AUTOMATED ATTENDANCE SYSTEM USING NFC

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ABSTRACT

Registering for attendance in education environments especially universities is a highly demanding activity as a result of increasing number of students. The attendance process normally involves circulating a paper for the students to register their names, or the lecturer calling the names and registering the students either in a paper or from PDA/PC. In the first case the students' attention may be attracted while taking the lectures and at the same time they can register for students who do not being present in the class.

While in the latter case the issue of cheating in the form of registering for their friends can be solved but imaging the number of students to be from 50 and above, a great portion of the lecture time will be wasted performing this process. In this we propose a smart attendance system using NFC that will simplify the attendance process, by simply touching an attendance poster or the lecturer's NFC based mobile device in the class.

Near Field Communication (NFC) is an emerging short-range wireless communication technology that offers great and varied promise in services such as payment, ticketing, gaming, crowd sourcing, voting, navigation, and many others. NFC technology enables the integration of services from a wide range of applications into one single smart phone. NFC technology has emerged recently, and consequently not much academic data are available yet, although the number of academic research studies carried out in the past two years has already surpassed the total number of the prior works combined.

I. INTRODUCTION

As we have seen in our schooling days that in the class when teacher comes he has to take the attendance of students by using pen and paper method, which was a very lengthy and time consuming approach. In today's era this is very necessary to save time from all other works

besides study and to employ that time in studying. So for this we also have to take care of attendance system which takes much time and to make such system in which employed time is very less. By making a system of attendance teacher can give his maximum time to students. To overcome the disadvantages of this attendance system we are proposing the NFC based attendance system for schools, colleges and universities.

In the proposed system implementing a very simple NFC (Near Field Communication) System with an android application device to track the attendance details of the student and providing some access permissions to the student in the campus. The system implemented in NFC was highly secured. Although the higher-layer cryptographic protocols (e.g., SSL) are used to establish a secure channel in order to overcome General Security Threats like Eavesdropping, Data modification, Relay attack, and Lost property and Walk-off.

Although NFC based applications run in a similar manner to Bluetooth on mobile devices, the working principal behind Near Field Communication is based on RFID. Therefore it is essential to study the basics of RFID before discussing the technical details of Near Field Communication. As mentioned earlier, RFID system contains 3 essential parts which are the reader, tag, and middleware. We will briefly describe how these components work in sync.

The RFID reader is also called an interrogator or an initiator. It is a device that continuously propagates Radio Frequency (RF) signals and waits for a tag to response. Readers can be stationary (fixed RFID) or moving (mobile RFID). Tags, also called transponders, are just basically a microchip with an antenna. They come in three varieties: Passive tags that do not contain a battery, Active tags that have a battery and are constantly broadcasting a signal (just like the reader), and Battery Assisted Passive (BAP) tags where the battery is activated only in presence of an RF field.

The tags can be stored in any small device or object according to their applications easily due to their small size. A good example is tags stores on rental cars or criminals for tracking purposes. They can also be placed in animal collars or in garments in a clothes shop for inventory purposes. A reader can be programmed to accept information only from particular tags. For example, in faculty parking spaces on a university campus, only the faculty is allowed to pass through whereas student cards are rejected. This depends on the frequency, modulation, encryption, etc. and this decision is made by a form of middleware installed on the reader.

II. LITERATURE REVIEW

Seema Rao, Prof.K.J.Satoa suggested in “An Attendance Monitoring System Using Biometrics Authentication”, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 4, April 2013 ; that they have written about the attendance monitoring system using fingerprint as the biometrics to register student’s attendance. A fingerprint is captured by user interface, which are likely to be an optical solid state or an ultrasound sensor. They have used two approaches for fingerprint verification system which are Minutiae based technique, in which minutiae is represented by ending or termination and bifurcations and Other one is Image based method or matching pattern. This process is completed in three phase, fingerprint scanning and registration,

authentication and the last phase being attendance updation. Due to the reqirement of fingerprint matching applications & sensors, it becomes a costly affair.

Abhilash Bhise , Radhika Khichi and Amol Korde suggested in "Attendance System Using NFC Technology with Embedded Camera on Mobile Device" , International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 2, February 2015; that they develop one system which gets attendance and updates attendance at a single place. They use near field communication technology (NFC) to get the attendance of students in school and colleges. NFC tags are given to every student when they register in college. When students enter their class rooms ,they need to touch or move their tag on lecturer's NFC enabled mobile phone, NFC readers program will read these tags, identify the students from their respective NFC tag and embedded camera will capture the face of the particular student. The teacher's mobile application then sends all the data to college server and in server side validation program will check the data for validation, if valid data found then program will update the database and grant attendance to that particular student. Each student getting a distinct NFC tag makes these tags very important without which they may be marked as absent.

