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(TANDATANGAN PENULIS)	(TANDATANGAN PENYELIA)
(Mohammad Syafiq Bin Mhd Hussain)	(Puan Maslita Binti Abdul Aziz)
Alamat tetap : Quater Klinik Kesihatan Pekan Jitra,0600 ,Jitra Kedah Darulaman	
Tarikh : _____	Tarikh : _____

ADVANCE SMARTPHONE CLASSROOM ANDROID APPLICATION SYSTEM

MOHAMMAD SYAFIQ BIN MHD HUSSAIN

This report is submitted in partial fulfilment of the requirements for the Barchelor of Computer Science (Software Development)

FACULTY OF INFORMATION AND

COMMUNICATION TECHNOLOGY

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2013

DECLARATION

I hereby declare that this project report entitled

ADVANCE SMARTPHONE CLASSROOM ANDROID APPLICATION SYSTEM

Is written by me and is my own effort and that no part has been plagiarized without citaitons.

STUDENT : _____ Date : _____

(MOHAMMAD SYAFIQ BIN MHD HUSSAIN)

SUPERVISOR : _____ Date : _____

(PUAN MASLITA BINTI ABDUL AZIZ)

DEDICATION

All praise to Allah, the most merciful, kind and beneficent, and the source of all knowledge, wisdom within and beyond my comprehension. He is the only God, who can help us in every field of life. All respect and possible tributes goes to my Holy Prophet Mohammad (SAW), who is forever guidance and knowledge for all human beings on this earth. I am very grateful to my Project supervisor. He guided and helped me through timely suggestions, valuable advices and specially the sympathetic attitude, which always inspired me for hard work. I am proud to say that I am very grateful to my family whose kind prayers and cooperation helped us at every step of my work. Special thanks go to my parents for their cooperation for the sake of my knowledge. I am really very thankful to one of my friend Mr Faizan Ismail for his cooperative attitude during the completion of my project work. He helped and supported us during gathering and analyzing information.Special dedicated to my beloved family and my friends. Thank you for all the supports and love given all the way this project report has been made.

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ABSTRACT

Advance smartphone classroom android application system is a combination of contactless services based on near field communication (NFC) and S Beam technology that offers substantial advantages over basic smart card technology. The advantages range from peer-to-peer communications to accessing functions of the mobile phone. This generates chances of more complex and interactive applications, as well as the ability to modify any applications on the phone via the communications link. Therefore, the Advance smartphone classroom is a step to manipulate the NFC and BEAM technology for students' benefit as mobile phone is a necessity. The application highlights attendance taking and as a fast mechanism for information sharing without internet connection. In other word, the information sharing includes (i) an effective way to circulate username and password of free Wi-Fi for each university building, (ii) easy distribution of class notes as well as lecturers contact information, (iii) reading university events on mobile phone that reduce poster printing, (iv) to reduce time consuming for student and lecturer in taking attendance by replacing paper base system and make easier in setting properties in smart phone. Nevertheless, the application is a step to explore the new technology in university environment with the intention that the students especially UTeM students are aware of the latest technology.

ABSTRAK

Advance smartphone classroom merupakan gabungan perkhidmatan sentuh berdasarkan komunikasi medan dekat (NFC) dan teknologi Beam yang menawarkan kelebihan besar ke atas teknologi kad pintar asas. Pelbagai kelebihan dari komunikasi jarak dekat dari rakan sebaya untuk mengakses fungsi telefon bimbit. Ini menjana peluang aplikasi yang lebih kompleks dan interaktif, serta keupayaan untuk mengubah suai mana-mana permohonan di telefon melalui pautan komunikasi. Oleh itu, Advance Smartphone Classroom merupakan satu langkah untuk memanipulasi teknologi NFC dan BEAM untuk faedah kepada pelajar sebagai satu keperluan. Mengambil kehadiran pelajar dan sebagai mekanisme cepat untuk berkongsi maklumat tanpa sambungan internet. Dengan kata lain, perkongsian maklumat termasuk (i) satu cara yang berkesan untuk mengedarkan nama pengguna dan kata laluan Wi-Fi percuma untuk setiap bangunan universiti, (ii) pengagihan mudah nota kelas serta pensyarah maklumat kenalan, (iii) membaca peristiwa universiti pada telefon mudah alih yang mengurangkan cetak poster, (iv) untuk mengurangkan memakan masa untuk pelajar dan pensyarah dalam mengambil kehadiran pelajar menggantikan kertas sistem asas dan membuatnya lebih mudah dalam dalam telefon pintar. Walau bagaimanapun, ini adalah satu langkah untuk menerokai teknologi baru dalam persekitaran universiti dengan matlamat bahawa pelajar-pelajar khususnya pelajar UTeM sedar teknologi terkini.

