

WOLFATTEND: An easy, Accurate Automatic attendance Management System.

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Abstract—Attendance Management is a term which is heard across a lot of organizations. It is the act of managing attendance at a place such as work environment or an educational institution. Traditionally, educational institutions have a manual system of managing attendance. This urges the student to be in class on time, improve the grades and the student learning. However, the manual attendance system can become tedious for the class professors, their tutors and the students know the “way out” of this manual system. Using software for attendance management will reduce the manual work of the professors and the tutors and improve the accuracy for counting attendance, leaving less room for the students to “cheat”. This paper describes the problems we encountered in the current manual attendance system after studying it and an analysis of the system.

Keywords—attendance management system, WIFI, QR code, NFC, face recognition, biometrics

I. INTRODUCTION

Taking attendance during each class is a time consuming process especially when classes have large strength. Some institution policies require this task to be performed by the instructor in each lecture. This means that a considerable amount of time is spent in taking attendance. As per some of the statistics, we found that there are most cellphone users in the age groups of 12 to 34 (Figure 1).

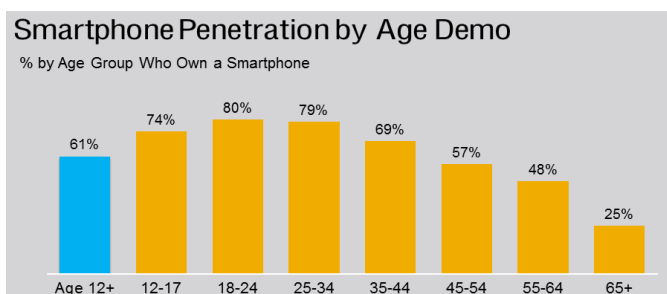


Fig. 1: Smartphone penetration by age

And as per general observation, almost 95% of the students in a class have their smart phones with them. Also, students are supposed to bring their ID Cards to the lecture. These are a few things which can be used to record attendances and hence save a lot of time and effort.

There are several types of attendance management systems, for example, student identification card, bluetooth and Near Field Communication (NFC), QR Codes, biometrics recognition, and one time password. The advantages of those systems

include less time consuming, less human interference, more accurate, and less possibility of cheating. However, there are also some drawbacks. They can lead to long queues in front of the machine (in case of card swipes), or the cost can be an issue in some of the systems.

In the next section, we will discuss in detail of our literature review findings. We will first explain why the traditional attendance taking methods are inefficient, and provides three different approaches with more advanced technologies.

II. LITERATURE REVIEW

Taking attendance in a medium to large class using traditional method such as roll calling can be very tedious and time consuming. Data shows in article [1] that among 54 lecture classes of class-size 102 students, time wasted for calling rolls varies between 1min 30sec to 5min 45sec, Nearly 50% of those 54 classes take 4 to 5 minutes to call the rolls, this time is long enough for a regular 1 hour or 1 hour 15 minutes class. Article also indicates that, usually there is a time lag between actual lecture topic and calling rolls. An average of 1 to 2 minutes additional time will be added to the roll calling time due to the transition, which makes the average time for 54 classes to take attendance using the roll calling method become 5min 41 sec.

Undoubtedly, a more advanced attendance management system can really help instructors save class time and concentrate on the academic topic. Article [2] introduces a new attendance management system by placing Near Field Communication (NFC) card closely to an Android device. Under the RFID standard, the NFC card will be automatically read by the Android device, so it is totally contactless. In this way, it is unnecessary for the students to insert or swipe the card, and multiple students will be able to place their cards near the card reader and all their information will be read separately.

Reference [3] proposes usage of QR Code i.e.(Quick Response Code), it is a trademark for a type of matrix barcode first designed in Japan. In this method they propose a way in which there are two module one is the server and other is the mobile module. The Server module mediates the student's attendance system, generates a QR code for the instructor/professor and then runs identity and location check. Mobile module is just the mobile application interface for the smart phones which can access the server module by the local WIFI or the Internet. The QR code can have encrypted data like the course name, instructor name, lecture time and some passcode.

