Tracking Students Attendance Using a Mobile based System

Idoko Nnamdi. A[1], Ihedioha Uchechi. M[2], Onyedeke Obinna C[3], Ezema Modesta[4], Uzo Blessing Chimezie[5], Juliet Ugbama[6]

[1,5]*Department of Computer Science, Renaissance University, Nigeria*
[2,4,6]*Department of Computer Science, University of Nigeria, Nsukka, Nigeria*
[3]*Department of Computer Science University of Kairouan, Tunisia*

Abstract: **- Student attendance is a crucial content of the administration of any tertiary institution as many results to truancy afterwards. There is nothing wrong with the traditional way of manual tracing of student attendance in the classroom but technology can get it better.**

Since Smartphone are now a very common tool or gadget. This process becomes tidier since all the teachers and students can get access easily and take attendance. The method of this attendance is based on many to many matching, the matching results are so good that it could perform very well on large databases. Mobile application is to be used for documenting student attendance record to avoid missing paper sheet for attendance:

Keywords: **Mobile based system, Attendance System, Class Attendance, Students tracking**

I. INTRODUCTION

The mobile computing and mobile based application processing are being popular in all environments and it is not exceptional to academic institution too [1]. The conventional and traditional mode of attendance management system (AMS) leads lot of paper work and it is hard to maintain for a long period of time. Due to the nature of manual work, it is hard to perform the activities related to the management of attendance, when there is a need in taking reports of specific interest and there is a chance of committing error in recording the data and information on the records.

The computerized automation of academic attendance management system is available in the form of personal computer based application and available in various computing platforms [2][3]. The various topology equipped, PC based management applications are running efficient and effective manner in many institutions and are being in the category of either internet based applications or intranet based applications [4].

Attendance as a system used for knowing a record of students present and absent in a class room. The following are the issues attached to the existing system; it lack real time pattern of attendance, it waste time and most of the time confusion attendance management, due to human error, it does provide better analysis of the attendance

The work is aimed at design and implementing a mobile based android for student recording present and absent student. The application is implemented using the android mobile framework. The following are the objectives of the new system: Create an android based attendance system for student attendance record keeping in class using android framework, provide analytical computation of attendance per course, determine numbers of times student attend/present in a course lectures, the departments are represented in the attendance management. Conventional systems cannot fit into the technological world which we are into. The traditional system waste time and inaccuracy.

The work contribute to ICT body by making attendance system to be easier for both student and lecturer. The system or platform has motivational purpose for which it formed a project work. The project work is determinist to eradicate the system of paper and pen method of taking attendance due the failures attached to the platform. It was a motivation from the failure of the existing system.

II. RELATED LITERATURE

A review of related literature (RRL) is a detailed review of existing literature related to the topic of a thesis or dissertation. In an RRL, you talk about knowledge and findings from existing literature relevant to your topic. When writing the review, begin by providing the background and purpose of the review.

[5] In this development, the traditional mode of manual attendance management, is replaced with PC application based and mobile app based activities. As for PC and mobile the platform of operating system is planned as Android OS. The mobile based platform of android OS is available on the market for smart phones. The application for the smartphone development is supported by Google with various range of API's in the name of Android Development Tool (ADT). The developer will have full privilege over the developed application and can be distributed as open source product to the market for further development [6]. The android applications are termed as simply "Android Apps". Android OS is available in the name of "Android-x86 - Porting Android to x86", which can be installed (ported) in a PC (x86

alone and not for 64 bit processor) [7]. This gives the advantage of working with Android OS even from PC.

[8] Developed a system for the student's attendance automation. In this system, each students have an ID assigning a barcode which is read by the smartphone application. In this system, one students can carry the ID of the others which will mislead the attendance system.

