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Attendance Information of Student by Android based using OTP and GPS

Sakthivel[1], Sreerambabu[2], Kalidasan[3], Mohammed Riyaz[4]
[1]PG Scholar, [2]Head of the Department, [3, 4]Assistant Professor Dept of MCA

Abstract: ***Integrating GPS functionality into the attendance application using Android's Location APIs offers several benefits. It allows for accurate tracking and recording of student locations during attendance marking, adding an extra layer of verification and ensuring attendance record accuracy. The system generates a unique OTP for each session , displayed along with class details to the teacher, while students enter the OTP on their devices. By comparing GPS locations between teacher and student devices, the system verifies if students are within designated areas duriPng attendance, minimizing fraudulent entries. Additionally, capturing GPS locations enables comprehensive attendance reports with geolocation data for analysis and insights. Android's Location APIs also enable the use of geofencing, triggering actions or notifications when students enter or exit predefined areas, further ensuring physical presence during attendance. In summary, integrating GPS functionality enhances accuracy, provides location based verification, and generates comprehensive attendance records for analysis and monitoring.***
Keywords: Attendance marking, android location API, OTP generation, GPS tracking, MySQL database, view attendance.

I. INTRODUCTION

The project proposes an innovative attendance management system that utilizes live geolocation to ensure accurate and accountable attendance tracking. It caters to administrators, teachers, and students, with the teacher generating a one-time password (OTP) for attendance. By integrating GPS functionality through Android's Location APIs, the system tracks the precise location of student's device during attendance marking.

This live geolocation data adds an extra layer of verification, preventing proxy attendance and fraudulent entries. Additionally, it records geolocation data along with attendance information, enabling comprehensive analysis and insightful reporting. The project aims to enhance accuracy, real-time verification, and accountability in attendance management, leveraging the benefits of live geolocation technology.

Key features of the Attendance Information of Student By Android Based Using OTP and GPS Includes:

1) Live Geolocation Tracking: The system utilizes GPS functionality and Android's Location APIs to track the precise location of student's devices during attendance marking.
2) One-Time password (OTP) Generation: The teacher generates a unique OTP for each attendance session, ensuring security and preventing unauthorized attendance marking.
3) Physical Presence Verification: The live geolocation feature verifies that students are physically present at the designated location when marking their attendance, reducing instances of proxy attendance or fraudulent entries.
4) Comprehensive Attendance Records: The system records geolocation data along with attendance information, creating comprehensive attendance records that include the exact location of each entry.
5) Analysis and Reporting: The geolocation data captured during attendance allows for in-depth analysis of attendance patterns, identification of trends, and generation of insightful reports for administrators, teachers and students.
6) Increased Accuracy: By leveraging live geolocation, the system enhances the accuracy and reliability of attendance tracking, minimizing errors and discrepancies.
7) Real-Time Verification: The integration of live geolocation enables real-time verification of attendance, ensuring immediate feedback on the presence of students.
8) Accountability and Transparency: The system promotes accountability and transparency within organizations by providing a robust and accountable method of attendance management.
9) Streamlined Attendance Processes: The use of live geolocation simplifies and streamlines the attendance process, making it faster and more efficient for teachers and students.
10) Enhanced Security: The generation of unique OTPs and the verification of physical presence through live geolocation add an extra layer of security to the attendance management system, ensuring data integrity and preventing unauthorized access.

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II. PURPOSE SYSTEM

The purpose of the system is to develop an attendance information system for students using Android devices. It incorporates OTP and GPS functionalities to streamline attendance tracking, ensure data integrity, and enhance accuracy. The system aims to provide efficient attendance recording, real-time monitoring, and comprehensive attendance records. It prioritizes user-friendliness, data security, and analysis of attendance patterns for informed decision-making. Overall, the system aims to improve attendance management by leveraging advanced technology and providing valuable insights for administrators, teachers, and students.

III. SYSTEM ANALYSIS

A. *Existing System*

The existing manual attendance system used in educational institutions involves time-consuming tasks and challenges in maintaining accurate attendance records. To overcome these challenges, the proposed system introduces the concept of one-time passwords (OTPs) for attendance marking. Each student receives a unique OTP on their registered mobile number, ensuring security and preventing unauthorized access. The use of OTPs adds verification and accuracy to the attendance process, eliminating errors in recording and linking attendance records to individual identities. This streamlines the process, reduces administrative burden, and allows for accurate data analysis. Overall, the integration of OTPs improves security, accuracy, and efficiency in attendance management within educational institutions.

B. *Proposed System*

The proposed system aims to automate attendance tracking through a mobile application installed on faculty and student mobile phones. It offers convenient attendance taking anytime and anywhere, with records stored in a database for accurate reporting. The system provides a user-friendly interface, saving time and resources. Students log in using their unique ID and password, with OTP-based authentication.

