STUDENT TRACKER: ENHANCING SAFETY AND ACADEMIC ACCOUNTABILITY THROUGH SMART MONITORING

Mohammed Rayan[1], Mohammed Moinuddin[2], Mohammed Shameem[3], Mohammed Umar Farooq[4], Prof. Ateeq Ahmed[5]
Department of Information Science Engineering
HKBK College Of Engineering, Visvesvaraya Technological University

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ABSTRACT

The "Student Tracking App" is a mobile application developed using Android Java, aimed at simplifying student management and attendance tracking in educational institutions. Built with Android Studio and JDK 8, the app provides an efficient, scalable platform for both students and administrators. Its main purpose is to automate attendance, profile management, and real-time tracking. The app includes a registration and login system where students provide personal information such as name, USN, email, SSLC marks, and CGPA, along with an option to upload a resume. Once registered, students can view and update most details, except for sensitive data like USN and email. The app's GPS-based attendance system ensures that students can mark attendance only within a 50-meter radius of the department building. If attempted elsewhere, the app blocks the action and sends an alert to the admin. It also tracks time-based campus presence between 9 AM and 5 PM, notifying admins if students are detected off-campus during these hours. For administrators, the app

offers a registration system and the ability to monitor attendance, track student movement, and ensure security. The integration with the Android SMS library allows real-time communication, providing immediate alerts for attendance violations or unusual behavior. The Student Tracking App modernizes traditional attendance systems by combining GPS tracking, real-time alerts, and centralized data management in a user-friendly platform.

Keywords: Student Tracking Application, Attendance Management, GPS-Based Monitoring, Real-Time Alerts, Android Development.

INTRODUCTION

Technology has revolutionized the educational landscape, transforming how institutions manage student data and monitor activities Doe, J., & Smith, A. (2023)[1]. Efficient attendance management has become a critical requirement, as traditional manual methods are often error-prone and time-consuming. In the era of digitization, educational institutions are turning to advanced solutions to optimize administrative processes A. Porwal (2021)[2]. One such innovation is the Student Tracking App, a mobile application developed using Android Java, designed to overcome the limitations of conventional student management practices. The Student Tracking App offers a holistic solution for managing student attendance and data Magaraa (2022)[3]. By automating attendance tracking, providing real-time monitoring of student movements, and centralizing student information in a user-friendly platform, the app simplifies workflows for both students and administrators. Utilizing advanced technologies such as GPS-based tracking, real-time notifications, and secure data storage, the app ensures enhanced accuracy, reduced administrative workload, and improved compliance with institutional attendance policies Smithe and M. Patel (2023)[4]. This app serves as a vital tool to bridge the gap between students, faculty, and administrators. It promotes transparency, streamlines attendance management, and supports academic monitoring in a secure and efficient manner, aligning with the evolving needs of modern educational systems G. Joseph (2023)[5].

LITERATURE REVIEW

Attendance Tracking Systems Traditional attendance methods are prone to errors. Recent advancements, like biometric attendance systems (fingerprint, facial recognition), offer high accuracy but are costly R. Shankar and P. Kumar (2023)[6]. GPS-based systems, leveraging Location-Based Services (LBS), are a more cost-effective alternative V. Nair (2022)[7]. These systems track students' real-time locations to ensure they are physically present before marking attendance. Studies (R. Gupta et al., 2022)[8] highlight the benefits of location-based systems in reducing proxy

attendance and enhancing accountability. Mobile App Development for Student Management Mobile apps have become essential for managing student data. Android apps are popular for attendance management and student profile management, allowing students to track progress and update personal details. Integrating secure login systems like Firebase Authentication ensures data privacy, which is crucial for handling sensitive student information.

Location-Based Services (LBS) and Geofencing is widely used in attendance systems to define virtual boundaries around campuses or classrooms. This ensures students can only mark attendance when physically present. Research by H. Sharma (2022)[9] shows that geo-fencing reduces attendance fraud and improves accuracy by preventing remote marking of attendance. Real-Time SMS Alerts for Attendance Violations SMS alerts notify administrators about attendance violations or irregularities, enabling prompt intervention. D. Narayan and A. Kumar (2023)[10], demonstrate the effectiveness of SMS-based systems in improving communication and response times in educational settings. Admin Interface and Data Management Admin interfaces allow real-time monitoring of student profiles and attendance data. Cloud-based systems facilitate centralized data management, and data visualization tools help analyze attendance patterns, ensuring efficient system administration. Security and Privacy in Educational Apps Security is critical for educational apps handling sensitive student data. Apps use encryption and secure protocols like HTTPS to protect information. Secure login systems (e.g., JWT) further enhance data security.

