International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 12 Issue: 2
Article Received: *25 December 2023* ***Revised:*** *12 January 2024* ***Accepted:*** *20 February 2024*

Student Attendance Monitoring Using Android Application

Peter Paul Apuyan San Diego, MIT
Information Technology Department
Computer Arts and Technological College, Inc.
Balintawak Street, Albay District, Legazpi City 4500, Philippines
peterpaulsandiego25@gmail.com

Abstract— In today's world, a paper-based approach is used for marking attendance, where students sign attendance sheets. This data is then manually entered into the system. Managing student attendance during lectures is a difficult task, which becomes even more challenging during the report generation phase. Manual computation produces errors and wastes a lot of time.

The automated attendance Android application aims to provide a new, quick, and easy way of registering attendance.

Keywords- *Android; attendance; Teacher's personal digital assistant; attendance tracker; dynamic timetable.*

I. INTRODUCTION

In almost every institution and organization, attendance monitoring is a very important process. The current method involves using sheets of paper or books to record students' attendance. This method easily allows for impersonation, and the attendance sheet could be lost or damaged. Taking attendance is thus time-consuming with this traditional approach, and hence there is a need for an automated and reliable system.

The Student Attendance Monitoring System will provide the needed solution. The system consists of two APK files, one for the teacher and one for the student, installed on their Android devices. The Student Attendance Monitoring System will be used to mark the attendance of the students and to generate reports for all the students, enabling faculty members to keep track of student records. Rather than signing the attendance sheets, students will mark their attendance with a single click on their device. Additionally, the teacher has the facility to generate reports with a single click. There is also a facility to generate reports for one or more students.

II. LITERATURE REVIEW

The review of existing literature provides a comprehensive understanding of the methodologies and technologies previously employed in student attendance monitoring.

A. Computerized Attendance System

A desktop application developed by S. K. Jain, U. Joshi, and B. K. Sharma (2010) displays a list of registered students in a particular course when the lecturer starts the application. Attendance is recorded by clicking a checkbox next to the names of the students who are present, and then clicking the register button to mark their presence. However, this method still requires human involvement for attendance tracking.

B. Bluetooth Based Attendance System

In 2013, Vishal Bhalla, Tapodhan Singla, Ankit Gahlot, and Vijay Gupta proposed an attendance system that uses Bluetooth for taking attendance. In this project, attendance is recorded using the instructor's mobile phone. Application software installed on the instructor's mobile phone enables it to query students' mobile phones via a Bluetooth connection. By transferring the Media Access Control (MAC) addresses of the students' mobile phones to the instructor's phone, the presence of the students can be confirmed.

However, this proposed system has some drawbacks. It requires students to have their phones with them; if a student does not carry their phone, their presence will not be recorded. Another issue is that if a student gives their phone to a friend, the system will still mark the student as present, as long as the phone is within the coverage area.

C. NFC based Attendance System

In the paper 'TouchIn: An NFC Supported Attendance System in a University Environment' (Media Anugerah Ayu, 2014), the author presents the implementation of an Attendance Management System (AMS) based on Bluetooth and NFC technologies in a multiuser environment. It uses the fingerprint and Bluetooth address of the user's NFC-enabled phone to authenticate the user's identity. A Java-based desktop

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 12 Issue: 2
Article Received: *25 December 2023* ***Revised:*** *12 January 2024* ***Accepted:*** *20 February 2024*

application receives the NFC tag IDs and other information associated with the mobile phone and the user, then submits them to an analyzer for the interpretation of the user's behavior. However, in this case, students must have an NFC-enabled phone to mark their presence in the classroom.

D. Fingerprint based Attendance System

In 2013, Seema Rao and Prof. K.J. Satoa proposed a new system for employee attendance using fingerprints. This system checks each fingerprint template against all templates stored in the database, which can be time-consuming as it needs to check one fingerprint against all the templates in the database. The main problem with this system is that it is very time-consuming.

