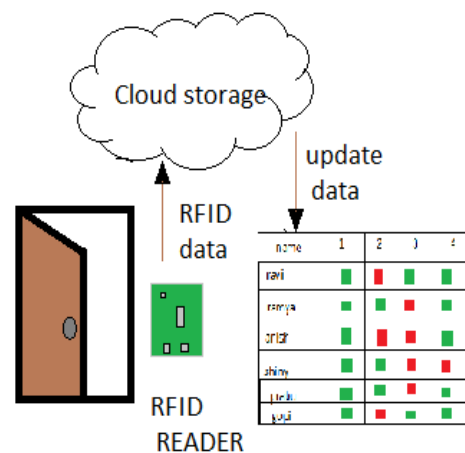


Figure 1. Architecture diagram

3.2 Wireless adapter and Cloud

After detecting the RFID of student identity card we need to store that data to some place. For that we are using Wi-Fi adapter as our storage is Cloud. So using the adapter we are transferring the data from reader to the cloud.

We are using cloud as data base because our concept is to use the Internet of Things in our project, So that we can access the database from anywhere and from any device at any time. If we use the computer instead of cloud than cost and maintenance may be high. We need one person to operate that system. So cloud as data storage is better than this.

One more thing is that Wi-Fi adapter and Cloud is less costly than the Desktop computer and needs less maintenance. We are getting the data from the RFID tags and sending it to the cloud system.

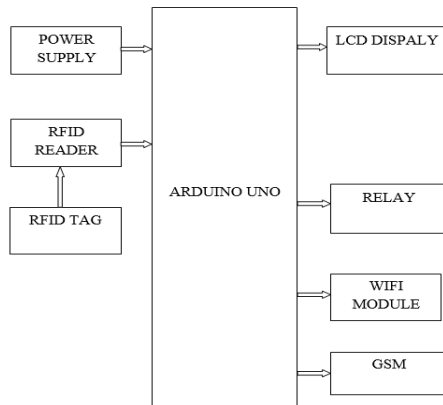


Figure 2 Working of Arduino board

3.3 Principle of Operation

After the RFID senses the student's unique identity number the student's details like Name, Registration Number, and Unique Identity Number will be stored to the Cloud.

Now we have data from RFID reader. So the unique identity number will be matched/compared from the database. If unique identity number is present in the result RFID Reader then only attendance of student will be marked as present, if unique identity number is not present in the result data then attendance will be marked as absent. So for student it is compulsory to bring the University ID card along with him.

All these work will be done automatically and also uploading of attendance. All the attendance will be updated to the intranet as per predefined time slot of teacher. So here no need to worry about the attendance. No need to worry about the proxies. After implementing this teacher will be tension free.

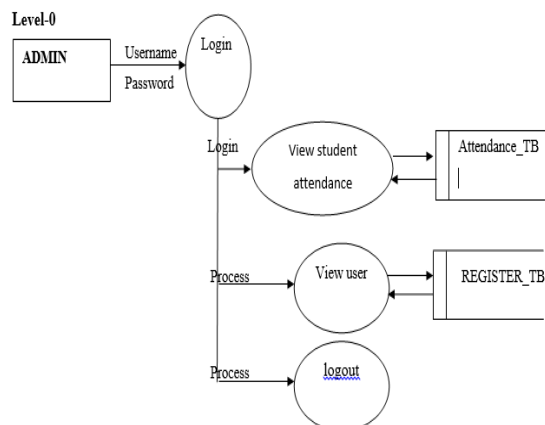


Figure 3. Admin level view of flow diagram

4. Objective

The main objective of the project is to automate the process of attendance and make it possible to check the attendance in real time. In this system we made a RFID sensor to sense the students unique identity card to receive the data from the RFID reader and do the calculations to calculate attendance percentage of each and every student. This system has an android application through which student can check their attendance in real time using android. Android application can also be used by teachers to give assignments to the students so that students get the notification. Android application also provides push notifications when new assignments are given by teachers and when the attendance of particular students is low.

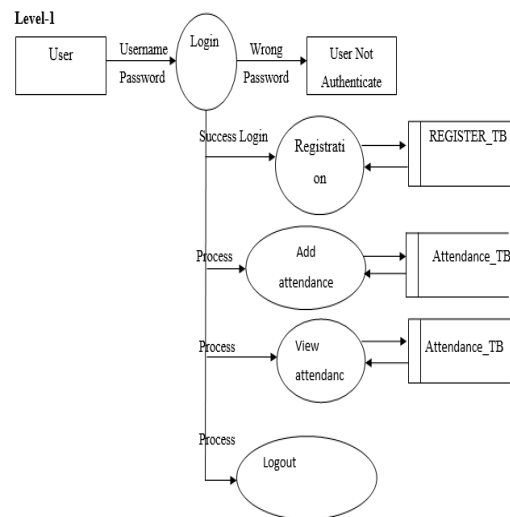


Figure 4. User level view

5. Future Extension and Conclusion

In our extension work, we will design several algorithms for determining student performance by utilizing the proposed IOT framework in a classroom. Our high performance computer will be utilized for machine learning processes based on collected data from various sensor devices. Usability and accuracy of designed framework to serve specific purpose (e.g., detecting student attendance using artificial intelligence) shall be compared and assessed with other researchers work and the actual responses by students in the classroom.

As RFID is a low cost device so we can use in the various field like transportation, medical, corporate, security. Tracking the vehicle and entrance door authentication can make it better.

In conclusion, the trend of computing economics (i.e., greater computing power at lower price) and device miniaturization become main influences for improving educational platform. Evolution of IOT in educational platform affects the changes of facility provided in a learning environment. Therefore, equipping IOT infrastructure in educational platform is essential for gathering nearby data, processing and performing action to facilitate teaching and monitoring learning environment. By implementing IOT solution in learning environment, we believe that performance of students, lecturers and educational system shall be enhanced.

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