The last paper that we reviewed talked about the feasibility of implementing an attendance system using the combination of mobile device and web application. In this paper the author proposes a way of using smartphones to initiate as well as to save verify the presence of a student. In this every student have to click on their name, confirm their ID, then they have to register thereby verify by a selfie(taking your photograph yourself) as well as by their sign(whatever of their choice). These will be compared with the one in the database and accordingly given the attendance to that particular person. At the end a Roll Sheet is generated with all the above details as mentioned.

III. USER SURVEY

In this section, we will describe all the different questions we put into our survey, the reason why we ask those questions, and what we can conclude about the answers.

Question 1: Do you think is taking attendance for a class/meeting or some event important?

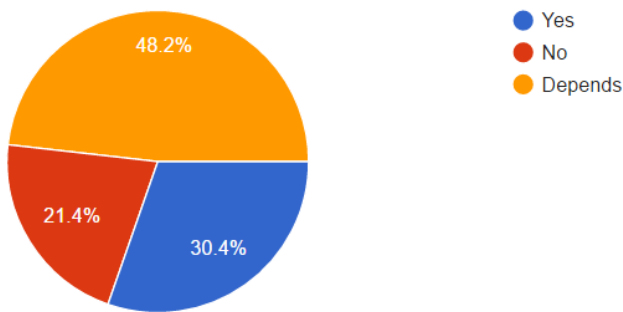


Fig. 2: Question 1

This question get the useful data and the rest are not taken into consideration. As out of the 56 responses we considering 44 responses and not considering the once who said taking attendance is not important. As attendance is important or at least depends on the lecture that is the reason in some classes professor take quizzes to keep a check on the attendance.

Question 2: Please, give at least one reason as to why attendance should/shouldn't be taken.(Type - Yes [for attendance should be taken] and No [for attendance shouldn't be taken] followed by your reason).

This was a descriptive question with everyone writing their own choices along with the reason as to why attendance as to why attendance is or is not important(Fig. 3 is a snippet of the answers).

Question 3: Do you prefer a daily attendance or a surprise quiz to keep a check on the attendance?

This question was to show that as the majority of the users said that daily attendance is preferable, we infer this that they are not confident with the content of the subject thereby may be pointing to some reasons of not attending the lecture.

| |
|--|
| No there should be no compulsion to attend |
| For better continuity in discussion |
| Promotes healthy and better classroom environment |
| Yes, Keeping a track of attendance provides sort of enforcement on student to attend the class and learn |
| Yes [When factoring in participation for a grade or something like that] No [When an event is for leisure] |
| Yes [When needed for grading] No [When the event is for leisure] |
| Yes so your work and dedication to a class can be recognized |
| Yes, it serves as a performance review for the presenter. |
| Yes- ensures people are coming to class. Making classes interesting just doesn't cut it |
| Yes- gives you a better sense of who is a part of your demographic. |
| No, because taking attendance makes the thing seem like a compulsory event and the reason to attend that class/ seminar becomes more like compulsion rather than interest. |
| Yes - Creates accountability for that person |

Fig. 3: Question 2

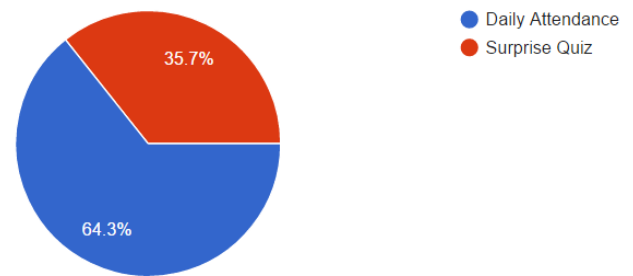


Fig. 4: Question 3

This question was to show that as the majority of the users said that daily attendance is preferable, we infer this that they are not confident with the content of the subject thereby may be pointing to some reasons of not attending the lecture.

Question 4: What do you think is it easy to give a proxy (i.e. giving attendance to a person even if he/she is not present)?

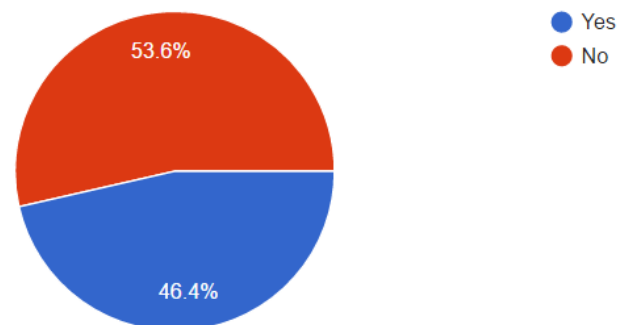


Fig. 5: Question 4

This question was to evaluate how the present attendance system was misused and shows that about half of the responders have done this particular misuse of traditional attendance system.

