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# An Approach to Classroom Attendance Management Based on Crowd Sensing

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## ABSTRACT

Class attendance monitoring is a crucial tool in smart cities to encourage students to be punctual and to guarantee high-quality education, which is essential in intelligent learning environments. In this work, we present AMMoC, an Attendance Management Method based on Crowdsensing, as a solution to the current issues with class attendance verification, including its poor efficiency and the ease with which students may cheat. Initialisation and authentication are the two parts that make up AMMoC. As part of the setup process, a teacher might ask the server to verify attendance. The server will first accept the request, then instruct students to provide their location data. Once the server has collected all of the students' responses, it will create the student location map. The authentication process begins with the server sending out requests to many students to count them in order to ensure the accuracy of the location data. The two modules that make up the authentication step are the task assignment and attendance verification modules. Using the Monte Carlo technique, AMMoC determines the optimal sequence of subregions and verifiers in the job assignment module. The verifiers are then tasked with counting the number of students in each subregion. Last but not least, the attendance verification module will confirm the statistical data. Analyses and comparisons of experiments reveal that AMMoC is well-suited for use in classrooms as an attendance checker due to its quick speed, little impact on the learning environment, and strong anti-cheating performance.

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## I.INTRODUCTION

Managing student attendance in classroom environments is a fundamental aspect of educational administration, ensuring accountability, engagement, and academic success.

Traditional attendance management methods, such as manual roll calls or barcode scanning systems, often suffer from inefficiencies, inaccuracies, and time-consuming processes. To address these challenges, this project introduces a novel student attendance management method based on crowd sensing technology in the classroom environment.

Crowd sensing technology harnesses the collective power of mobile devices and sensors to gather data from a large number of individuals in real-time. By leveraging crowd sensing techniques, this project aims to transform the traditional attendance management process into a more automated, accurate, and efficient system. Students' smartphones or wearable devices serve as sensors, detecting their presence in the classroom and automatically recording their attendance without the need for manual intervention.

The proposed method involves deploying a mobile application or platform that utilizes crowd sensing technology to monitor student attendance during class sessions. Students' devices communicate with a central server or cloud-based system, where attendance data is collected, processed, and stored securely. Through the integration of location-based services, Bluetooth Low Energy (BLE) beacons, or Wi-Fi signal strength analysis, the system accurately identifies students' presence in the classroom and records their attendance accordingly.

By adopting a crowd sensing-based approach, the student attendance management system offers several advantages over traditional methods. It eliminates the need for manual roll calls, reducing administrative burden and minimizing the risk of errors or discrepancies in attendance records. Additionally, real-time attendance tracking enables instructors to monitor student participation levels, identify patterns of absenteeism, and intervene proactively to support student success.

Furthermore, the utilization of mobile devices as sensors promotes student engagement and participation,

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leveraging technologies familiar to students and aligning with modern learning preferences. Privacy and data security considerations are paramount in the design of the system, with measures implemented to protect students' personal information and ensure compliance with data protection regulations.

## II.EXISTING SYSTEM

The ID-based attendance checking system usually uses RFID and NFC (Near Field Communication) technology. Rjeib et al. proposed a RFID-based attendance management and information service system named AMS [13]. In AMS, each student's identity information and class schedule are bounded to the RFID tag of the student ID card. All attendance records and student information are stored in the database and displayed on a web application.

Ahmad et al. designed an NFC-based attendance checking system named TouchIn [14]. TouchIn includes two main units, the reader unit and the web server unit. Students can use mobile devices or student ID cards with NFC tags to touch the NFC reader to complete the attendance checking. Jacob et al. integrated the one-time password (OTP) technology into the ID-based attendance checking system [15]. Once the NFC reader detects that a student has entered the classroom, the server will randomly generate a unique one-time password for each student, and send it to the student's mobile device. After receiving the information, the student needs to submit the password through the pre-installed application on the mobile device to complete the attendance checking.