The conventional automation is very essential, when the existing system is analyzed and designed toward complete automation. The conventional mode of development provides the users, to experience the previous mode of operations, even it is now available with complete automation. The heterogeneous computing deals with this project in the manner of combining the computing's of mobile and PC based together to provide basis of computing for this application

In order to enhance attendance tracking framework, scholars chipped away at the change from the alternate point of view. Zhang et al. [9] is with the assessment that attendance administration is overlooked by current instructive organization administration framework, concentrating just on record administration, training design, course administration, and so on thus they established attendance administration framework utilizing VisualStudio.NET and Oracle. Mohamed et al. [10] outlined a unique finger impression gadget that is utilized as a part of unique finger impression attendance framework. The students check their essence by putting their finger on the gadgets sensor. But this framework has a lack of feasibility because finger print scanner can't always detect at the first time. The NFC-based applications rearrange different human everyday exercises by just touching a thing settled or coordinated with NFC tag. For example, Smart Touch is one of the early NFC ventures that spotlights on NFC innovation which was composed by VTT Technical Research Centre Finland; applications in different zones were produced under this venture, for example, mobile compensation and ticketing, savvy publication, attendance framework for schools, home utilize, family unit get to control and security, blood glucose meter, and so forth [11]. In [12], a robotized attendance administration framework was executed both in electronic and portable stage utilizing stationary grid AR 400 RFID reader with four circulatory polarized antennae and Symbol MC9000-G hand held RFID reader separately. But the system is highly expensive. Soewito et al. [13] proposed an attendance system using finger print and GPS technology through smartphone. The system is time-consuming as it used finger print technology. The system is able to collect data but can't generate .pdf or .xlsx file. Noor et al.

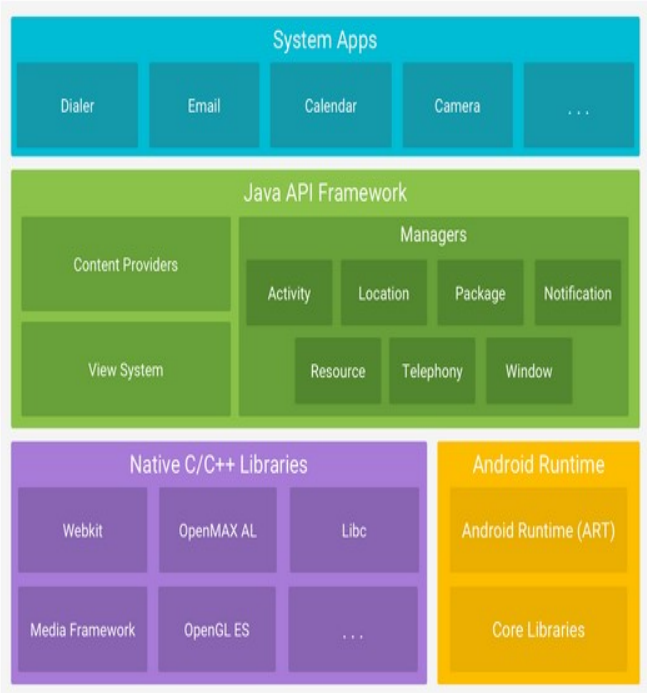


Figure 2.1 Android Core [source [13]]

2.1 Design of AAMS

The design of AAMS is having two categories of plan in it. The first plan is based on technical aspects and includes client / server computing architecture, medium of communication

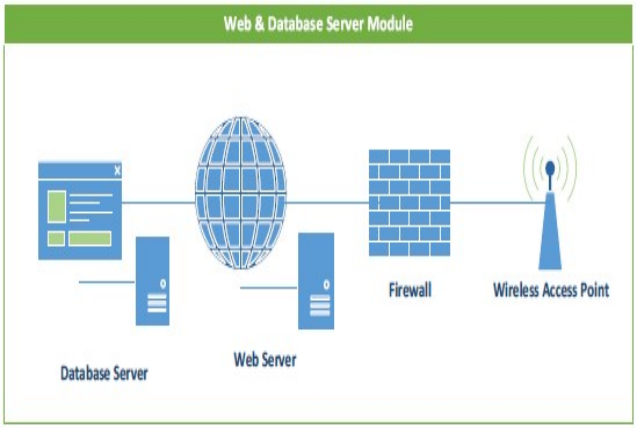


Figure 2.2a Web and Database Server Module [source [14]

The web server we use throughout this book is the Apache Software Foundation's Apache HTTP server, the open source web server used by more than 60% of Internet connected computers.[2]

We use the PHP scripting language as our middle-tier scripting language.[1] PHP is particularly suited to web database applications because of its integration tools for the Web and database environments. In particular, the flexibility of embedding scripts in HTML pages permits easy integration

with the client tier. The database-tier integration support is also excellent, with more than 15 libraries available to interact with almost all popular database management systems.

