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Smart Attendance System Using Near Field Communication and Biometric System

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ABSTRACT: With the ever growing trends in technology its has become essential to develop smart systems in each field which give more output in less involvement of man power. This paper represents one such idea of Smart Attendance System which uses the concept of NFC to control the attendance system wirelessly. The proposed model not only overcomes the drawbacks of conventional attendance monitoring manually but also proves better than other technologies introduced till date by maintaining the confidentiality and security of the system. Concept of NFC technology is implemented through RFID card. This project uses a Microcontroller to store the database, RFID TAG to store the identification data, RFID Reader to transmit and receive the data through microcontroller, a display device to display the information and a Zig-Bee module to make the whole system wireless and handy to use.

KEYWORDS: RFID , NFC , Biometric system , ID Card Reader

I. INTRODUCTION

Attendance is an important part of student's academic record and poor attendance may lead to serious implications for later outcomes. In some institutions, without a certain percentage of attendance, student is not allowed to sit for an examination, whilst in some other institutions it is part of the continuous assessment. However, the traditional approach of attendance registration is time consuming and prone to cheat by some students. The process involves lecturer giving the attendance sheet to student in a class to sign. In this situation, some students may deceive the lecturer by signing attendance for their friends who are not present in the class. Another way which is much more difficult and time consuming is lecturer will calling student name one by one based on the list of the students that are enrolled into the course, and mark present for each student who in the class. Imagine how long it will take to register attendance in a class for 100 students by using this method. Therefore, it is necessary to changing the current approach to overcome the problem and make it more convenience for lecturer recording their student attendance.

II. PREVIOUS WORK

There are a few technologies-based attendance system that are currently exists today. The technology-based attendance system can be divided into two groups; sensor-based attendance system and biometric- based attendance system. An example for sensor-based attendance system is such as RFID and barcode. Whilst for biometric-based attendance system is like fingerprint, retinal scanning, voice and face recognition.

III. METHODOLOGY

Extreme Programming (XP) is a subset of agile development methodologies. According to Dennis Mancl (2010), three principles that used in XP are continuous testing, simple coding, and close interaction with end users to build the system quickly. XP begin with gathering user's requirement, and then the developers will conduct the analysis based on the requirement. After finish with analysis, they started with design phase iteratively until users are satisfied with the design and the functionality of the system.

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[1]PLANNING

The initial stage for XP methodology is planning, where developer collect the requirement from user. For NFC-based Student Attendance, the requirement is determined by creating 'user stories'. Then, the user stories are converted into iterations that will cover a tiny part of the functionality/features required.

[2]NEAR FIELD COMMUNICATION TECHNOLOGY

Near Field Communication, shortened for NFC, is a short-range wireless communication technology. This technology is used for contactless communication between devices such as smartphones or tablets. Contactless communication lets user to touch the smartphone over to another NFC compatible device to transfer data without having to go through multiple steps to established connection.

NFC requires at least one transmitting device, and another to receive the signal. Any device with NFC support is allowed to use the NFC standard and the device itself also can be considered either active or passive, depending on how the device works. Active devices could use both either sending or receiving data, and can interact with another active devices as well as passive devices. Smartphones are the most common implementation of active NFC devices, and same goes with public transport card reader where people had to touch the card for payment.



[3]DESIGNING

After done with gathering requirement, developer will proceed with design stage. This is the stage where the iteration process is begin and during this stage, a specific description of what is necessary to overcome the problem is designed. This stage will cover database design, user interface design and system design for NFC-based Student Attendance project.

[4]CODING

In XP approach, coding is the most important stage for the entire lifecycle. The reason why XP gives priority in coding stage over all other tasks such as documentation is because that the application is received something in value at the end of the day. Attendee is coded based on the requirement given and the functionality is added little by little during the iteration process.

[5]TESTING

Extreme Programming is a bit different from any other software lifecycle methodology. In XP, testing stage is integrating with the coding stage rather than at the end of coding stage. All source codes have unit test to remove bugs,

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and before it can be released, the code must pass during the unit testing. There are many techniques that can be used for testing process and for this project black box testing has been selected.

IV. ANALYSIS

Lecturer can interact with Attendee by operates them via Android device. Attendee requires lecturer to sign up first before it can be used to record student attendance. Lecturer may log in into Attendee either by using NFC or log in manually using text field. Only lecturer have permission to create new attendance or delete attendance on those particular days. Attendee can record student attendance via NFC and also via student list. For NFC option, student need to touch their ID card on lecturer's phone. Whilst for student list, lecturer can tick student name and Attendee will send the data to server and store it into database.

V. RESULTS

- **Reliability**

To ensure the reliability of the application, Attendee still be able to register student attendance via student list even though the device does not support NFC.

- **Simplicity**

Kelly Johnson (1970) stated that "keep it simple, stupid" (KISS) which mean a system can be well-performed when they have simple design rather than complicated design. Attendee should have a simple interface to make sure user did not take too long to figure out how to use it.

- **Availability**

Based on data collected by Android Developers, 29% of user who visited the Google Play Store is still running on Jelly Bean (4.1), 37.8% is running on KitKat (4.4) and Lollipop (5.0) is 25.6%. From this statistics, there still a large number of devices are running on Jelly Bean and to ensure the availability of the product is reached to the end user is by minimise the Android requirement to version 4.1.

- **Security**

Attendee should provide log in authentication to avoid unauthorised user from modifying the attendance database. There are two ways to log in into Attendee, first is via text field and other is via NFC; where lecturer just have to touch their ID card at their device.

- **Portability**

Attendee can be installed in any supported device such as smartphones and tablets. Providing portability for Attendee make it easier for user to bring it into the class.

VI. CONCLUSION

For a conclusion, NFC Based Student Attendance may bring changes in a way of taking student attendance. Attendee itself have an intuitive design where user can operate it without relying on user manual. Moreover, Attendee is ease to use, user just need to sign in and create attendance. Attendee automatically will capture the ID when student touch their

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ID card on lecturer phone. Even though Attendee was developed for helping lecturer taking student attendance, but still it has several limitations.

Currently, there are two limitations of this NFC Based Student Attendance. First, it does not have online and offline support. At this moment, Attendee relies on internet connection to register student attendance. So, it is necessary for Attendee to support in offline mode as well in case the lecturer having a problem with the internet connectivity. Secondly, Attendee does not support multi-platform. With the various devices running on different OS now, releasing Attendee in different platform could improvise the usability of the application.

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