OBJECTIVES OF THE STUDY

- Modernize Attendance Management: Transition from manual attendance methods to an automated GPS-based system for accurate and proxy-free attendance tracking.
- Centralized Student Information: Provide easy access to academic and personal details, including SSLC marks, PUC marks, CGPA, skills, and resumes in a well-organized manner.
- Real-time Monitoring: Equip administrators with tools to monitor, update, and manage student profiles and attendance in real-time.
- Location-Based Verification: Ensure that attendance can only be marked within the campus premises using GPS verification, preventing unauthorized attendance marking.
- Immediate Alerts: Send SMS notifications to administrators in case of attendance violations, enhancing accountability and security.
- Support for Placement Preparation: Allows final-year students to upload resumes and maintain records of their academic achievements for placement purposes.

- User-Friendly Design: Provide an intuitive and seamless interface to meet the needs of both students and administrators.
- Bridge Traditional and Modern Practices: Integrate technology into educational management to enhance efficiency, reliability, and productivity.

PROPOSED METHODOLOGY

The Student Tracking App was developed to provide an efficient and reliable system for managing student attendance and profiles. Built using Android Java as the primary programming language and Android Studio as the Integrated Development Environment (IDE), the application ensures a user-friendly and robust interface. The app's architecture as shown in *Figure 1* adopts a client-server model to optimize performance and scalability. The client side consists of an Android application installed on users' devices, supporting distinct workflows for students and administrators. The server side, backed by Firebase, manages user data, attendance records, and profiles, ensuring efficient data storage and retrieval.

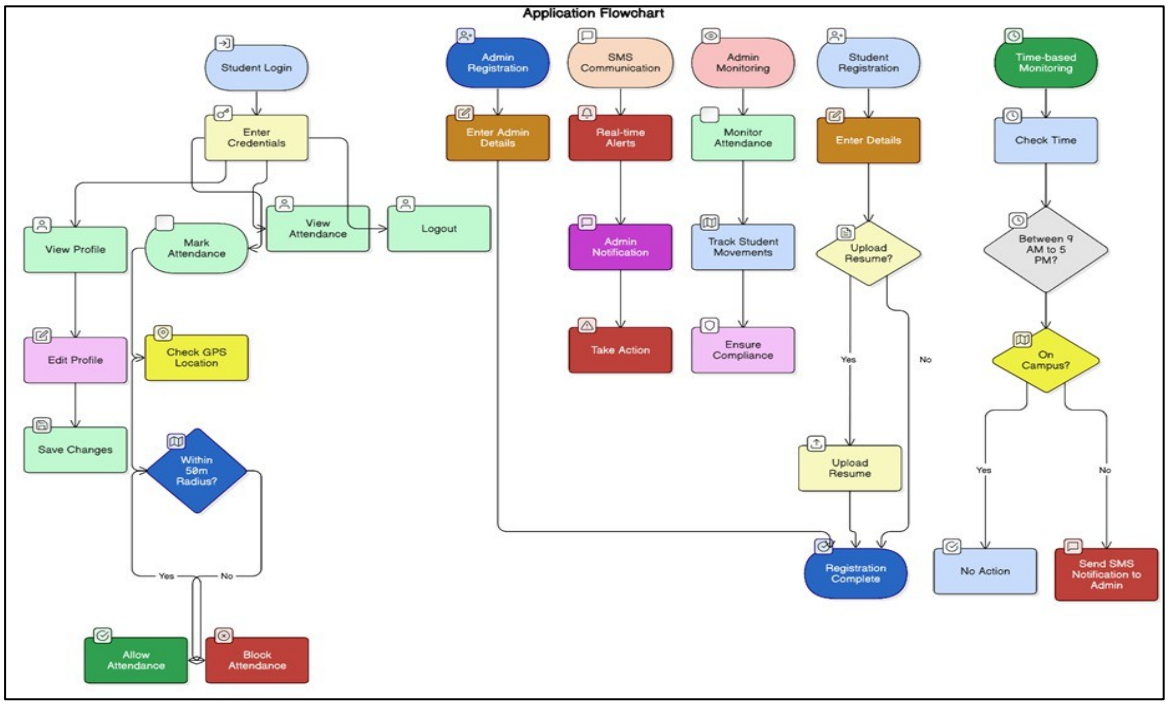

Figure 1: Application Flowchart

The application design incorporates separate feature flows for students and administrators. For students, the workflow includes registration, login, profile management, attendance marking, and viewing attendance history. Administrators follow a similar process but are additionally equipped with tools for managing student profiles, overseeing attendance, and monitoring alerts. The student module enables users to register by providing personal and academic details, including their name, university seat number (USN), contact information, and academic performance

metrics such as grades and skills. The profile management feature allows students to view and edit their profiles, except for locked fields like USN and email, ensuring data integrity. Attendance is tracked in real-time using GPS location services, allowing students to mark attendance only within a 50-meter radius of the department during designated hours (9:00 AM to 5:00 PM). Violations, such as attempting to mark attendance outside the permitted area or hours, trigger SMS alerts to administrators.