GPS functionality is integrated to track the location of the student's device. Overall, the system streamlines attendance management, ensuring convenience, accuracy, and real-time monitoring.

IV. DEVELOPMENT ENVIRONMENT

A. *Hardware Requirement*

1) Processor – i3
2) Hard Disk – 5 GB
3) Memory – 1GB RAM
4) Android device

B. *Software Requirement*

1) Windows 7 or higher.
2) python
3) Node JS
4) Python IDLE
5) Google Chrome Browser
6) Front End: React Native
7) Backend: Sqlite3

V. MODULE DESCRIPTION

A. *Admin*

The admin login interface ensures authorized access to the attendance system. After logging in, the admin is presented with a dashboard providing an overview of student attendance, including statistics and total student count. The admin can navigate the system to view detailed attendance records, dates, times, and verification methods.

The interface allows filtering and searching for specific students or date ranges. Analyzing the attendance data helps identify poor attendance, track overall rates, and detect anomalies. This information aids interventions, report generation, and informed decision-making for attendance policies.

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B. Staff

Staff members have their own login credentials to access the system. Once logged in, they can perform various tasks related to attendance management. One important task is generating unique One-Time Passwords (OTP) for students' attendance. The staff initiates the OTP generation process within the system, which sends the OTP to students via email or SMS. Staff members also have additional functionalities like managing student records, modifying attendance data, and generating reports. These features enable staff to efficiently handle attendance-related tasks and contribute to the overall attendance management process.

C. Student

Students utilize their individual login credentials to access the attendance system. Upon successful login, they gain access to an interface or dashboard where they can perform attendance-related actions. To mark their attendance, students are prompted to enter the session-specific One-Time Password (OTP) provided by the staff. This OTP is communicated to students via email or SMS. By entering the OTP into the designated field, students enable the system to verify its authenticity against the staff-generated OTP. Upon successful verification, the system confirms the student's attendance and updates the attendance records accordingly. This process ensures the integrity and accuracy of the attendance tracking system, as it verifies that the correct OTP has been entered by the intended student.

D. Verify Location

The attendance system has two verification steps to ensure accurate tracking. First, it checks if the student is at the correct class location by comparing their live location. Second, it verifies the One-Time Password (OTP) entered by the student against the one generated by the staff. These steps ensure that the attendance record is reliable and secure, confirming the student's presence at the right place and authenticating their attendance.

E. ADD Attendance

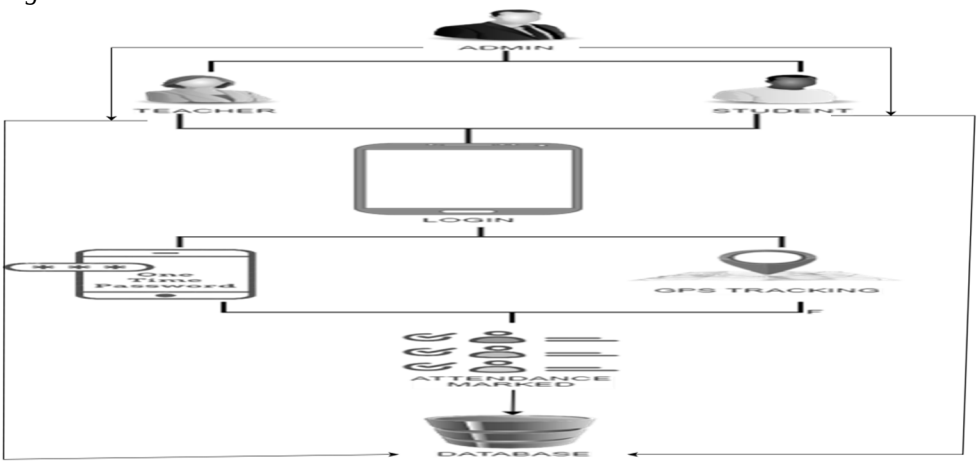
The attendance system requires a match between the live location shared by the student and the OTP generated by the staff to add attendance. This ensures that the student is physically present at the correct location, validating the attendance record. If the live location or OTP does not match, the system does not add the attendance, indicating an inability to verify the student's presence. This matching process enhances the security and accuracy of the attendance tracking system, ensuring reliable attendance data.

F. View Attendance

The attendance records in the system are accessible to three user roles: admin, staff, and students. This accessibility enables the admin to monitor attendance trends, generate reports, and maintain oversight. The staff can track attendance for their specific classes, ensuring accurate record-keeping. Meanwhile, students have the privilege to review their own attendance history, promoting self-awareness. The availability of attendance information to these user roles fosters transparency and accountability within the attendance management system.

