

Android Mobile Application for Attendance Marking using Biometrics

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Abstract---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 marking and calculation system which is implemented on Android mobile application integrating biometric scanner that communicates with the database and verification can be achieved. This Android application will give the students information on attendance and change in timetable if any whereas the biometric scanner is used for verification, authentication and to avoid proxy.

Keywords: Android, Attendance System, Biometrics, Operating System, Open source, Web services, RFID, ZIGBee, JSON, Authentication, WAMP, PHP MySQL, HTTP, Bluetooth, Near Field Communication, Application, Mobile Application, Mobile computing.

I. INTRODUCTION

In the last decades we have witnessed an enormous increase in the end user acceptance of mobile communications. The appearance of mobile platforms based on the open source software has rapidly increased the interest into mobile applications development. In this paper, we present an approach to the Android mobile phone application development that is based on an open source software and open source development environment. For achieving portability, our aim is to have wireless communication of the biometric scanner with the server.

Development of software should be more real, user friendly, compatible with system and cost effective. The use of software by user must be simple and should not require much training to use software. So we have use the android platform for our project which is open source, scales to every device and it offers a unified approach to application development.

II. RELIABLE REAL-TIME APPLICATIONS ON ANDROID OS

The Android operating system (OS) is widely used within several types of embedded & mobile platforms, including mobile phones and tablets, and the industry is exploring the ability of Android within other embedded platforms, i.e., automotive or military, that require real-time guarantees and the ability to meet deadlines as a pre-requisite for reliable operation.

The Android OS is an operating system primarily designed for mobile platforms by Google. It is an open source OS based on LINUX kernel (version 2.6) that enables developers to write applications primarily in Java with support for C/C++ as well [1].

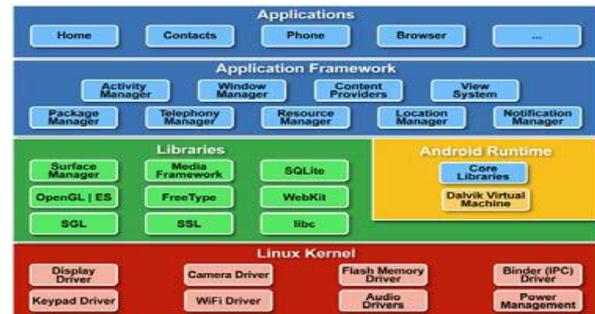


Fig.1: Android Architecture [1]

The main objective of our project is to automate the manual attendance system to save the time and eliminate redundant work of entering and calculating attendance on daily basis.

One of the most common methods to do so is by using the concept of web services. Web Services are platform independent and language independent since they use standard XML or JSON [2]. Moreover, majority of the web services use Hypertext Transport Protocol (HTTP) for transmitting the messages.

One of the most interesting features of a web service is that they are self-describing. Once the database and PHP files are hosted online, it can be accessed in the android application by using HTTP request.

III. EXISTING SYSTEM

RFID based Attendance System [3] uses RFID reader to get the student information through student matrix card. After getting the student information, it will send it to the computer in that class or lab. After that, the individual in charge (professor, staff, and student) must connect to the PC using Bluetooth [4] [5] to make his/her see the student attendant in that class.

A research on Near Field Communication [6] based systems for attendance marking has been carried out, but there were certain limitations in it.

There are some shortcomings in this system. The attendance marking process is time consuming and tedious. To avoid proxy of student, manual head count also needs to be performed.

To overcome the above shortcomings, the idea of combining powerful features of android OS and biometrics would be very helpful.

IV. PROPOSED SYSTEM

Our system primarily focuses on building an efficient and user friendly Android mobile application for an Attendance Monitoring. The application will be installed on the professor's phone as well as student's phone which runs android OS. It intends to provide an interface to the professor 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. Another noticeable feature of the entire application is to give options to the user such as feedback provision, attendance retrieval in a very convenient way, messaging between user and professor and campus notifications like low attendance reminder, lecture amendments to name a few. The application thus build would also help to avoid the chance of a proxy as the system has biometric scanning which will serve the purpose of authentication.