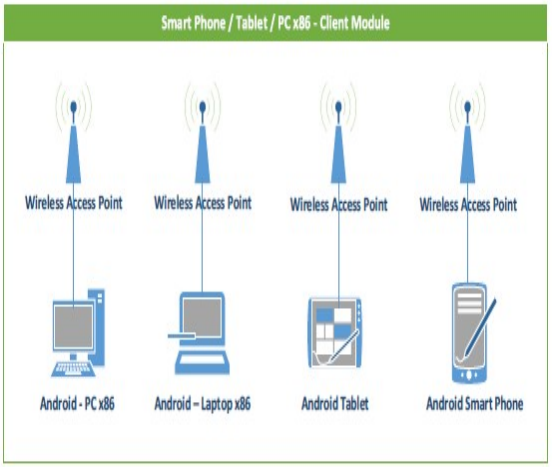


Figure 2.2b AAMS based on Technological Plan.

The AAMS is mainly designed, developed and implemented in any institution, for needful effective decision making by the management users. The users of the system is defined, and their role on the system access and the restrictions on the user accesses are defined. The exceptional management details of the institution for academic management is structured and focused at the time of development [8].

III. RESEARCH METHODOLOGY

Every research work makes choice of method demand is based on the distinction between qualitative and quantitative data. As mentioned previously, qualitative data takes the form of descriptions based on language or images, while quantitative data takes the form of numbers. Qualitative data is richer and is generally grounded in a subjective and interpretive perspective. However, while this is generally the case, it is not always so. Qualitative research supports an in-depth understanding of the situation investigated and, due to time constraints, it generally involves a small sample of participants. For this reason the findings are limited to the sample studied and cannot be generalized to other contexts or to the wider population. Popular methods based on qualitative data include semi-structured or unstructured interviews, participant observations and document analysis. Qualitative analysis is generally more time-consuming than quantitative analysis.

3.1 Analysis of the Existing System

The Existing system is a manual entry for the students. Here the attendance will be carried out in the hand-written registers. It will be a tedious job to maintain the record for the user. The human effort is more here. The retrieval of the information is not as easy as the records are maintained in the hand written registers. This application requires correct feed on input into the respective field. Suppose the wrong inputs are entered, the application resist to work. The user actually have difficult to use. The existing system cannot fit into this technology or digital world based on the size of student population with the university world of departmental lectures.

3.2 Analysis of Proposed system

To overcome the drawbacks of the existing system, the proposed system has been evolved. This project aims to reduce the paper work and saving time to generate accurate results from the student's attendance. The system provides with the best user interface. The efficient reports can be generated by using this proposed system. The mobile application is to be used for documenting student attendance record to avoid missing paper sheet for attendance. The following are the advantages of the newly proposed system.

3.2.1 Advantages of Proposed System

The proposed system is to remove or reduce the problems associated with the existing system that liken ti its failure to improve on. The following are the advantages;

1. It is trouble-free to use.
2. It is a relatively fast approach to enter attendance
3. Is highly reliable, approximate result from user
4. Best user Interface and efficient reports

The system is educational institution activities to keep record of students present and absent in lecture hall. Time and attendance systems (TNA) are used to track and monitor when student enter the class. A time and attendance system enables a lecturer to monitor their student present or absent, early arrival, time taken on breaks and absenteeism. TNA systems can also be used to ensure compliance with student regulations regarding proof of attendance.

3.3 Primary Unit of Administration

The primary unit of administration, this describe where this project work is applicable. The mobile attendance system is an application run on the mobile phone to conduct student attendance to determine the numbers of time student are available in the lecture hall or class room.