Similarly, in 2013, Neha Verma, Komal Sethi, and Megha Raghav designed a fingerprint recognition-based identification system for student identification, specifically for taking attendance at institutes like NIT Rourkela. This system reduces fingerprint template matching time by partitioning the database. However, all students in every class must stand in long queues to mark their attendance. This system also suffers from issues related to the fingerprint device, and one significant disadvantage is that it only works within a short distance.

E. Iris Based Attendance System

In 2010, Seifedine Kadry and Mohamad Smaili proposed a system in their paper. A wireless iris recognition attendance management system was designed and implemented using Daugman's algorithm (Daugman, 2003). This biometric-based system, using wireless technology, addresses the problem of spurious attendance, making it easier and more effective for users to mark their attendance. However, the system relies on RF wireless technology, making it too expensive. Additionally, all students in every class must stand in long queues to mark their attendance, and the system only works within a short distance, which is a significant disadvantage.

F. Face Recognition based Attendance System

In 2013, Muthu Kalyani K. and Veera Muthu A. proposed a Face Recognition-based Attendance System. This system employs a CCTV camera at the entry point of a classroom to automatically capture images of individuals and compare them with a face database using an Android-enhanced smartphone. It serves two primary purposes: marking attendance for students by comparing recently captured face images, and identifying unauthorized individuals. For image verification, the system uses 3D face recognition, which provides higher accuracy in matching images. The main drawback of this system is that each recognized face must be compared with the entire database to authenticate individual attendance.

G. Mobile Based Attendance System

In 2013, Dr. S. Ramnarayan Reddy, Deepanshu Goyal, and Ankit Bansal attempted to implement a system that overcomes the limitations of existing approaches by taking attendance through teachers' mobile phones. Using mobile phones for this task not only saves resources but also enables users to easily and interactively access students' attendance records. This system is implemented on the S60 Symbian platform, so teachers must have mobile phones with the S60 Symbian platform, and human involvement is still required for attendance.

H. RFID based Attendance System

The BISAM-BIS Attendance Management System by BIS Software Development Services PVT Limited offers an attendance management solution for schools and colleges. The system can automatically send SMS and email alerts to the parents or guardians of students. Students register at the gate by touching an RFID device with their RFID tag, which sends the data to the BISAM server in the school. The server processes the attendance data and sends an SMS to the parents or guardians of absent students through the BISAM SMS gateway server. Additionally, the system includes Time Manager Software for managing employee attendance and HR-related functionalities.

III. METHODOLOGY

User authentication is a major factor in the Student Attendance Monitoring System. Every user is authenticated based on their unique user identification number, which is present on the ID cards of faculty members and students.

Both faculty members and students register by signing into the system, during which all their personal details are recorded. After registering, they must log in again to ensure that only valid users access the system.

A flag in the system is set to a default value of false. This flag can only be altered by teachers, and only when the flag is set to true can students mark their attendance. During the attendance marking phase, the teacher of the concerned subject activates the application from their device, changing the flag's value to true. Students can then mark their attendance for that particular lecture with a single click. The teacher deactivates the app after a short period (usually after a minute) by changing the flag's value back to false.

Teachers have the facility to generate reports once the students have marked their attendance. If any student cannot mark their attendance due to technical issues, the teacher can mark it for them. Similarly, the teacher can delete students' attendance if necessary.

The next phase is report generation, for which the code is written using JSP. Only the admin, concerned staff, or faculty member

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 12 Issue: 2
Article Received: *25 December 2023* ***Revised:*** *12 January 2024* ***Accepted:*** *20 February 2024*

has the authority to access this page. They can search for a particular student in the database and generate monthly or weekly reports. Additionally, periodic SMS notifications are sent to students' parents by the admin, enabled by connecting the system to an SMS gateway.

This chapter discusses the methods and procedures used in the study, with a major focus on the research instrument and statistical treatment.

