



ISSN: 2454-9940



**INTERNATIONAL JOURNAL OF APPLIED
SCIENCE ENGINEERING AND MANAGEMENT**

E-Mail :
editor.ijasem@gmail.com
editor@ijasem.org

www.ijasem.org

A STUDENT ATTENDANCE MANAGEMENT METHOD BASED ON CROWDSENSING IN CLASSROOM ENVIRONMENT

¹MR.A N L KUMAR, ²BUSI ASHA KUMARI

¹(Head, Department Of MCA), MCA, Swarnandra College

²MCA, scholar, Swarnandra College

ABSTRACT

In smart cities, intelligent learning environment is an important application scenario, and class attendance checking is an important measure to urge students to attend on time and ensure the quality of learning. Aiming at the existing problems in class attendance checking, such as low efficiency and easy to cheat, this paper proposes a student attendance management method named AMMoC (Attendance Management Method based on Crowdsensing). AMMoC includes two phases, i.e., the

initialization phase and the authentication phase. In the initialization phase, a teacher sends an attendance checking request to the server. After receiving the request, the server sends a request to tell students to submit their location information, and then forms the student location map once the server receives all the response from students. In the authentication phase, the server verifies the truth of the location information by sending requests to several students to count the number of students. The authentication phase includes two modules, i.e., the task

assignment module and the attendance verification module. In the task assignment module, AMMoC first finds the optimized sequence of subregions and verifiers by using the Monte Carlo algorithm, and then requires the verifiers to count the number of students in the subregion. Finally, the statistics results will be verified in the attendance verification module. Experiment comparisons and analyses show that AMMoC has the advantages of good anti-cheating performance, fast speed, and little disturbance to class, and is suitable for attendance checking applications in classroom environment.

1. INTRODUCTION

A major challenge in developing smart cities is figuring out how to create a mobile learning interactive environment, given the proliferation of mobile devices. The notion of mobile learning is quickly becoming an essential component of today's educational systems. Problems with conventional

classroom learning methods, such as inefficient class administration, delayed feedback on the effectiveness of instruction, and a lack of two-way contact between instructors and students, may be addressed by the use of mobile computing technology in the classroom (i.e., mobile education). One of the most exciting areas of contemporary education is mobile learning.

One important metric for assessing a course's quality is the class attendance ratio. The correlation between the percentage of college students who showed up to class and their grades was investigated by Lukkarinen et al. using clustering and regression analysis. A high student attendance rate will increase the effectiveness of instruction, and they discovered a favorable correlation between attendance and test results. Plus, not only will students' individual grades suffer, but the whole classroom environment will suffer as a result of their absence. Therefore, tracking student attendance has always played a significant role in educational administration.

The current method of taking attendance in class is often done by hand and may be categorized into two forms: one that is not

supervised by a teacher and one that is. In unsupervised class attendance checking, students fill out a check-in form by passing it around the room; nevertheless, this process disrupts the natural flow of class and encourages some students to falsify their attendance.

Teachers or aides in the classroom take roll one by one to verify that all pupils are present throughout the period of time when class attendance is being checked. This kind of roll-calling is very wasteful. The roll-calling procedure consumes a significant amount of class time when there are many pupils. Based on our research, we know that students can't verify their own attendance simultaneously since they have to do each work individually. This is why manual attendance checking is used. So, to make attendance verification more efficient, it's best to run the operation in parallel. Installing a number of Radio Frequency Identification (RFID) readers throughout the classroom allows students to simply scan their cards to verify their attendance. Its flaws are readily apparent, despite the fact that this technique may substantially enhance the efficiency of attendance checks. To begin, teaching using

RFID readers in the classroom comes at a hefty price. Secondly, we still don't know whether someone is posing as a cardholder since RFID scanners can't confirm the cardholder's identification. Some new methods are developing to address the aforementioned issues as a result of the widespread use of mobile smart devices. For instance, students may use their mobile devices to create apps that track their attendance, and then they can simply use such apps to monitor their own attendance. Even while this technique drastically cuts down on system implementation costs, it is still unable to detect whether a user is posing as someone else. In order to take someone else's attendance, students may simply bring their own cell phones into the classroom. Some researchers have suggested using biometric technologies—such as fingerprint, face, and voiceprint recognition—in the attendance verification system to combat this issue. Because these biometric traits may be acquired using mobile devices, which can lower costs, class attendance monitoring systems that employ facial recognition or voiceprint recognition are more appropriate. Biometric verification may put students' privacy at risk and put school property at risk,

but it does eliminate the issue of fraudulent attendance tracking.