Wireless communication [7] can be implemented using ZigBee with the help of Receiver RX CC2500 [8]

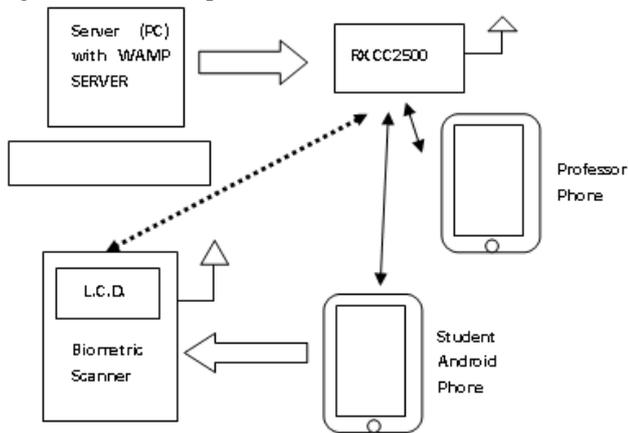


Fig. 2: Block Diagram of Proposed System

V. INTEGRATION WITH OTHER TECHNOLOGY

The system has a wide base application. The proposed system can intercommunicate between an android OS and windows based pc. The backend or the database part of the system can be maintained using a WAMP server for use in a local server or web based PHP hosting network for a global application. Using the web hosting the reach of the system can be extended on a global scale.

VI. MODULAR DESIGN

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

User authentication: Initially, when the professor runs the application for the first time, a login screen will be displayed that will prompt the professor to enter the username and password required for authentication. The professor will be provided with a unique username. Only when the professor enters the correct username and password, a “success” message will be displayed and the professor will get authenticated and directed to the next screen.

Activation of lecture by calling of web service (GPRS or Wi-Fi): In this module, the professor will need to select details such as the name of the subject, date of lecture and the particular semester. After doing so, the professor needs to call the web service by clicking a button provided on the screen. The web service thus invoked sends all this data to the server via GPRS or Wi-Fi. The respective PHP files are executed on the server with the SQL queries and the result of queries is sent back to the application.

Marking attendance: As seen in the previous module, the activation of lecture is completed. Students’ would receive a notification to login using their respective

phones running android OS. They use their username and password which is matched with the values stored in the database. Response is sent back to the user.

Biometric verification: One of the flaws in the traditional system of RFID is that there is no means to know whether the student marking his attendance is actually present. For that, any unique biological specimen is needed which would prove the students’ identity. The best and most convenient way is to use fingerprints. Biometric fingerprint scanner circulated in the class and verification is done by matching the obtained fingerprint image with the fingerprint images stored on the server, and the student is notified for the same. If verification fails, then attendance marked in process 3, is deleted from the database. The fingerprint images matching can be done in Matlab.

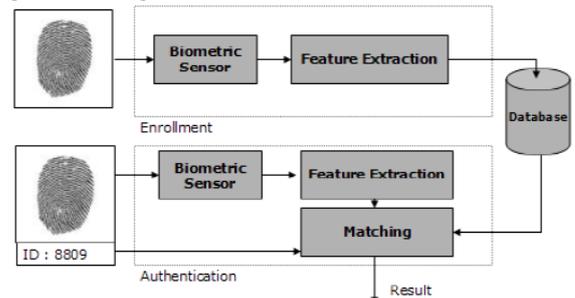


Fig.3: Block Diagram of Biometric Authentication [9]

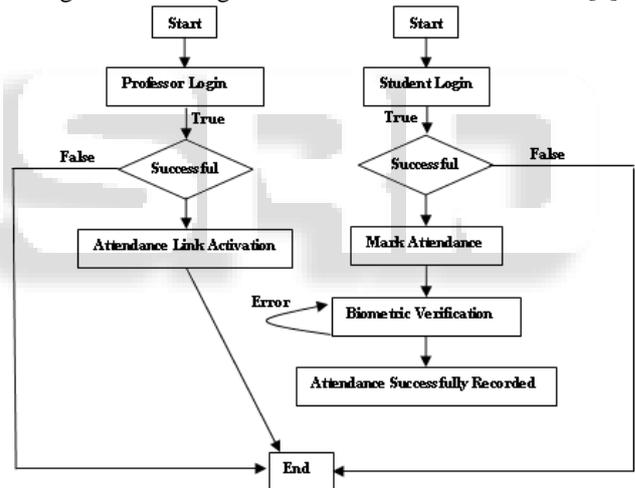


Fig.4: Flow of the System

VII. BIOMETRICS- GT511C1

GT-511C1 [9], which is a portable fingerprint scanner, suits the needs of the system. Having wireless communication is a must in this system. What is the use if the system is wired and lacks portability? Best device to include wireless communication is RX CC2500 [8].



Fig.5: GT-511C1 [9]

VIII. CONCLUSION

In this paper, an Android based mobile application for Attendance Monitoring is presented. The application offers reliability, time saving 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.

IX. 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. Moreover, the mobile application can also be ported to popular Symbian OS based phones using the Qt framework.

The scope of the system can be expanded & 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.

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