INSTRUMENT

The researchers used questionnaires for surveys as one of the instruments to assess the needs of today's children regarding games and applications. It identified possible problems during the implementation of the games/Android application. The data gathered from the target population were described, analyzed, and interpreted to recommend possible solutions for the identified problems, enabling the researchers to develop a relevant and timely mobile application to address children's addiction issues. The selected respondents were 4th and 5th grade students of Brentwood College of Asia International School, Tabaco, Naga City.

A dry run of the questionnaire was conducted with the current 4th and 5th grade students of the mentioned institution, who served as examples of the target children. Modifications were then made to the instruments, especially for items that were not easily understood by the respondents, resulting in a clarified final instrument. The respondents also ticked an enumeration of problems they encountered while using the Android Mobile Application, Jump It, to identify possible issues.

For recommendations, the researchers provided check circles for the respondents to select from based on their individual experiences, making it easier to identify the preferences and suggestions of all the respondents.

Some of the students were asked verbally to determine their preferences and inclinations towards gaming. The number of respondents was 20, representing 100% of the selected sample.

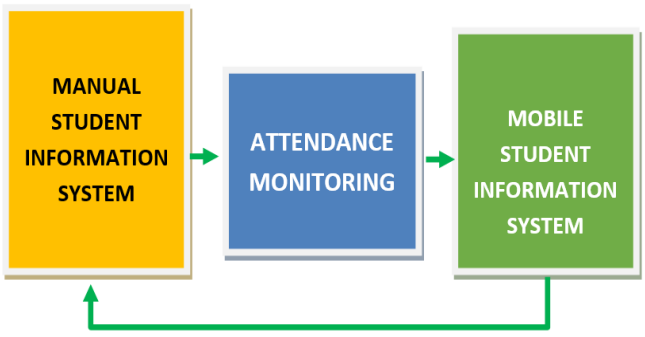

Figure 1. Conceptual Framework

Problem-solving questions were formulated and analyzed to provide challenging content for the Jump It: Android Mobile Application. The researchers developed a mobile application with the simplest and most user-friendly graphical user interface and an eye-level contrast, designed to provide a fun and easy mobile learning experience for users. The initial mobile application developed is compatible with Android devices. Feedback from end users will be considered for the revision and enhancement of the first version released. Common users are those who get to play the educational Jump It app.

The following are the things to be addressed by the proponent:

A. Accuracy
- Does the Application provide correct information and determine the user's type?
- Do the Application buttons perform accurately?

B. Reliability
- Does the Application perform its intended functions all the time?
- Does the Application satisfy the end-user's needs?

C. Usability
- Does the Application can be use without minimal help from other?
- Does the Application have all the functions and capabilities I expect it to have?

D. Efficiency
- Does the Application perform the desired output?
- Does the Application is easier compare to the predecessor called android game "Jump It"?

E. User Friendliness
- Does the Application instruction is easy to understand?
- Does the User can operate the application easily?

FUNCTIONALITY is the capability of the system to provide functions which meet stated and implied needs when the software is used under specified conditions.

RELIABILITY is the capability of the system to maintain a specific level of performance when used under specified conditions.

USABILITY is the capability of the software product to be understood, learned, and used under specified conditions.

EFFICIENCY is the capability of the software product to provide appropriate performance, relative to the amount of resources used under specified conditions.

MAINTAINABILITY is the capability of the system to be modified for corrections or improvements under specified conditions.

International Journal on Recent and Innovation Trends in Computing and Communication
ISSN: 2321-8169 Volume: 12 Issue: 2
Article Received: *25 December 2023* ***Revised:*** *12 January 2024* ***Accepted:*** *20 February 2024*

PORTABILITY is the capability of the software to be transferred from one environment to another under specified conditions.

IV. FINDINGS

The findings of this study are based on the objectives and the resulting analysis of all the gathered data. This includes assessment questions and information essential for boosting the researchers' confidence in determining the current system.

The current attendance monitoring system of CATC is manual. Instructor monitor attendance by checking attendance based on a master list of currently enrolled students.