3.4 Use case Diagram:

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases. The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted

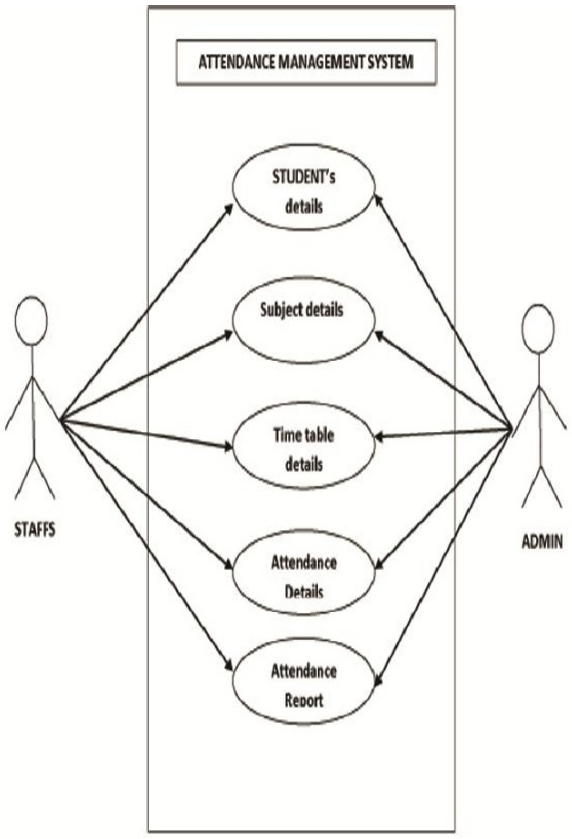


Figure 3.1 Use Case Diagram mobile Attendance system

The use case diagram are usually referred to as behavior diagram used to describe the actions of all user in a system. All user describe in use case are actors and the functionality as action of system. The Use case diagram is a collection of diagram and text together that make action on goal of a process.

3.5 Problem of the Existing System

Project work reveal the issues associated with the existing system. This is due inefficiency, ineffectiveness of the existing system to be confirmed to the modern day technology.

IV. SYSTEM DESIGN

The work and implementation was carried out using the android studio framework. The system is a mobile based platform designed for mobile student attendance system with student registration activity, attendance activity, course activity etc. The student register to the system by presenting the following details; name, course and semester. The adding new course is another module with the sole aim to add new course per semester and a lot more seen in the software.

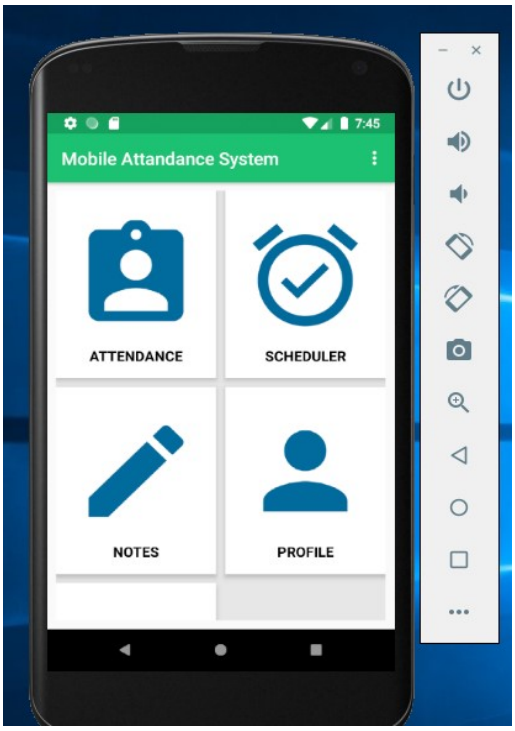


Figure 4.1 Front-end

4.1 Input Design

The input design, usually are form with description of fields. The designed is implemented using a Microsoft office.

The input design format of the system is user friendly. Input format is basically concerned on how data is being fed into the system. They refer to files that could be updated, the input data, how the input data gets into the system and the medium in which they get in. The user enters the data using input devices as a medium.

4.2 Process Design

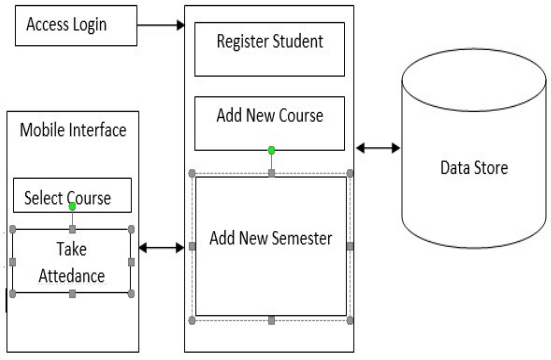


Figure 4.2 Proposed System Process Design

Every box represent and object in the software development and implementation. The administrator on the backend implements a the following activities;

1. Add new Course
2. View Attendance
3. Add new student.

This is the simplest pattern and process of the system design to suite the entire system development.