Freya. Vora, Pooja. Yadav, Rhea. Rai, Nikita.Yadav suggested in "Android Based Mobile Attendance System", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 6, Issue 2, February 2016; that they have written about the mobile application that they have attempted to build which would require connecting to the internet through WiFi technology or through GPRS .All faculty members need to sign up for this in advance. Later on, the teacher can take attendance any time they wish by first logging in through their android smartphone to the server. After taking attendance, lecturer would send it over to sever via GPRS. The lecturers can also enroll new students, delete information about a particular student, modify some information etc. This application helps in saving a lot of manual paperwork by btinging in technology for the good. In this concept, the teacher herself has to call out the roll numbers of students to verify their presence, which neither reduces the burden nor saves the time spent while taking attendance.

III. PROPOSED SYSTEM

Attendance Management System is software developed for daily student attendance in schools, colleges and institutes. It facilitates to access the attendance information of a particular student in a particular class. This system will also help in evaluating attendance eligibility criteria of a student.

Fig : NFC tags Fig : NFC Enabled Device

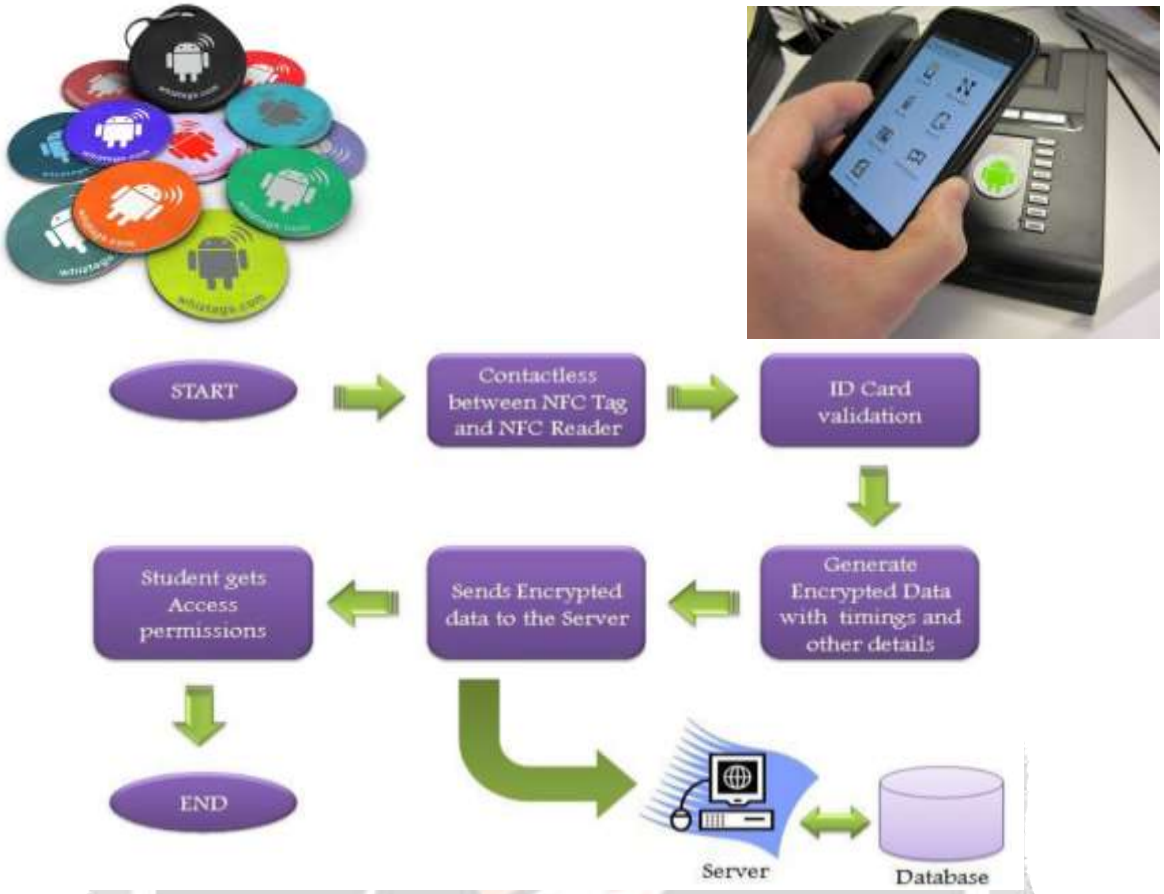

FIG 1: Block Diagram

This system is an android application for daily attendance system in schools, colleges, and institutions of students which uses NFC technology. It has a unique identification NFC tag of a student by using that he can register his attendance. This application also provide the facility of cross checking the attendances which have been made on the day. It also facilitate parents and students to check their attendances of the day and month as well and percentages of attendances. It generates the list of debarred students automatically on the basis of their attendance percentages. The Modules are:-

Login: - This is the login interface in which admin has to login himself first of all so that he can access the further options. Every authentic user has a username and password to login in the system. The supplementary tool Attendance Status Tracker also has login interface. In that application teacher, student and parents can also login. Everyone is provided with his unique username and password to get access of application by management. After login further more action can be done.