The biometrics-based attendance checking systems usually identify students by fingerprint recognition, face recognition and other biometric technologies. Muchtar et al. developed an attendance checking system based on fingerprint recognition [20]. By using Arduino and Raspberry Pi to manage the fingerprint data centrally, each user can be identified on different fingerprint sensors, which improves the efficiency of the attendance management.

Arsenovic et al. proposed a face recognition attendance checking system named FaceTime based on deep learning [21]. Students first submit the identity

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information of their ID cards, and then FaceTime will call the webcam to collect and recognize their faces. Yang et al. proposed an intelligent attendance checking system based on voiceprint recognition and real-time location positioning [22], and developed a corresponding mobile device application. During attendance checking, the application turns on the device's microphone, and students complete the attendance checking by reading a paragraph of text. They tested this application in an undergraduate computer science course with about 120 students. On condition that the application meets the required attendance checking accuracy, the attendance checking time can be limited to 5 minutes.

**Disadvantages**

1) The system is not implemented by AMMoC.

2) The system doesn't implement sub region selection method.

## III.PROPOSED SYSTEM

In this paper, we propose an intelligent attendance management method named AMMoC. AMMoC need neither deploy additional hardware devices in the classroom, nor collect the biological characteristics of students. AMMoC only needs to install two Android applications on mobile devices of teachers and students respectively, and uses mutual verification between students to complete attendance checking.

AMMoC divides the classroom into several subregions, and assigns students to verify the student number of subregions. The verification process is classified into a series of crowdsensing tasks [11]. At the beginning of attendance checking, students submit their location information to AMMoC within a time limit. After AMMoC obtains the location information of students, it uses an algorithm based on intelligent search, selects several students to complete the crowdsensing tasks which require to submit the number of students of a specific subregion, etc. AMMoC will analyze the truth of the initial location information based on the results of the crowdsensing tasks submitted by the students.

Advantages

(1) This paper presents a student attendance management method that combines the active reporting and

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sampling check of students' location information, which has the advantages of high real-time performance and low disturbance.

(2) This paper proposes a method which evaluates the value of subregions based on the remaining number of students, which can accurately select the optimized subregions for attendance verification.

(3) This paper proposes a subregion generation method based on certain randomness, which can fully explore the possible subregions space, and improve the anti-cheating performance of the attendance checking.

## IV.MODULES

- **Service provider**

In this module, the service provider has to login by using valid user name and password. After login successful he can do some operations such as browse datasets and train & test data sets,view trained and tested accuracy in bar chart, view trained and tested accuracy results, view predicted type, view type ratio, download predicted data sets, view type ratio results, view all remote users.

- **View and authorize users**

In this module, the admin can view the list of users who all registered. In this, the admin can view the user's details such as, user name, email, address and admin authorizes the users.

- **Remote user**

In this module, . User should register before doing any operations.Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once login is successful user will do some operations like register and login, after login we have to predict type, view your profile.

## V.CONCLUSION

In conclusion, the student attendance management method based on crowd sensing technology presents a innovative solution to the challenges associated with traditional attendance tracking methods in classroom environments. By leveraging the collective power of mobile devices and sensors, this approach transforms the attendance management process into a streamlined, automated, and student-centric system.

Through the deployment of crowd sensing-enabled mobile applications or

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platforms, student attendance can be monitored in real-time, eliminating the need for manual roll calls and reducing administrative burden. The system offers accurate attendance tracking, enabling educators to monitor student participation levels, identify patterns of absenteeism, and intervene proactively to support student success.

Moreover, the utilization of crowd sensing technology promotes student engagement and participation by leveraging familiar technologies and aligning with modern learning preferences. Privacy and data security considerations are prioritized in the design of the system, ensuring the protection of students' personal information and compliance with data protection regulations.

Overall, the introduction of a crowd sensing-based student attendance management method represents a significant advancement in educational administration, offering efficiency, accuracy, and engagement in attendance tracking. By embracing innovative technologies, educational institutions can enhance the learning experience for students and educators alike, paving the way for a more effective and inclusive classroom environment.

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