4.3 System Data Flow Diagram (DFD)

A data-flow diagram is a way of representing a flow of a data of a process or a system. The DFD also provides information about the outputs and inputs of each entity and the process itself. The proposed system is designed to assist the product seller to advertise the product and to check how the project are effective the market. Every object/function has its symbols to represent an entity.

A data flow diagram shows the way information flows through a process or system. It includes data inputs and outputs, data stores, and the various sub processes the data moves through. DFDs are built using standardized symbols and notation to describe various entities and their relationships.

Data flow diagrams visually represent systems and processes that would be hard to describe in a chunk of text. You can use these diagrams to map out an existing system and make it better or to plan out a new system for implementation. Visualizing each element makes it easy to identify inefficiencies and produce the best possible system.

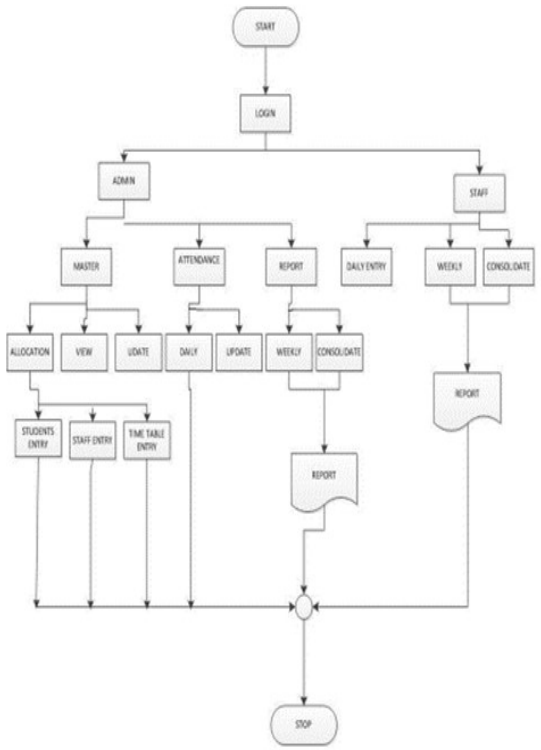


Figure 4.3 Data Flow Diagram of the proposed system

The system flow diagrammatically, explain the structural flow of operation the entire system organization. Every users most have access by login into this account to make attendance relative to the course in question.

4.4 Output Design

A Design Output is a drawing or specification or manufacturing instruction. Design Outputs describe all the components, parts, and pieces that go into your medical device. Design Outputs describe all assemblies and sub-assemblies of your product. The design is done using the Microsoft office.

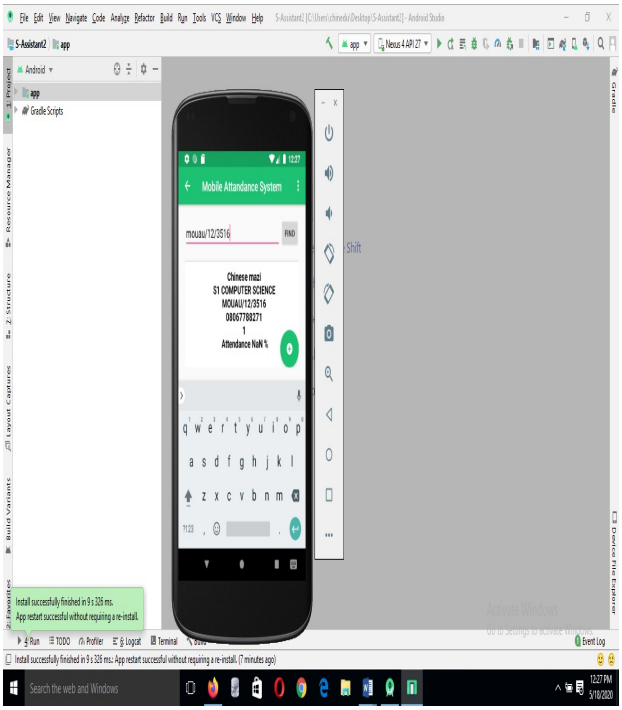


Figure 4.4 Attendance Output

The student by entering the registration number and click find to determine the number of time the student have attended the course.