Question 5: How many times have you given a proxy (i.e. an attendance for someone who is not present at that place during that time-period) for your friends/colleague or someone else?

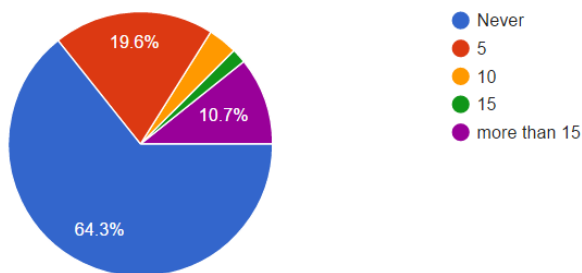


Fig. 6: Question 5

This question was to evaluate or get the approximate number of wrong attendance marked with respect to just these 56 responders and they are about 210 extra attendance.

Question 6: Give one of the ways in which you have given a proxy attendance for your friend/colleague or someone else. Also specify the way attendance was recorded.

| |
|--|
| Attendance was recorded in sheet, wrote name of person in a random blank. |
| The way is to write student's name on an attendance sheet, and I once wrote name for my friend |
| Seen. Signing on friend's behalf |
| I have never given proxy |
| Never given |
| During undergraduate while calling out names say yes |
| I've never given a proxy |
| Didn't do it here |
| Roll call n signatures |
| Writing his/her name on attendance sheet |
| Signing attendance sheet |

Fig. 7: Question 6

This question was to get the different ways and to handle them in our software we will be making thereby preventing someone from giving the proxies now in the future.

Question 7: Which are the most common types of attendance recording methods have you came across?

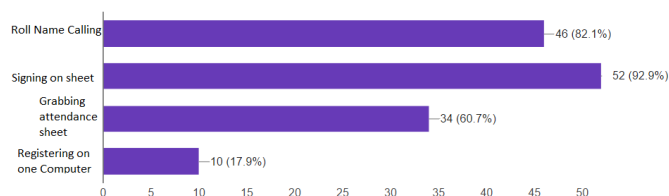


Fig. 8: Question 7

This is a question to ask about the different ways of

attendance taking methods in general out presently at most of the places and we got this as the output.

Question 8: Do you like the traditional way of attendance like signing on attendance sheet, or giving roll calls, or grabbing attendance sheets filling and submitting back. In which you have no proof of your attendance is been actually been taken or sometimes you might?

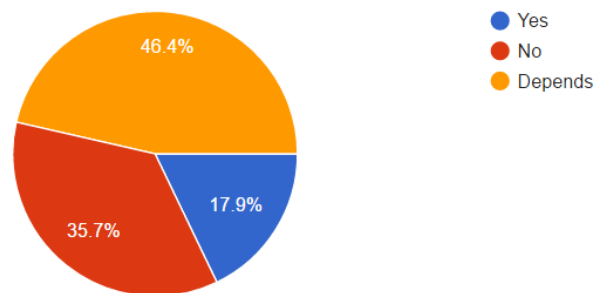


Fig. 9: Question 8

This question was to get the users view of traditional methods do they like the present method or they want to change the present method. From the results we deduce there is a need of change.

Question 9: On a scale of 1(least) to 5(most), rate the idea that such attendances can be automated rather than filling up the attendance forms/sheets?

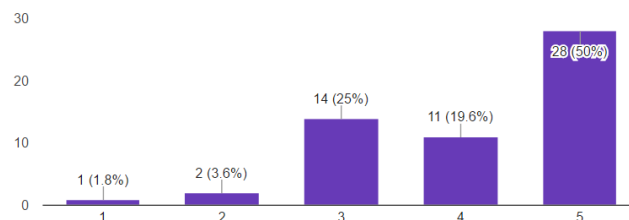


Fig. 10: Question 9

This question was to get the users view on the use of automated system in attendance managing and this was the input we got.