Choice: - Choice is the second interface of this system in which some choices are provided for admin. After logging in admin has to choose one of them like check attendance status, add a new tag, delete a tag or record attendance of students. In the supplementary tool the only choice which is given to students and parents is to check the attendance status while teacher can also check the attendance status of the whole class.

Record Attendance: - This interface is the main interface of the system in which a student can register his attendance by simply touching his NFC tag with the system. In the beginning of day admin login and open this interface after that a student can make his attendance.

Add/Delete tags: - This is the interface in which admin can delete and add a new NFC tag. This option is available only for management.

Attendance status Class/Student: - In this interface admin can check the attendance status of whole class as well as particular student that who is present and not on any day.
This interface is also available in Attendance Status Tracker application for parents, students and teachers. Student and parent can only check their attendances while teacher can also check the attendances of whole class.

NFC tags are designed just like an RFID tag to be used at 13.56 MHz and therefore the tag design is similar. At this frequency range, RFID tags mostly use the theory of Strongly Coupled Magnetic Resonance. This is basically where two nearby loop antennae provide strong electromagnetic mutual induction resonance. This effect is also known as inductive coupling. During operation, other communication frequencies are disabled which allows very fast communication between coupled resonances. Please note that this phenomenon is valid only for loop antennae that are placed very near to each other.

IV. DESIGN

From the below FIG 4 Use Case Diagram it is clearly visible that the system is not only accessible to the Teachers but also to the Students and their Parents. The Teacher however is the only actor in the system who can change the predefined values.