Based on the data gathered in this study, the findings were as follows:

A. Assessment Survey Overall Total

Out of 20 respondents, 18.13 (90.65%) answered 'yes' or agreed to all questions, while 9.35% disagreed with only one question (Question #2). This indicates significant findings in Table 1 of the questionnaire results. Specifically, in Question #8, respondents expressed a desire for more enjoyable math apps, believing they can facilitate easier practice in solving mathematical problems

B. Verbal Interview Overall Result

In Table 2, it can be seen that there are no negative statements from respondents of different ages. Instead, they are more inclined towards a futuristic outlook with the application.

V. DISCUSSIONS

The researchers view Jump It as a well-known and enjoyable mathematical application for the modern generation. It not only makes sense in children's lives but also fits into their daily routines. Every parent dream of their child possessing good attitudes and manners. However, combining these attributes with skills equates to character and intelligence, where mathematics plays a pivotal role as a skill that is not easily acquired. The world needs individuals with active and positive minds, and based on these principles, the researchers developed this knowledgeable math trainer.

Questions	**YES**	**NO**
1. My teacher asks us to think about different ways to solve each math problem.	20	0
2. Math is boring.	5	15
3. I like to come up with new ways to solve math problems.	20	0
4. In math class, we work on one big math problem for a long time.	20	0
5. My teacher shows us how to solve problems and then we practice similar problems.	20	0
6. We want to make mathematics solving easy and enjoyable. To make it memorable in our mind	20*	0
7. The use of technology in solving math will help you to solve the quest in Question #6.	20*	0
8. Having a mathematical application in your mobile phone is the perfect way to practice and make solving easier.	20*	0

With Jump It, pupils will learn and engage in daily challenges they encounter. It is an application with a mathematical learning system and fun graphics. All knowledge and skills can be acquired through practice.

VI. CONCLUSIONS

In this paper, we propose a new system for monitoring students' attendance using the Android platform. The results showed improvements in accuracy compared to traditional paper-based approaches. Moreover, the proposed technique provides an easy way to generate reports.

VII. RECOMMENDATION

The following recommendations are based on the findings and conclusions of this study on the Mobile Student Attendance Monitoring System. The current manual system has been observed to be error-prone, ineffective, and time-consuming, often leading to incorrect attendance information. This can ultimately affect decision-making within the department or institution, especially towards the end of the semester or during examination periods. I recommend that the new system proposed in this study be implemented promptly once fully tested and deemed reliable.

VIII. REFERENCES

[1] Anil K. Jain, Arun Ross, and Salil Prabhakar, "An Introduction to Biometric Recognition," IEEE Transactions on Circuits and Systems for Video Technology, Special Issue on Image- and Video-Based Biometrics, vol. 14, no. 1, January 2004.

[2] Tabassam Nawaz, Saim Pervaiz, Arash Korrani, Azhar-Ud-Din, "Development of Academic Attendance Monitoring System Using Fingerprint Identification," IJCSNS International Journal of Computer Science and Network Security, vol. 9, no. 5, May 2009.

[3] Seema Rao, Prof. K.J. Satoa, "Attendance Monitoring System Using Biometrics Authentication," International

Journal of Advanced Research in Computer Science and Software Engineering, vol. 3, issue 4, April 2013.

[4] Kunal Vilas Chaudhari, "Android Application Suite for Student Tracking System," International Journal of Computer Applications, vol. 104, no. 6, October 2014.

[5] Mohammad Salah Uddin, S.M. Allayear, N.C. Das, and F.A. Talukder, "A Location Based Time and Attendance System," International Journal of Computer Theory and Engineering, vol. 6, no. 1, February 2014. [6] B Cook, G Buckberry, I Scowcroft, J Mitchell, T Allen, "Indoor Location Using Trilateration Characteristics," unpublished

[7] Kavita Rathi and Sudhir Sawarkar, "Finger Print Matching Algorithm for Android," International Journal of Engineering Research & Technology (IJERT) Vol. 2 Issue 10, October - 2013.

