A Novel Approach Of Mobile Based Student Attendance Tracking System Using Android Application

K. Akhila[1]

Research Scholar

K.L.University

Vaddeswaram

B. Prathyusha[2]

Research Scholar

K.L.University

Vaddeswaram

M. PavanKumar[3]

Research Scholar

K.L.University

Vaddeswaram

M. Amrutha[4]

Research Scholar

K.L.University

Vaddeswaram

Abstract

A Education system in India has been changing widely in last 10 years due to the development of the technology. Smart class, E-learning, Video conferencing are some of them. The core idea of this paper is to implement some of the emerging technologies like mobile computing and near field communications and advances in behavioral science studies to make a better educational system. This paper will be implemented in application as two parts. A secure framework for implementing different educational service mobile applications like, mobile attendance, mobile marks register etc by using Android and java applications. The second part will leverage Near Field Communication technologies and gamification behavior approach to incorporate game mechanics into activity oriented learning systems. To update the all data through web server by using GPRS technology.

Keywords: *Android, Near Field Communications, Mobile Computing, Android SDK, Education Tool, GPRS.*

1. Introduction

1.1. Scope of the Project

We have seen over the years that the process of manual attendance has been carried out across almost all educational institutions. The process is not only time consuming but also sometimes inefficient resulting in the false marking of attendance. Today, we need not maintain pen and paper based attendance registers. Following this thought, we have proposed an attendance monitoring system based on the concept of web services which is implemented as an Android mobile application that communicates with the database residing on a remote server. The

mobile application would require connecting to the database using either General Packet Radio Service(GPRS) or Wi-Fi technology. This paper discusses the proposed system, overview of the design, the various modules of the system and its implementation.

1.2. Overview

Our project is an efficient and user friendly Android mobile application for an Attendance Monitoring. The application will be installed on the user's (in this case teacher's) smart phone. It intends to provide an interface to the teacher who will require minimal details to input for marking of attendance of a particular class of students. Apart from that, the application would support strong user authentication and quick transmission of data via the web service. Another noticeable feature of the entire application would be that no data would be stored on the user device in any form whatsoever. The application thus build would also help to avoid the chance of a proxy as the application would be handled by the teacher only.

2. Existing System and Proposed System

2.1 Working of Existing System:

In the present system all work is done on paper. The whole session attendance is stored in register and at the end of the session the reports are generated. We are not interested in generating report in the middle of the session or as per the requirement because it takes more time in calculation. At the end of session the students who don't have 75% attendance get a notice.
Disadvantages of Present Working System

- Not User Friendly

- Difficulty in report generation

- Manual control:

- Lots of paperwork

- Time consuming

2.2 Characteristics of Proposed System

*User Friendly: The proposed system is user friendly because the retrieval and storing of data is fast and data is maintained efficiently. Moreover the graphical user interface is provided in the proposed system, which provides user to deal with the system very easily.
*Reports are easily generated: reports can be easily generated in the proposed system so user can generate the report as per the requirement (monthly) or in the middle of the session. User can give the notice to the students so he/she become regular.
*Very less paper work: The proposed system requires very less paper work. All the data is feted into the computer immediately and reports can be generated through computers. Moreover work becomes very easy because

there is no need to keep data on papers.
*Computer operator control: Computer operator control will be there so no chance of errors. Moreover storing and retrieving of information is easy. So work can be done speedily and in time.

3. System Analysis

3.1 Software requirements of our system are:

1. Windows XP/ Windows 7 Operating System
2. Android mobile Operating System
3. JSON (JavaScript Object Notation)
4. Eclipse IDE
5. SQL Server 2008 or later

3.2 Hardware requirements of our system:

System   **:** IBM-Compatible PC
Processor   **:** Pentium IV
Speed   **:** 2.0 GHz
Memory   **:** 256 MB RAM
Hard Disk Drive   **:** 40 GB
Mobile Side**:** Android OS enabled smart phone

3.3 Feasibility Study

*Economically Feasibility: The system being developed is economic with respect to School or Collage's point of view. It is cost effective in the sense that has eliminated the paper work completely. The system is also time effective because the calculations are automated which are made at the end of the month or as per the user requirement. The result obtained contains minimum errors and are highly accurate as the data is required.
*Technical feasibility: The technical requirement for the system is economic and it does not use any other additional Hardware and software.
*Behavioral Feasibility: The system working is quite easy to use and learn due to its simple but attractive interface. User requires no special training for operating system.