The admin module supports registration and login, enabling administrators to access all registered student profiles and modify relevant details when necessary. Real-time monitoring features allow administrators to receive alerts for attendance violations, access attendance logs, and manage attendance records comprehensively. The app utilizes Android Location Services for GPS tracking, Firebase for database operations, and the Android SMS library for notification alerts. The development process involved setting up the environment, designing responsive UI layouts, implementing backend logic for authentication and attendance validation, and integrating location-based features and SMS functionality.

ANALYSIS

The app enhances efficiency in attendance tracking and student data management by automating processes and eliminating manual efforts. GPS-based verification ensures attendance accuracy by restricting marking to the designated campus area, preventing proxy attendance and minimizing errors. Centralized data storage enables administrators to easily access and manage academic records, resumes, and profiles. Real-time SMS alerts for attendance violations improve transparency and accountability for both students and administrators. The app empowers students by allowing them to manage their profiles and upload resumes, fostering personal and professional growth, particularly for those preparing for placements. However, challenges such as GPS accuracy issues in low-signal environments and high battery consumption due to continuous tracking have been identified, suggesting the need for enhancements like Wi-Fi-based location tracking and optimized energy usage. Dependence on network connectivity for alerts and real-time data synchronization highlights the importance of offline functionality and push notifications to ensure seamless performance in low-network areas. Despite these challenges, the app's user-friendly interface provides an excellent experience for students and administrators. Future updates could focus on incorporating advanced location tracking, energy-efficient algorithms, and offline capabilities to further enhance its overall functionality and usability.

CONCLUSION

The "Student Tracking App" marks a significant advancement in integrating technology into educational management. This application bridges the gap between manual and automated attendance systems by leveraging tools like Android Studio and Java. Its extensive features cater to both students and administrators, offering a blend of efficiency, security, and user-friendliness. From a student's perspective, the app simplifies interactions by organizing academic data through detailed registration fields such as SSLC and PUC marks, skills, and CGPA. The ability to upload resumes is particularly useful for final-year students preparing for placements. Students can easily manage their profiles, with restrictions on key fields like USN, email, and phone number, ensuring the integrity of critical information. Attendance tracking is a core feature, utilizing live location services to ensure accuracy. GPS-based verification within a 50-meter radius eliminates the possibility of proxy attendance. Attendance can only be marked during the specified hours of 9:00 AM to 5:00 PM, and attempts outside these constraints trigger real-time SMS alerts to administrators. This feature enhances accountability and reliability. For administrators, the app provides comprehensive tools for managing student profiles and monitoring attendance. Admins can view, edit, and download student details with centralized access while receiving immediate alerts about any irregular activities, such as attempts to mark attendance outside the designated area or timeframe. The app ensures flexibility in managing data while maintaining control over essential information.

REFERENCES

[1] Doe, J., & Smith, A. (2023). Location-Based Attendance System: An Android Application for Automating Class Attendance. International Journal of Computer Applications, 182(3), 45-52.

[2] A. Porwal (2021), Geo-loco: Location-Based Attendance System Using Geofencing Technology in Android (Java), GitHub.

[3] Magaraa (2022), Attendance Monitoring: An Android Application for School Attendance Management," GitHub.

[4] Smithe and M. Patel (2023), Android-based student attendance management system using Firebase, J. Softw. Eng., Vol. 15, No. 2, pp. 112–119.

[5] G. Joseph (2023), Attendance Manager Using Firebase and Java: Employee Attendance System, GitHub.

[6] R. Shankar and P. Kumar (2023), A mobile attendance system for university students using Android and Firebase, International Journal of Mobile Computing, Vol. 7, No. 5, pp. 210–218.

[7] V. Nair (2022), Geo-fencing and SMS integration for mobile attendance systems in educational institutions, International Journal of Android Development, Vol. 6, No. 4, pp. 52–65.

[8] S. Patel and R. Gupta (2022), Student attendance system with real-time location tracking using Android, Journal of Educational Technology, Vol. 8, No. 3, pp. 115–121.

[9] H. Sharma (2022), Real-time monitoring and attendance tracking with Android and Firebase, International Journal of Digital Systems, Vol. 5, No. 8, pp. 93–100.

[10] D. Narayan and A. Kumar (2023), Design and implementation of a location-based attendance tracking app for students using Android," International Journal of Software Engineering Applications, Vol. 13, No. 4, pp. 77–89.

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