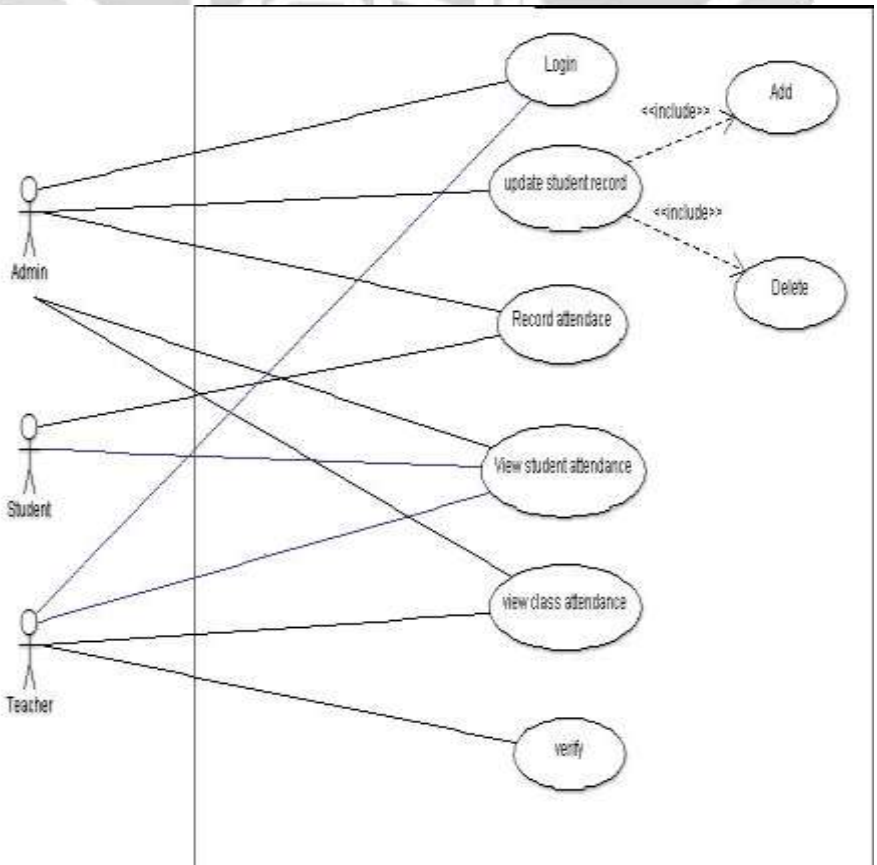

FIG 4 : Use Case Diagram

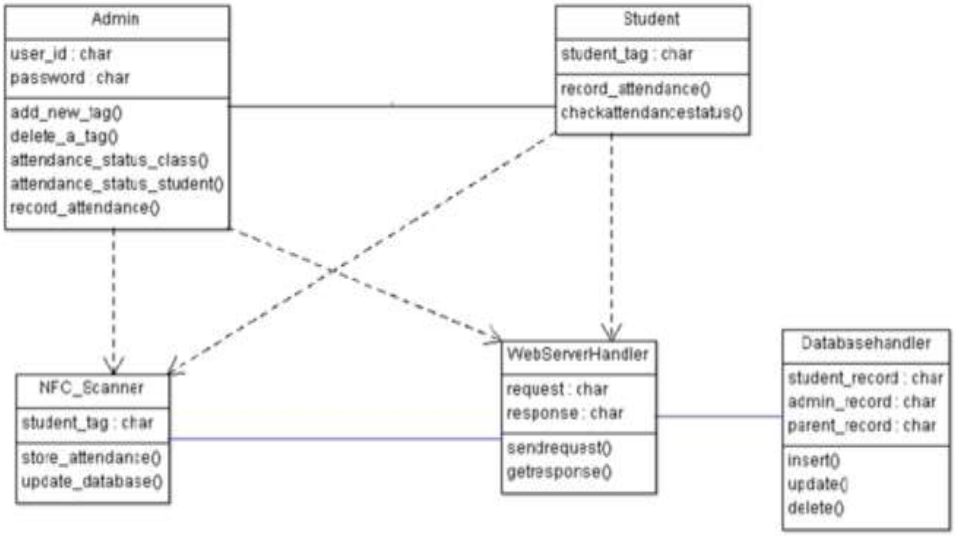

FIG 5: Class Diagram

The above Class Diagram has 4 entities, Attendance, Student, Database, Admin. Attendance has attribute Student id, Date, Time. Student has attributes name, phone no, RFid, Class, Branch, Student id, Username, Password, Semester, Gender. The Student and Admin have a one to one relationship .Attendance and Student has one to one relationship since one student has one Attendance per lecture .Admin Updates the Database of Student Attendance.
The database handler is controlled by the web server.It has one to one relationship.
The database handler has student record,admin record,parent record in it.The Web server request data from the database or it respond to the database handler for the Attendance.

V. CONCLUSION

Attendance management in education institutions is a very important issue, because in most institutions attendance is part of student's continuous assessment or is a condition that student must met before they are allowed to sit for examinations. The system presented in this paper will substantially improve the current day's attendance registration system and eliminate many paper works involved in it. Other benefits include eliminating the chance of losing attendance data, different attendance reports can be easily generated by a click of mouse, simplifying the decision making process related to attendance, etc. One of the major distinct

characteristics of our proposed system is that the hardware required are minimal, i.e. only NFC tag and NFC-enabled mobile device. This is as oppose to most systems where other devices like NFC or RFID reader is required. As well, the system can cater for several types of situations, whether the student has an NFC-enabled device or not. In the future, the system will be implemented in a real institution setup in order to validate it. The system can also be improved by updating the client application in receiving response and be able to reply back directly from the application.

This paper customization of how system relaying on NFC technology may be developed. This system is easy, flexible, convenient and reliable which will extend by adding new modules. The tag which provide by colleges that have been employed for this system are NFC tag, and algorithm used that shown stable and reliable outcomes. Our study clearly defined the benefits of currently developed NFC applications by classifying them into NFC operating modes. For future developments of NFC- based application it will guide to believe that underlying each operating modes benefit by analysing already develop applications.

VI. REFERENCES

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