4.5 Database Design

Database design is the organization of data according to a database model. The designer determines what data must be stored and how the data elements interrelate. With this information, they can begin to fit the data to the database model. According to Teorey, Lightstone (2009). Database design involves classifying data and identifying interrelationships. This theoretical representation of the data is called an ontology. The ontology is the theory behind the database's design.

```
#Database Schema
Class Users(db.Model):
        __tablename__ = 'Users'

        id = db.Column('id', db.Integer, primary_key=True)
        Name = db.Column('Name', db.String(30))
        course = db.Column('Course', db.String(20))
        Attendance = db.Column('Attendance', db.String(15))
        regno = db.Column('Reg. No.', db.String(6))


        def __init__(self, name, course, attendance, regno):
                self.name = name
                self.course = course
                self.attendance = attendance
                self.regno = regno

        def __repr__(self):
                return '<Users {}>'.format(self.userid)
```

The database Physical Structure table below provides the exact physical structure of the database, with the tables, data type and the length of the data type.

Table 4.1 Physical Structure of the New System Database

S/N	FIELDNAME	DATA TYPE	LENGTH
1	Id	Int	Auto_increment
2	student Name	Varchar	30
3	Department	Varchar	30
4	RegNo.	Varchar	30
5	Courses	Varchar	30
6	Attendance_Counter	Varchar	30

4.6 Database Design and Functionalities

The database of the system has been designed to meet the following functional requirements:

Ability to accept user's input/data for registration.

Data such as student name, regno, attendance etc are required for both student registration and attendance.

4.7 Program Design

Software design is the process by which an agent creates a specification of a software artifact, intended to accomplish goals, using a set of primitive components and subject to constraints. According to Ralph and Wand (2009). This includes both a low-level component and algorithm design and a high-level, architecture design.

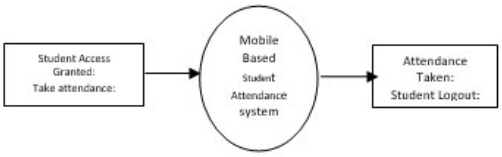


Figure 4.5 O level Context Diagram

The student start the application on its mobile phone select options and begin to add names and finally take attendance.

Algorithm

1. Start by running Android Studio IDE;

    i) Upload the program to android studio (file > Import program > upgrade gradle for
    Building application etc)

    ii) After a proper mobile application building .apk install on mobile application.

2. Open the application to;

    i. add new student

    ii. Add New Courses

    iii. Add New Semester

V. RECOMMENDATION

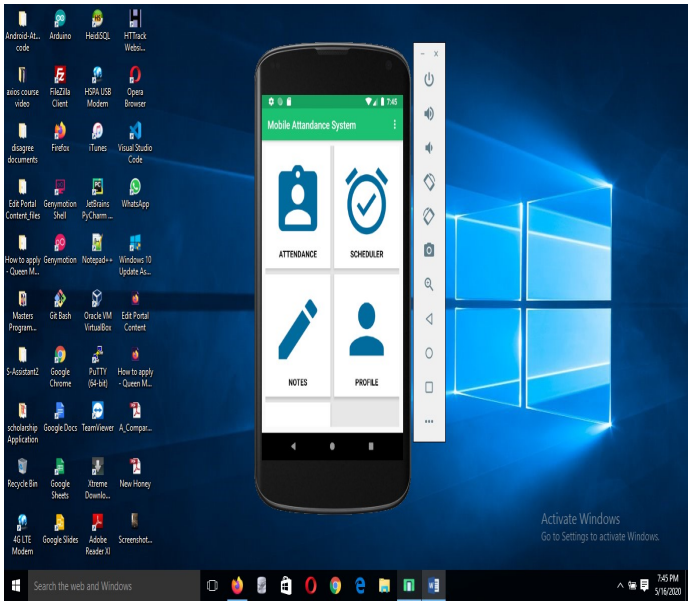
The work mobile attendance system is target to making an existing conventional system to upgrade from the traditional methodological pattern of operation to a more enhanced system that make attendance system to be convenient for both the student and teachers.

It is recommended for every educational institute for student attendance record.

