

An Automatic Attendance Monitoring System using RFID and IOT using Cloud

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Abstract— If we talk about the current scenario of our education system than we found that we have lot of technologies to use but still we are following the traditional system. We if we talk about the attendance system in universities and schools, lecturers did that work manually. Lecturers took the attendance and update it manually in the database. If we talk about the technology than we found that there are lot of tools to use and reduce the burden of lectures. Using RFID is the one example of that. We if combine the RFID and IOT (Internet of Things) than we can do it automatically and there is no need to do it by lectures. Here we are planning to use the Cloud as storage for better performance. Using IOT and Cloud we can access it from anywhere and anytime which will provide us the better proficiency and flexibility.

Index Terms— RFID, IoT, Cloud Computing, Attendance System.

INTRODUCTION

In the world of technology there is no one who is not using the technology. But if talk about the Indian Education system still we are far away from technology. There is no improvement in this field. Even we have lot of tool and technology but any how we are avoiding this field from using the technology. If someone has used the technology then there are lot of work which are done by professors or lecturers. So some time we think if we are using technology and still we have to do work manually then what is the use of these technologies.

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.

Now the next thing is we are embedding the IoT (Internet of Things) in this. As our Moto is to use the technology in such a way so that we don't needed to do work

manually. 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

Now the question arises that if we are doing this in the attendance system than there are lots of disadvantage of this system. The biggest drawback is if we are going to use this system than there are chances that students can mark proxies easily. So for that we are embedding video camera in that system. As every university or school has the image of their students in their database. So we will capture the image at real time and then comparing the image with the existing database.

So after getting the comparison result we are retrieving the details of student which have the details like RFID unique no, Name, Branch, and Address. Now we have the result from image comparison and RFID reader. Here our main task starts, compare both the result and put the attendance as present we both the details are present.

Here main point is that if someone wants to mark proxies of friend and taking RFID card of friend then only RFID reader will read that value as that student is physically not present so if any one detail is not found it will mark the attendance as absent. One more thing to remember is that if such case is happen (Someone is bringing friends RFID card) then system will automatically send an email to that student as warning that you are trying to break the rule and if next time happens then any action can be taken against you.

RELATED WORK

As RFID is a low cost device so lots of area is implementing 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:

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.

Office Use:

Using RFID 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.

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 field of medical. 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 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 to announce 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.

PROPOSED METHODOLOGIES

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 detect 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 and distance parameter of this tag.

1.1 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

WiFi 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 (IoT) 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 WiFi adapter and Cloud is less costly than the Desktop computer and needs less maintenance.

Till now we have completed the half work of our project in which we are getting the data from the RFID tags and sending it to the cloud system. The following figure shows the RFID tag, RFID reader and different type of storage:

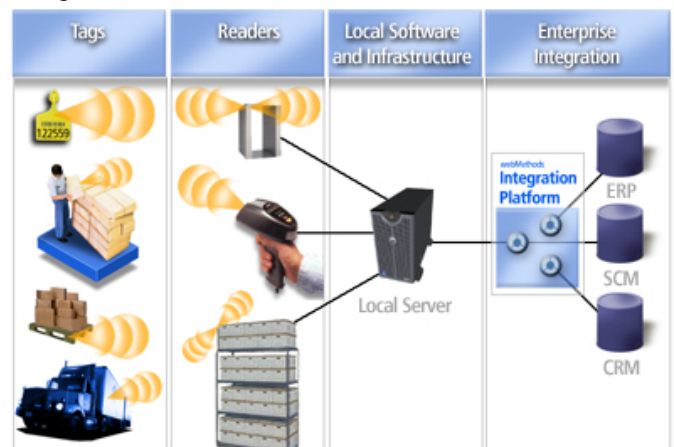


Figure 1 Different uses of RFID

Above figure shows how we can use the RFID tags. In figure four areas are shown where we can use the RFID tags. We have different types of RFID reader. Next column shows how we can store the data detected by the RFID readers.

1.2 Image Comparison:

The next thing is we are adding the Camera to get the real time images. So there are lots of techniques to compare the images. As in the university database we already have the image of each student's. We are extracting a single frame from the continuous set of frame (From Real Time Video), than comparing with the existing database.

We are extracting the frame two times. One at the starting of Class and one before the end of class and result of both will be compared so that if there is any mistake, can be rectified at that time only.