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INTRODUCTION

1.1 Project Background

Over the last few decades steady development of mobile services are increasing, starting with basic feature such as voice and short messages, leading to the new feature such as mobile multi-media messaging, mobile TV and mobile Internet. The objective of smartphones are to make life simple and convenient. The smartphone technology is advancing with introduction of Near Field Communication (NFC) and Android Beam to smartphone that are built by Samsung Coporation and Google which is Galaxy S3, Galaxy Note 2 and Google Nexus. This feature is easy and simple to use and well built inside.

NFC is a wireless proximity communication. Occupying on the Radio Frequency Identification (RFID), it uses magnetic field induction to enable communication between electronic devices. The number of short-range apps for NFC technology all continued to grow.

Android Beam is a NFC based technology which provide sharing of like web pages, videos and apps between two phones in NFC range. Other important information can also be shared between phones. For example Google Maps information, videos watched in You Tube and contact information.

The NFC circuitry is built in the battery of the phone and not on the back plate. In order to share data between two NFC enabled phones, one has to bring the phones to touch each other. This will send the selected data to the phone. It is pretty remarkable- suppose you are watching a video on You Tube, the back of one phone has to be touched with the other and immediately the video are sent to the other phone. What happens is that it sends a link that directs to an application

on the market where it's can download it. Thus, the advance feature motivate to produce Advance Smartphone Classroom (ASC).

The ASC, the combination of contactless services based on NFC technology offers substantial advantages over basic contactless smart card technology, including: peer-to-peer communications and access to facilities on the mobile phone, such as the screen and a communications link. This generates chance of more complicated and interacting applications, as well as the ability to modify applications on the phone via the communications link.

Until now, the disscusion reveal the various ways in which NFC is being used all over the world. From this point onwards, the focus of the report will shift towards the process of classroom that can be effective in Malaysia, how NFC systems can be implemented here and whether they will be feasible. The best place to start such an implementation would be in the classroom since student and lecturer can be part of it to increase the effeciency in their learning process. The objectives to be accomplished in this project are as follows:

- Propose and design an NFC and Beam based classroom system. This system would incorporate the following services:
  - NFC Technology Based
    1. Advance Smartphone Classroom - Classroom Smart
       - Smart Application that has two main module which is NFC write and read and Wifi connect.
    2. Advance Smartphone Classroom - Student Swipe Attendance
       - Application that register student throught NFC tag, this application user by lecturer in classroom for taking attendance.
  - Beam Technology Based
    1. Advance Smartphone Classroom – Student HiFive
       - Student HiFive or exchange contact is application that use Beam to tranfer contact number.
    2. Advance Smartphone Classroom – Document Exchange
       - Document exchange is application that tranfer document throught Beam, the document can be set password for security.

1.2 Problem statements

1.2.0 Attendance is paper base

- In most of the classroom, lecturer still use paper based attendance systems for tracking student attendance in the classroom. Paper consumes utilization of resources which contributed to unefficiency of tracking student.

1.2.1 Old technology hinder development

- Environment on the classroom need to adopts the new technology to advances new level of standard in efficiency of learning process. Technology such as NFC and Beam will help the achievement of the new standard of learning process.

1.2.2 Lacking effieciency in exchange data

- In the classroom lecturer needs to deliver document or files related to the subject as well as the students need to exchange the document among themselves, as technology such as bluetooth and pendrive are always the choise but it is not efficiency anymore because there are new technology that are more fastes and easyies which is NFC and Beam.

1.2.3 Sharing hassle to enter the Wi-Fi credentials

- Nowadays in the classroom lecturer and student need to connected to wifi for accessing portal or document, but the problem appear when username password always keep on changing by administrator and the user has to contact administrator to get the information.

1.3 Objectives

The objectives of the project are:

1. To reduce time for student and lecturer in taking attendance by replacing the paper base to application.
2. To introduce smart phone technology in exchanging data between devices to replace old technology like bluetooth to the new technology which is Beam .
3. To make use of technology such as NFC and BEAM in various ways for better technology implementation in a classroom such as shorter time to exchange document or connected to wifi.

1.4 Scopes

1.4.1 Scope of users

- Students:
  - Student that being involved in process learning in school ,high school and university that equip with smartphone as one of method to be part of learning process. Student use this application to register their attendance daily as they come to classroom.

- Lecturer/Teacher:
  - Lecturer use this application for taking an attendance for whole classes, attendance will be saved and can be track in the application. Furthermore lecturer can use it to tranfer any document using Exchange Document application to the student.
- Public User
  - Public user that have smartphone that built with NFC and beam can use this application. This application will help them to use the NFC in their routine everyday.