VI. SYSTEM DESIGN

A. Architecture Diagram



VII. CONCLUSION

In conclusion, the integration of location and OTP verification in attendance management systems enhances the reliability, security, and efficiency of tracking attendance. These systems play a crucial role in ensuring accurate record-keeping for organizations and institutions. By utilizing location information and OTP verification, the systems offer improved accuracy in confirming the physical presence of individuals and validating their attendance. This reduces the likelihood of errors and fraudulent activities, promoting transparency and accountability within the attendance management process. Overall, attendance systems incorporating location and OTP verification provide a robust solution for efficient and trustworthy attendance tracking.

VIII. FUTURE ENHANCEMENT

Future advancements in attendance management systems should prioritize leveraging emerging technologies, improving user experience, and enhancing data analytics capabilities. This involves exploring Android-based platforms for increased accessibility, integrating machine learning and artificial intelligence for valuable insights, and addressing the evolving needs of organizations and institutions. By embracing innovation and adapting to changing requirements, attendance systems can become more efficient, accurate, and user-friendly. Incorporating these developments will ensure comprehensive and robust attendance management solutions that meet the evolving demands of educational environments.

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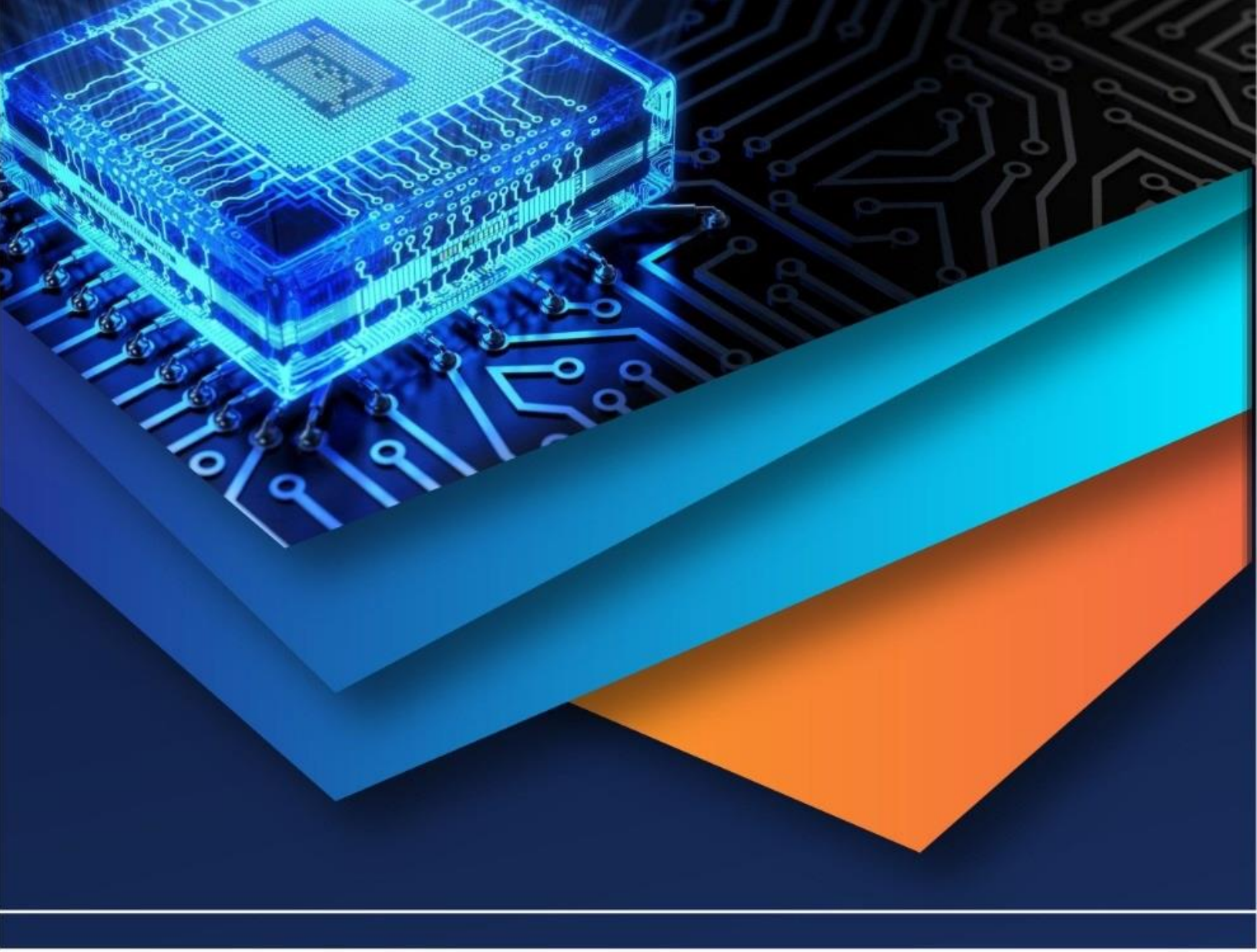

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