Here we have done the image comparison based on Pixel by Pixel values. Here we are using instance of colour to make things simpler. We have to rescale the image because of the

resolution issue. Many times we face the issues like in our database we have the High definition (HD) Image and frames and the real time video image is low resolution. So to comparing two different scaled frames is difficult and there are lots of chances of error.

Next is image comparison for that we used the naive similarity algorithm to compare images. Here our task is to compare the set of images continuously and get the desired result. Here we have set the ranges from 0. If there is no difference between images then the value will be 0. Otherwise we get the different values for different images.

The process of image comparison can be understood from the below given algorithm:

Input: Video consisting of multiple frames

Output: Difference between the frames

Algorithm Image Comparison

1. Calculate the signature of the reference image which has to compare.
 2. Get the all other files in the component list with whom we have to compare the reference image.
 3. For each image calculate the signature.
 4. Calculate the difference between the each store image signature with the reference image signature.
 5. Return difference.
-

Algorithm Calculate Signature

Input: signature size N

1. Assign the proportion (x, y) two coordinates values with central pixel.
 2. Calculate the average around of the pixel of the all signature values using the pixel proportion value (x, y).
 3. Return Signature.
-

Algorithm To Calculate Average Around

1. Assign the sample size for the image pixels.
 2. Get the pixel value and store in the accumulator.
 3. Calculate the average of the accumulator values.
 4. Return Average Around.
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Algorithm To Calculate Distances of two signature values

1. Calculate the signature for the image.
 2. Get the RGB values of each pixel
 3. Compare the two signature images RGB values by following steps,
 - a. Difference between each colour i.e. Red, Green, Blue colours of two signature image.
 - b. Multiply each colour difference with itself.
 - c. Add the all difference.
 - d. Take square root of it.
 4. Return the distance.
-

Table 1 Image Comparison Algorithms

Table 1 shows the generalized algorithm of Image comparison. It briefly concentrates on discovering few areas of a given picture that matches with the pictures in the image

store as opposed to scanning for equity of the items in given images. It is an algorithm to find similar regions in a set of images.

One thing should be noted here is that we are using simple image comparison algorithm. For the whole class we can go for the multi-pose invariant system discussed by Athinodoros S. Georgiades [3]. In this paper they have discussed about the image comparison of multiple people. People are in whatever position or with beard or behind someone this will recognize the person and give the result.

2. Principle of Operation:

In this system after getting the result from image comparison we have to retrieve the details of student. Student's details like Name, Registration Number, and Unique Identity Number. These details will be stored to the Cloud.

Till now we have completed the third phase of our proposed system. Now we have data from RFID reader and Data from image comparison. So the unique identity number will be matched/compared from the database. If unique identity number is present in both the result (Image Comparison and RFID Reader) then only attendance of student will be marked as present, if unique identity number is not present in any of the result data then attendance will be marked as absent. The architecture diagram for the proposed method is given below:

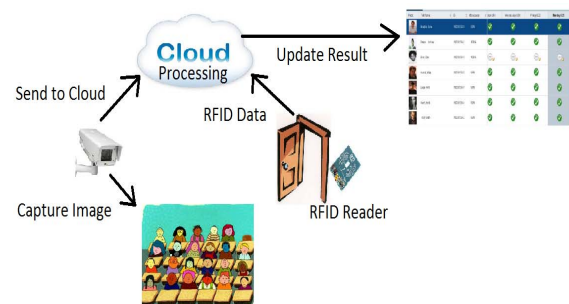


Figure 2 Architecture Diagram

So for student it is compulsory to bring the University ID card along with him. If someone wants to make proxy of a student then image comparison result will miss the detail of that student as he is physically not present and if any one data is missing attendance will be marked as absent. In this condition one mail will be sent to the student and his parents that you are trying to break the rule of university and if second time we found any such kind of activity then we can take any action against you.

All these work will be done automatically and also uploading of attendance. All the attendance will be updated to the intranet as per pre defined 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.

CONCLUSION

Here main thing is how you are going to use and utilize the technology in day to day life. In the above discussion we have used the RFID and IOT in the attendance monitoring system. By using above we are doing lots of work automatically instead of doing manually, which is the best part of that. We are using cloud as back end storage. Using Iot we are making it flexible so that can be accessed from anywhere.

FUTURE ENHANCEMENT

In the above system we have used the simple Image Comparison technique. By modifying the Image comparison technique like multi pose, no effect of lights we can improve the efficiency and computation time.

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.

So we have lots of opportunities to use the RFID and can make day to day life easier.

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