4. Implementation

4.1. Modular Design

Our proposed system is divided into four distinct modules described as follows:

a. User authentication:

Initially, when the teacher runs the application for the first time, a login screen will be displayed that will prompt the teacher to enter the username and password required for authentication. The teacher will be provided with a unique username which would be a combination of alphanumeric characters. Only when the teacher enters the correct username and password, a "success" message will be displayed and the teacher will get authenticated and directed to the next screen.

b. Calling of Web Service:

In this module, the teacher will need to select details such as the name of the subject for which the lecture is being taken, time of lecture and the particular semester for which the lecture is conducted. After doing so, the teacher needs to call the web service by clicking a button provided on the screen. The web service thus invoked would return the list of names of all the students belonging to a particular semester and branch as per the input provided.

c. Marking Attendance:

After the list of students has been displayed the teacher needs to begin the process of marking the attendance of students. For this purpose our application would be providing checkboxes against each student's name that will allow the teacher to mark the student either present or absent. Accordingly, the details of the student will be sent to the remote database and the attendance will be marked for that particular day.

d. Display information of student:

Once the attendance has been marked successfully, the teacher can anytime check the attendance record of a particular student by entering the unique roll number provided to every student. The information thus displayed would include the student's attendance percentage, number of lectures a student has attended for a particular subject, number of lectures missed, as well as the overall attendance.

4.2. FLOW DIAGRAM OF PROPOSED SYSTEM:

The flowcharts of the various modules are described as follows:

A. User authentication process

This is the initial process of the system. The teacher needs to enter the username and password. Accordingly, depending on whether the teacher is authenticated, a "success" or "failure" message will be displayed.
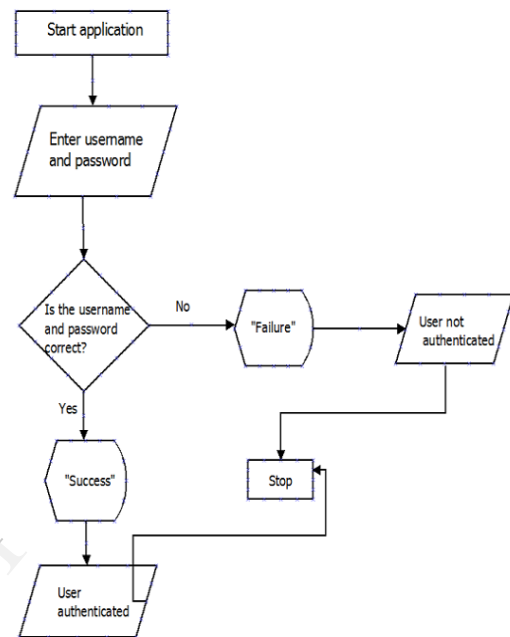

Fig: Flowchart of User Authentication Process

B. Calling of Web Service

Once the teacher has entered the required details to begin the attendance marking process, a web service needs to be called in order to generate a list of students for which the attendance is to be taken. Depending on the input, the details are fetched from the remote database and displayed on the application.

C. Attendance Marking Process

In this phase, the teacher can begin the attendance marking procedure. Once marked, the results will be stored in the remote database and can be used later on for generating attendance reports. The teacher can mark the attendance using checkboxes provided in the application against the name of every individual student of the class
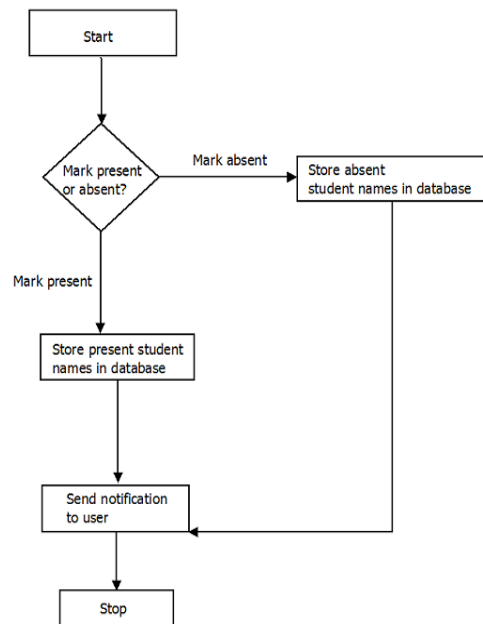
Fig: Flowchart of Marking Attendance