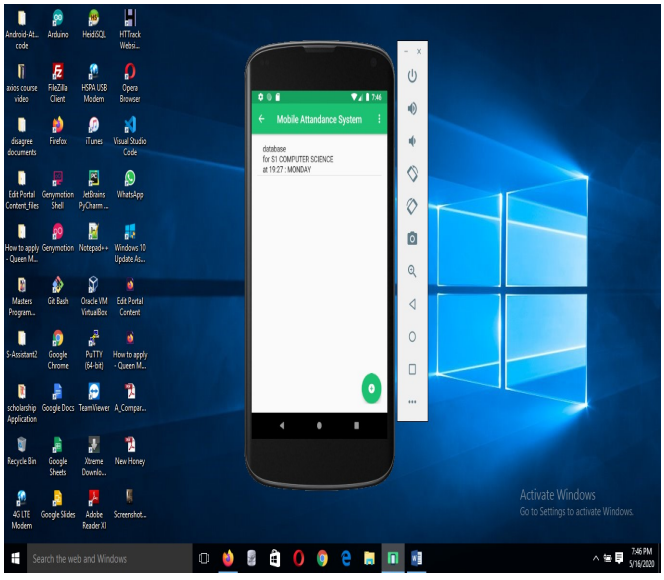
5.1 Conclusion

The entire work is shortened with narrative of implementation and strategy of the scheme. The choice of framework is the android studio framework used for implementation the mobile based student attendance. The App testing was on emulator (Android Virtual Device) or actual mobile phone consecutively on android operating system. The student name, Regno., department and course. Additional module for adding course by semesters. The courses are as well added to be visible by the student. And finally, the student presence is taken relative to the current course of lecture.

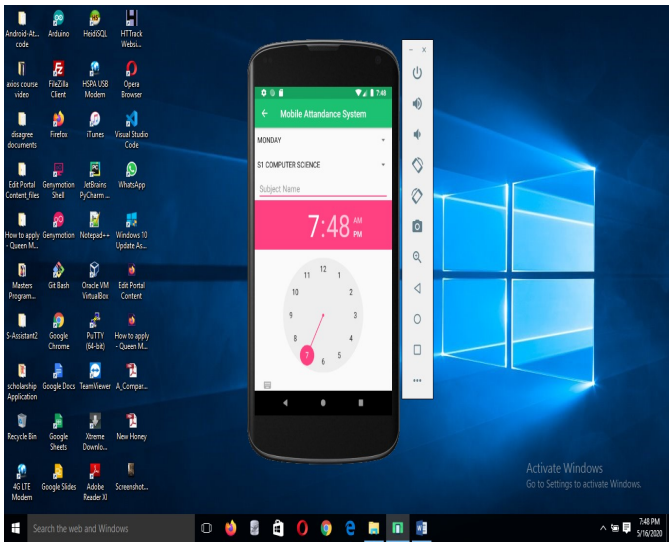
APPENDIX I (PROGRAM OUTPUT)