Question 10: Which are better ways do you think the attendance system can be made better than the traditional way ?

| |
|---|
| Interactive forums |
| Making an application for it. |
| May be simple ID card scanner at the entrance of the classroom. |
| Use a finger print scanner to keep track of people. |
| Use a fingerprint scanner |
| In some classes they use clickers or google forms throughout the lecture to keep up with who is actually there. |
| ID card swipe or answering questions through Google forms during class |
| Take a photo of the class and make sure everybody is visible. Let Computer vision do the rest |
| Card swipe. |
| We can use our student id card to swipe in and swipe out before and after classes. |
| have something to sense your presence |
| We can use face recognition. |

Fig. 11: Question 10

This was a way to get some inputs from the users as to what do they want the system to be like as well as to get some improvisation in our thinking of methods of implementations.

Data Analysis and Interpretation

The survey that we conducted have led to some interesting conclusions. We found that about 50% of the responders have given proxy attendance for their friends till now in their experience. There is a need to automate the present attendance system as the traditional is time and effort consuming as well as according to the survey there is a need of changing the system to automated attendance system.

On further analysis of data in the user review, we found that most of the users have smartphones so we can use QR code scanner, Biometrics method as well as NFC's and Bluetooth systems. Also with the different methods we came to know how the misuse of the traditional attendance system is happening with the different reviews and answers from the responders.

IV. PROJECT GOALS

To make attendance management system convenient for the instructors: As we saw in the above statistics, almost 5-6% of the total time in the classroom is wasted on the attendance. Our project aims at saving the time spent by the instructors in the classroom for the attendance of students. This way, we will be able to save a considerable amount of time which is critical.

Automate the attendance management system: The traditional way of attendance is an oral roll-call or signing attendance sheets. This usually takes time. It requires a good amount of human intervention and hence, can lead to human errors like a missed roll call. Automating the attendance system will thus help reduce attendance errors and save a lot of time.

Accuracy in counting the attendance: A missed roll call can cost a lecture attendance for a student. Similarly, a fake attendance put up by a friend will cause problems in

the accuracy in counting attendance. Some instructors have a policy to grant a few bonus points based on the attendance of the students. Thus, accuracy is essential in counting student attendance.

Minimize the incidences of cheating: A fake roll call or a proxy attendance by signing attendance sheet for a colleague are well known incidences when it comes to students. Automating the attendance management system will minimize the occurrence of such incidences and ensure that the students who attend the lectures regularly can benefit from this.

V. FEW IMPLEMENTATION METHODS

A few methods to automate the attendance management system have been proposed and mentioned in the introduction. We plan to modify a few of them or at least use the base idea of those methods and implement them in an entirely different manner.

1. Biometrics:

Fingerprint Scanning: The term fingerprint scanning relates to the fingerprint recognition method. It refers to the automated way of matching two fingerprints - in our case the one stored in the database and the other one entered by the student before entering the classroom.

Face Recognition: The term face recognition system is a system capable of identifying persons - here, students by scanning a digital image already stored in the database and matching it against the students image taken by the device installed near the class.

2. Smartphone Applications:

QR Code/Barcode Reader: A smartphone application which reads a Quick Response Code or a Barcode can automate the attendance management system to a good extent. The QR Code/Barcode scanning application will be installed on the students smartphone and the code will contain the details/data to mark the attendance.

Bluetooth/NearField Communication: The instructors device or a device kept in the class for the purpose (possibly a smartphone) will have an application which will be connected to the students smartphone. Using either bluetooth or NFC, we will be able to mark the students attendance.

One Time Passwords: A one time password is sent by the instructor to the students smartphone. The students who are present in the class only will receive this.

3. Student ID Cards:

The Student ID Cards can be used to mark a students attendance. A RFID scanning application will do this task for us. Reading the students id cards against the application should serve the purpose.

VI. CONCLUSION

As we previously mentioned above, taking attendance using the traditional methods can be very tedious and time consuming. So much class time was wasted on the attendance taking process. Therefore, after reviewing all the different literature and analysing the results from our survey, we conclude that a

more advanced attendance management system should be used in order to save more class time in college.

Currently, after reviewing the literature, we found that there are several approaches people have already been implemented for new attendance management systems. Each of them has its own pros and cons, but apparently, they are all better than the traditional methods. What we want to eventually come up with is an application which makes the attendance taking process convenient, accurate, and minimize the incidences of cheating.

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