D. Display Information of Student

The attendance record for a particular student can be viewed by entering the unique roll number provided to the student. The information thus displayed would include the student's attendance percentage, number of lectures attended, number of lectures missed for a particular subject as well as the overall attendance of the student.
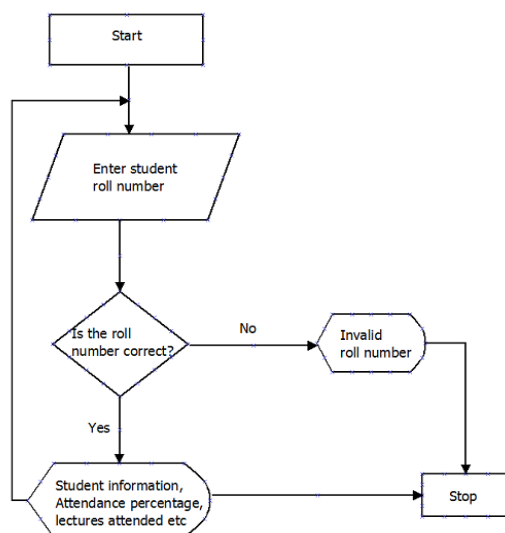
Fig: Flowchart of display information

5. Testing Results:

The following modules are successfully implemented:

a. User Authentication:

Client side:

The user authentication module on the client side involved the development of a login screen in the application. For this purpose, standard Graphical User Interface (GUI) that consists of buttons and textboxes were developed. The button is also associated with an action that sends the input parameters in the textboxes to the remote database via a web service.

Lecturer side:

Similarly, on the server side the teacher needs to enter the correct username and password for logging into the system.

b. Calling of Web Service:

In this module the application screen consists of a series of dropdown lists, also known as Spinners in case of Android development. The spinner fields are populated depending on the previous selected spinner item. A button has been provided to set the current date and time of the lecture. The submit button as shown in calls the web service to store the values of the spinners and returns a list of students depending upon the input provided.

c. Marking Attendance:

The attendance marking module involves displaying a list of students depending upon the spinner values the teacher sends in the previous module. The list includes a checkbox against each student's name. Teachers have to mark present for the students who are present when the list is loaded and submit using the button below. The submit button is associated with an action that sends the checked student names to the remote database via the web service.

d. Display of Information:

The attendance report on the lecturer side can be viewed after marking of attendance is saved/submitted where number of students present and the presentees names,numbers are displayed of a particular date selection. On the server side, when the student login with his/her id, percentage of attendance is displayed.

6. Conclusion:

In this paper, an Android based mobile application for Attendance Monitoring is presented. The application offers reliability, time savings and easy control. It can be used as a base for creating similar applications for tracking attendance in offices or any workplace. It can be also integrated in healthcare sector to keep track of nurse to patient visits by streamlining the time entry, time approval and management processes.

7. Future Scope:

In future our system plans on including a SMS notification feature whereby every student will be periodically notified regarding his/her attendance record for a specific duration.The main advantage of SMS notification is that the Students can know their attendance by sending SMS from anywhere. Students send a SMS to the server with their register number. If it is in correct format, the server will replays the attendance of corresponding student through SMS. Otherwise sends an error message.
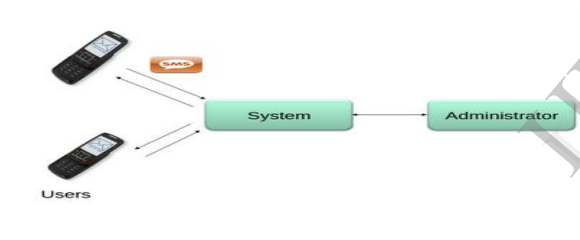

Fig: Mobile attendance system

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