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Smart Attendance System

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Abstract*: As we know the tradition approach of attendance, takes quite long to take attendance and pronounce each and everyone's name properly of a bulk of students. And in the changing world we must have to update our attendance system in a smarter way with speed and efficiency to reduce the time required to take attendance in our traditional way. Here, we are presenting 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 is 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. This system is applicable to not only students but also teachers, employees, workers*.

Key Word*: Near filed communication, NFC tag, RFID, Software Development Kit, Dalvic(Android) Virtual Machines.*

I. Introduction

As seen in 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 paper 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 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. 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.

II. Literature Survey

[1].Seema Rao, 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.

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.

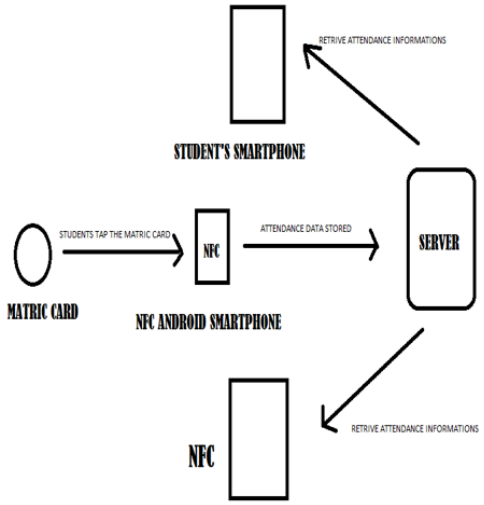
2.Abhilash Bhise , Radhika Khichi and Amol Korde suggested in "Attendance System Using NFC Technology with Embedded Camera on Mobile Device" , International Journal of Advanced Research in Computer and Communication Engineering Vol. 4, Issue 2, February 2015;

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. 3.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

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.

II. Methodology

Figure No.1: Block diagram of Smart Attendance System



Block Description

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.

HARDWARE DESCRIPTION

NFC Tags

NFC tags are a key element of the overall NFC system. One of the key elements of NFC, near field communications technology is the ability for NFC enabled devices to be able to be touched onto passive "NFC tags." This facility of NFC technology is a key enabler for many applications.

NFC tags are now incorporated into many different items and they are being manufactured in vary large volumes and

NFC tag basics

NFC tags are passive devices that can be used to communicate with active NFC devices (an active NFC reader/writer). The NFC tags can be used within applications such as posters, and other areas where small amounts of data can be stored and transferred to active NFC devices. Within the poster the live area can be used as a touch point for the active NFC device.

NFC tag type definitions

There are four basic tag types that have been defined. These are given designations 1 to 4 and each has a different format and capacity. These NFC tag type formats are based on ISO 14443 Types A and B which is the international standard for contact-less smartcards) and Sony FeliCa which conforms to ISO 18092, the passive communication mode, standard).

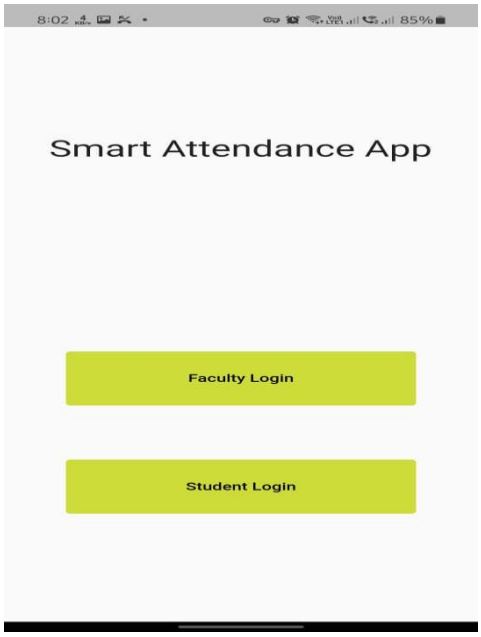
NFC tag operation

The NFC tag is a passive device with no power of its own. Accordingly when one is used, the users touches an NFC enabled device onto the tag. A small amount of power is taken by the NFC tag from the reader/writer to power the tag electronics. The tag is then enabled to transfer a small amount of information to the reader/writer.

The data stored in the tag memory is transferred to the NFC enabled device. Although normally only a small amount of data, this may be used to direct the device to a website URL, it may be a small amount of text, or other data.

III. Results and Discussion

Figure No.2 : Home Page created for Smart Attendance App

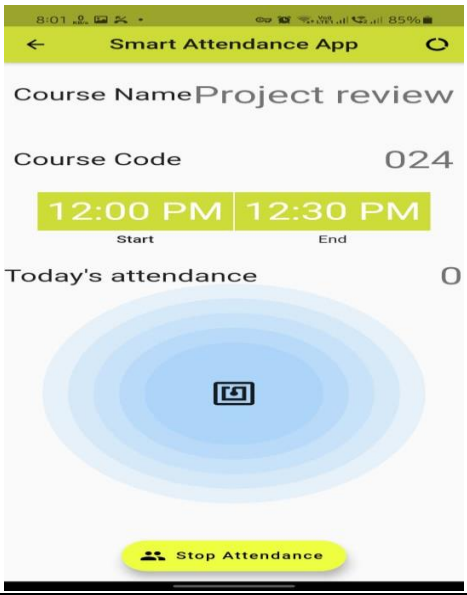


As shown in figure no.2 a Smart Attendance App is created in android system.In the Home page two tabs are provided. One tab is provided for Faculty and one tab is provided for student. In faculty login they should smart attendance given by student for every subject assigned to them.

Figure No.3 Faculty Home screen with Subject details

As shown in figure no.3 it showns faculy home screen with showing subject Project Review with attendance starting and end time. After clicking on plus sign add new subject to particular faculty.

Figure No.4: scanning NFC Tag for student's Attendance



As shown in Figure no.4 scanning of NFC Tag for student's attendance in student's login. Attendance is given for particular subject with course name and code is provided.The smart attendance system provides start and end time of 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 project 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. 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.

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