[8] Michał Szczepanik, Ireneusz Jozwiak, "Biometric Security Systems for Mobile Devices based on Fingerprint Recognition Algorithm," International Conference on Advanced Communications and Computation, 2012.

[9] Seifedine Kadry* and Mohamad Smaili, "Wireless attendance management system based on iris Recognition", Scientific Research and Essays Vol. 5(12), pp. 1428-1435, 18 June, 2010, ISSN 1992-2248.

[10] Mehmet Kizildag, Erden Basar, Murude Celikag, Emine Atasoylu and Sayedali Mousavi, "An Automated Attendance Monitoring and Registration System for EMU's SPIKE Seminar Series", Proceedings in Academia.edu.

[11] Media Anugerah Ayu, "TouchIn: An NFC Supported Attendance System in a University Environment", International Journal of Information and Education Technology, Vol. 4, No. 5, October 2014, DOI: 10.7763/IJIET.2014.V4.448

[12] Neha Verma, Komal Sethi and Megha Raghav, "AN EFFICIENT AUTOMATIC ATTENDANCE SYSTEM USING FINGERPRINT RECONSTRUCTION TECHNIQUE",

[13] Seifedine Kadry* and Mohamad Smaili, "Wireless attendance management system based on iris Recognition", Scientific Research and Essays Vol. 5(12), pp. 1428-1435, 18 June, 2010, ISSN 1992-2248.

[14] Muthu Kalyani.K and Veera Muthu.A, "SMART APPLICATION FOR AMS USING FACE RECOGNITION", Computer Science & Engineering: An International Journal (CSEIJ), Vol. 3, No. 5, October 2013, DOI : 10.5121/cseij.2013.3502.

[15] S. K. Jain, U. Joshi, and B. K. Sharma, "Attendance Management System," Masters Project Report, Rajasthan Technical University, Kota.

[16]Vishal Bhalla, Tapodhan Singla, Ankit Gahlot and Vijay Gupta, "Bluetooth Based Attendance Management System", International Journal of Innovations in Engineering and Technology (IJIET) Vol. 3 Issue 1 October 2013, ISSN: 2319 – 1058.

[17]Seema Rao and Prof.K.J.Satoa, "An Attendance Monitoring System Using Biometrics Authentication", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 4, April 2013, ISSN: 2277 128X.

[18] Neha Verma, Komal Sethi and Megha Raghav, "AN EFFICIENT AUTOMATIC ATTENDANCE SYSTEM USING FINGERPRINT RECONSTRUCTION TECHNIQUE", International Journal Of Advance Research In Science And Engineering (IJARSE), Vol. No.2, Issue No.3, March, 2013, ISSN-2319-8354(E).

[19] Dr. S. Ramnarayan REDDY, Deepanshu GOYAL and Ankit BANSAL, "Mobile Based Attendance Management System". Miss. Namrata N. Shahade, Miss. Priya A. Kawade and Mr. Satish L. Thombare, "Student Attendance Tracker System in Android", INTERNATIONAL JOURNAL FOR ENGINEERING APPLICATIONS AND TECHNOLOGY (IJFEAT), February 2013, pg- [119-124], ISSN: 2321-8134.

[20] BISAM-BIS attendance Management System by BIS Software Development Services PVT Limited. [Online]. Available: http://www.softwarehouse.co/school-attendance-brochure.pdf

[21] Unnati A.Patel and Dr. Sawminarayan Priya R. 2014. "Development of a Student Attendance Management System Using RFID and Face Recognition: A Review", International Journal of Advance Research in Computer Science and Management Studies, Volume 2, Issue 8, August 2014; Online ISSN: 2321-7782.

[22] Seema Rao and Prof.K.J.Satoa, "An Attendance Monitoring System Using Biometrics Authentication", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 4, April 2013, ISSN: 2277 128X.