1.5 Project significance

Based on the objectives, the benefit from the project are:

- The key to the academic success is the punctuality of the classes. The taking of the attendance of student wastes around 10 minutes of important learning time. This proposed system has the potential to replace all the manual attendances still taken during classes and eliminate this waste.
- In a learning process in a classroom, there are many different situation that need student or lecturer to remember piece of information and in need to save on the easy place to safe its.
- The main benefit of using NFC smart tags is that the information is channeled and received then and there. This downloading method usually requires, a data connection with an expensive data plan in the mobile device which not every mobile user be endowed with. There are no need to access the information and separately download it in case a Wi-Fi connection is not available.

1.6 Conclusion

In conclusion, this project can lead learning process and vision of acedamic move another step in effeciency of learning and nation toward better technology as expected by country vision. The long-term aim of this project is to provide environment of NFC for the whole classroom. Due to the expected widespread availability of NFC and Beam phones, we can safely believe the application will prove to be a success. As for the NFC and Beam, we saw how it offers more benefits than drawbacks compared to existing technologies. At the end, we suggested how in the future NFC and Beam can be used in the learning process to improve the student, lecturer and user in everyday life.

CHAPTER II
LITERATURE REVIEW AND PROJECT METHODOLOGY

2.0 Introduction

Near Field Communications, is an of advance technology feature, is starting to be used everywhere. Even in Asia, it's spreading it's wings. For example retail stores and public user are start to use NFC and Beam frequently in their everyday work .

The immediate impedement of the technology will be facing is the adoption rate of merchants , stores and public user . So what exactly is the future of NFC? Will it ever reach levels of mass adoption, hitting both the acquiring base of merchants and user base of consumers? The answer is clear yes. It is a technology that facilitate transactions, make it faster, more secure and when integrated within mobile devices, productivity gains will be so undeniable that mass consumption cannot but be triggered.

Most of the people around us are still not fully aware of what NFC is. The general thinking is the device is to replace bluetooth, or the NFC is only to allow accessory pairing on mobile phones (earphones or wireless speakers). This is true in term of one of its features but there are a lot more aspect can be benefited with these technology.

NFC can indeed be used to trigger connections with accessories, also to trigger some specifically set behaviors and profiles on mobile devices through special tags. It is will allow (it is already allowing in some markets) mobile payment through tapping the devices on terminals. We have now NFC-enabled cards, each card comes with an embedded microchip and antenna that is able to transfer data to an NFC-capable smartphone with a tap, Therefore there are apps to let users manage what information the card contains.

2.1 Fact Finding

2.1.1 Available System

The available system NFC supports classroom attendance supervision system. Traditionally, lecturer conduct pupil attendance monitoring every morning with manual roll calls, and mark the absences. This requires time and effort on every classroom, which is taken away from teaching. The NFC-enabled classroom attendance supervision system has been designed to simplify attendance monitoring.

Place here wifi is available freely still needs user authentication for password as a result it is time consuming. The NFC WI-Fi connect is the best method as a customer just need to tap and automatically connect to the internet.

In technology of exchanging document between device traditionally we seldom use a method like Bluetooth, infrared or sending by email. This method is somehow described as old technology because there are new technology that can be used with the concept but more easier and approachable. The smart NFC doc exchange is a system that can simplify the previous method with just a beam between two devices.

2.1.2 New System

The proposed new system that been purposed is to enabled student, lecturer and staff to use NFC in dynamic ways and will be equipped with an NFC enabled smart-phone. The mobile application development will be developed using the Android platform. Google is a major contribution of Near Field Communication technology and as such has provided many flexible Application Programming Interface APIs which will aid the development of the apps. As mentioned in the objective, this proposed NFC and Beam system would assist in automated attendance, exchange document, exchange contact and automated wifi connect. For student swipe application system, the instructor could be a NFC smartphone enabled phone and place it in an accessible place for students in the classroom. As the students enter the class, they would use their NFC smartphone enabled phones, passing it close to the instructor's and thus recording their attendance. Exchange document and exchange contact both are application that use beam

technology that will tranfer document and contact throught signal in Beam, student need to locate the document and contact and beam its to another device. As for wifi connect student need to swipe their NFC enabled smartphone to tag and it will automatically connected to wifi.

2.1.3 NFC Technology

NFC is a wireless communication technology that enables machine-to-machine data transfer over a short range using the concept of Radio Frequency Identification (RFID) (arrownac, 2010). NFC-equipped devices can be utilized in three different modes. First, NFC-equipped Smartphones can be used in a read/write mode, with the phone as the active component. The range to which this field is generated is short, reliable to about ten centimeters (Nambi et al., 2012). This is the source of the name, Near Field Communication. The passive tags can act as an address, directing the Smartphone to a repository of information. So, for example, a tag might be placed on or near a product for sale, a bookshelf in a library, or a map in a park. When an NFC-enabled Smartphone is moved near the tag, the phone downloads the appropriate materials, such as the specifications for the item, a list of books on the shelf, or information about nearby sights in the park (Nambi et al., 2012). Second, A NFC-equipped device can be used as Peer-to-Peer mode (Strommer, Hillukkala, & Ylisaukko-Oja, 2007; Nambiet al., 2012; Serfass, 2012) by allowing two users to exchange information between their devices.