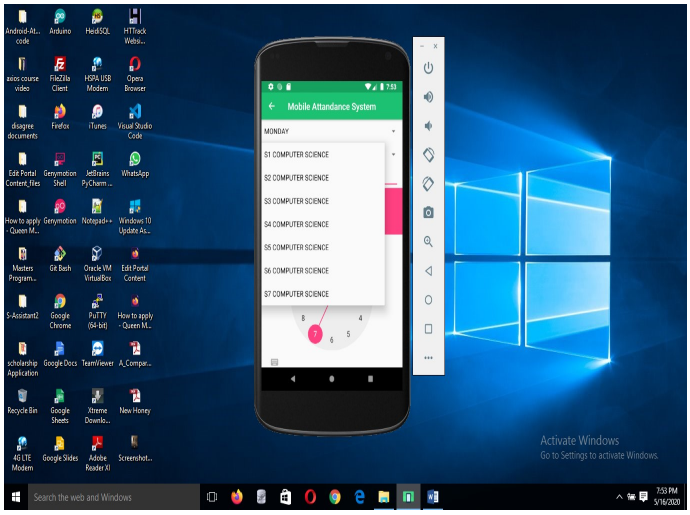
Initial Activity



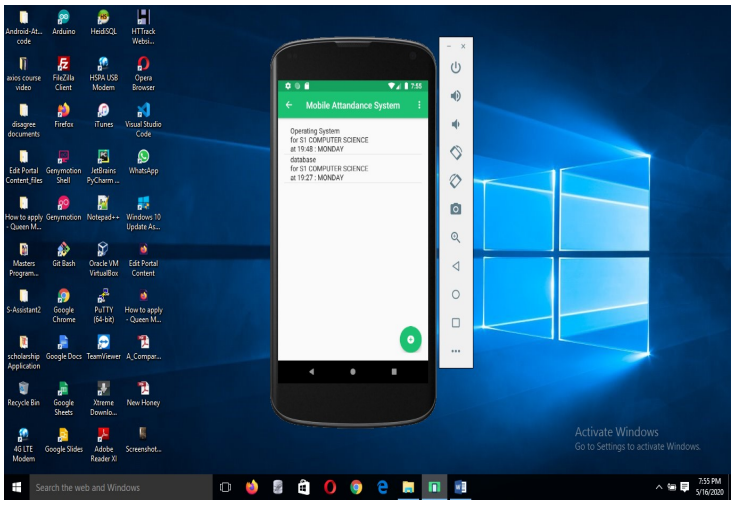
Added Activity Scheduling



Add New Schedule



Computer Science Courses (Semesters)



List of Courses

REFERENCE

[1]. Shibata, H., "An attendance management system using mobile phones", Communications, Computers and signal Processing, 2005. PACRIM. 2005 IEEE Pacific Rim Conference on, vol., no., pp.59, 592, 24-26 Aug. 2005.

[2]. Zengguang Zhang; Peng Gong; Lijun Cao; Yunlei Chen, "Design and Implementation of Educational Administration Attendance Management System Based on B/S and C/S," Information Technologies and Applications in Education, 2007. ISITAE '07. First IEEE International Symposium on, vol., no., pp.606, 609, 23-25 Nov. 2007.

[3]. He Zonggang; Zheng Junsheng, "Design and Implementation of Student Attendance Management System Based on MVC," Management and Service Science, 2009. MASS '09. International Conference on, vol., no., pp.1, 4, 20-22 Sept. 2009.

[4]. Kassim, M.; Mazlan, H.; Zaini, N.; Salleh, M.K., "Web-based student attendance system using RFID technology," Control and System Graduate Research Colloquium (ICSGRC), 2012 IEEE , vol., no., pp.213,218, 16-17 July 2012.

[5]. Lee, V.W.; Grochowski, E.; Geva, R., "Performance Benefits of Heterogeneous Computing in HPC Workloads," Parallel and Distributed Processing Symposium Workshops & PhD Forum (IPDPSW), 2012 IEEE 26th International , vol., no., pp.16,26, 21-25 May 2012.

[6]. http://developer.android.com/develop/index.html

[7]. http://www.android-x86.org/releases/releasenote-4-4-r1

[8]. http://www.fao.org/docrep/w7506e/w7506e03.htm

[9]. Z. Zhang, P. Gong, L. Cao and Y. Chen, "Design and Implementation of Educational Administration Attendance Management System Based on B/S and C/S," 2007 First IEEE International Symposium on Information Technologies and Applications in Education, Kunming, pp. 606-609, 2007.

[10]. B. K. P. Mohamed and C. V. Raghu, "Fingerprint attendance system for classroom needs," 2012 Annual IEEE India Conference (INDICON), Kochi, pp. 433-438, 2012.

[11]. M. Strommer et al., "Smart NFC Interface Platform and its Applications," in T. Tuikka and M. Isomursu, (Eds.), Touch the Future with a Smart Touch, 2009.

[12]. RFID Sens Net Lab, "A white paper on Automatic Attendance System," Texas A & M University, Texas, USA, 2005.

[13]. B. Soewito, F. L. Gaol, E. Simanjuntak and F. E. Gunawan, "Attendance system on Android smartphone," 2015 International Conference on Control, Electronics, Renewable Energy and Communications (ICCEREC), Bandung, pp. 208-211, 2015.

[14]. B. N. Gatsheni, R. B. Kuriakose and F. Aghdasi, "Automating a student class attendance register using radio frequency identification in South Africa," 2007 IEEE International Conference on Mechatronics, Kumamoto, pp. 1-5, 2007.