2.1.4 Beam Technology

The Android Beam is an NFC based technology with which you can quickly share webpages, videos, apps, pictures by simply tapping the two phones together within the reach of NFC range. You can also share other important data like files with other enabled devices.This feature also works to share Google Maps information, video being watched on YouTube, contact information and application which you are browsing on your browser can also be shared (androidadvices, 2013), in other word Beam technology is technology that use effective method which it is a way to transfer files between two enabled Beam smartphones in a easy way without much diffcult and time consuming setup.

2.2 Project Methodology

In developing this Advance Smartphone Classroom, methodology plays an important role in determining the successfulness of the whole system. Therefore we must identify the correct methodology that will match perfectly with the system development in terms of all aspects without any limitation or constraints.

Object Oriented Design (OOD) is a software engineering approach that models a system as a group of interacting objects. This object is used to represent the entity in the system being created. Object Oriented Analysis (OOA) is use to analyse the functional requirement for a system. OOD focus to elaborate the analysis model to determine implementation specifications. In more simplified word, OOA focuses on what the system does and OOD focuses on how the system does it.

The primary benefit of object oriented analysis and design is that it is understandable. The approach of this model builds on common paradigms that most people use to deal with complexity. Therefore, software developers and programmers are able to decompose complex problems into objects.

For this project, OOAD is chosen as it is more detailed and thorough for developing software and applications. With the use of OOAD, the structure of an application as it used object to represent the entity in the system that is being created can be clearly known.

This methodology has a few benefits that include:

i) Better modeling of the problem domain (equals happier users)
ii) Better overall software design with a strong focus on class structure
iii) More flexible and maintainable systems through better class partitioning
iv) Good documentation (the notations) and a single central overall design notation
v) A flexible approach to project phasing
vi) Assistance in tie-in down requirements

2.3 Project Requirement

2.3.1 Software Requirement

Eclipse Junos Adt Bundle equip with android SDK is the main software requirment for this project. Below is list of software that are use to devope the application for Advance Smartphone Classroom Application.

Table 2.0: Software requirement

SERVER	
Software	**Description**
Adobe Dreamweaver CS3	Platform to make the web based. Easier to coded and easy to design interfaces for the web based system fo NFC web. Dreamweaver CS3 has incorporated support for web technologies such as CSS, JavaScript and various server-side scripting languages and frameworks including PHP. It allows users to preview websites in locally installed web browsers helps in design and coding process.
Adobe Photoshop CS3	This software is used for image design and editing for a nice looking system interface. It is a powerful program used for creating and editing graphics and photographs. In this system, Adobe Photoshop CS3 is used to design the banner for the website.
Eclipse JunosAdt Bundle	Eclipse is a Java-based open source platform that allows a software developer to create a customized development environment (IDE) from plug-in components built by Eclipse members.
Java 7	SDK for Java provides Java APIs for building software on AWS' cost-effective, scalable, and reliable infrastructure products
SQLite	SQLite is an in-process library that implements a self-contained, serverless, no configuration, transactional SQL database engine. SQLite is an embedded SQL database engine. Unlike most other SQL databases, SQLite does not have a separate server process.
Android Developer Tools	ADT (Android Developer Tools) is a plugin for Eclipse that provides a suite of tools that are integrated with the Eclipse IDE. It offers you access to many features that help you develop Android applications quickly. ADT provides GUI access to many of the command line SDK tools as well as a UI design tool for rapid prototyping, designing, and building of your application's user interface.

2.3.2 Hardware Requirement

These hardware requirements are very minimum requirements that need to develop the project . The hardware requirements are shown in below.

Table 2.1: Hardware requirement

HARDWARE	DESCRIPTION
Smartphone	To testing and debug the application
Hard disk	The hard disk is the main storage in a computer where all the software installed on it.
Memory (RAM)	Memory is defined as Random Access Memory (RAM) provides space for the computer to read and write data to be accessed by the CPU (central processing unit) or processor.
Processor	The processor is the electronic component which is acting as 'brain' for of a computer. The higher the processing speed is much better.

2.4 Project Schedule and Milestones

A project schedule is a timetable or a plan for the completion of various stages of a project. It is very important and essential to draw up a schedule and milestone for a project as it can keep track the project progress from time to time. Approximately four months are taken to complete this project

The project is divided into two main parts which are PSM 1 and PSM II where both are different task are done by the given date. PSM 1 is need to be done in 14 weeks starting from February till June 2013 and for PSM II is 8 weeks starting from June till September 2013. The final completed system and report is which is from chapter 1 till chapter 7 need to be send in end of the due date.