We provide AMMOC, an intelligent attendance management system, in this research. Neither collecting students' biological data nor deploying extra hardware devices is necessary for AMMOC. For AMMOC to accomplish its attendance tracking, all that is required is the installation of two Android applications—one on the instructors' and one on the students' mobile devices—and the usage of mutual verification amongst the students. Assigning students to check the student number of sub regions is one way AMMOC divides the classroom into multiple sub regions. It breaks down the verification procedure into a number of crowd sensing tasks. There is a time constraint at the beginning of the attendance verification process when students must submit their location information to AMMOC. Using an intelligent search algorithm, AMMOC picks a subset of students to participate in crowd sensing assignments that require them to report the total number of students in a certain area, etc., after collecting their position data. The outcomes of the student-submitted crowd

sensing exercises will be used by AMMOC to determine the accuracy of the initial location data. The following are the primary benefits of reading this article.

High real-time performance and minimal disruption are the benefits of the student attendance management approach presented in this research, which combines the active reporting and sample check of students' location information.

In order to choose the best sub regions for attendance verification, this study suggests a technique that uses the remaining student body to determine each sub region's value.

This work presents a technique for generating subregions using a given amount of randomness. It can enhance the attendance monitoring system's anti-cheating performance and thoroughly explore the space of potential subregions. Here is how the remainder of this paper is structured. Section 2 provides an overview of relevant research on intelligent attendance systems. The AMMOC design and functionalities are detailed in Section 3. The steps for implementing AMMOC are described in Section 4. In Section 5, the experiments are

carried out and the findings are analyzed. The study concludes with a summary in Section 6.

2.LITERATURE SURVEY

SURVEY-1:-Digitalizing the Old Approach

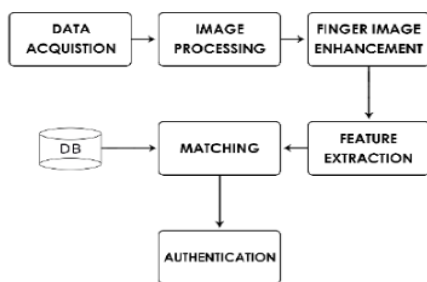
The time and effort required to conduct departmental sessions using traditional student attendance methods is substantial, and there are several problems associated with roll-calling. The process is time-consuming and demands the attention of several teachers and pupils. In order to shorten the time it takes to verify attendance in its entirety, Mendonca et al. [20] developed an online method. Instead than using the standard method, instructors had to take attendance by calling out each student's name and recording their response. A more direct and faster method of tracking attendance is provided by it. With their suggested approach, teachers won't need paper forms to take attendance. Making the whole process paperless, they may generate attendance records by retrieving the essential information from the database. Still another A method for tracking attendance was created and put into operation using research-based mobile devices. The developers used Visual

Basic for.NET and SQL Server to create an Android-based attendance management software. Students' attendance may be tracked, their grades can be computed, and a report can be generated using this project. An Android component rounds out the system's five main parts: admin, registration, student, SMS, and the system itself. Through the usage of the android component, students may notify their professors of their impending absence through the system. Parents may also be notified of their children's actions by text message.

SURVEY-2:-

The majority of studies have shown that biometric identification systems, such as those that use fingerprints or hand gestures, are an excellent choice for managing attendance. Automated fingerprint recognition is a computer process that compares a set of unknown fingerprints to a database that contains both known and unknown fingerprints. Mohamed and Raghu detailed a unique finger impression attendance architecture that includes a specific finger assumption device. Students may test their essence simply by touching the sensor on the gadget with their fingers.

Unfortunately, this approach isn't practical since fingerprint scanners aren't perfect. Using smartphone GPS and fingerprint technology, Soewito et al. [4] devised an attendance system. Using fingerprint recognition is a time-consuming process.



3. EXISTING SYSTEM

Most ID-based attendance tracking systems make use of Near Field Communication (NFC) and Radio Frequency Identification (RFID). An RFID-based AMS (Attendance Management and Information Service) system was suggested by Rjeib et al. Each student's AMS record and class schedule are tied to their ID card's RFID tag. A web application displays all student information and attendance records that are maintained in the database.

The TouchIn system, developed by Ahmad et al., is an NFC-based attendance tracking tool. The reader and web server components make up TouchIn. Students may verify their

attendance by touching their mobile devices or NFC-tagged student ID cards to the NFC reader. The one-time password (OTP) technology was included into the ID-based attendance verification system by Jacob et al. A random one-time password will be sent to each student's mobile device by the server as soon as the NFC scanner recognizes that they have entered the classroom. In order to finish verifying attendance, the student must enter the password into the app that is pre-installed on their mobile device after getting the necessary information.

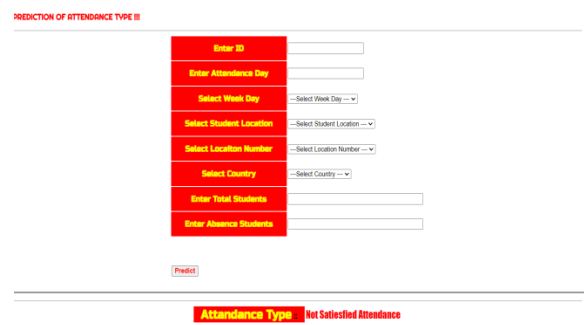
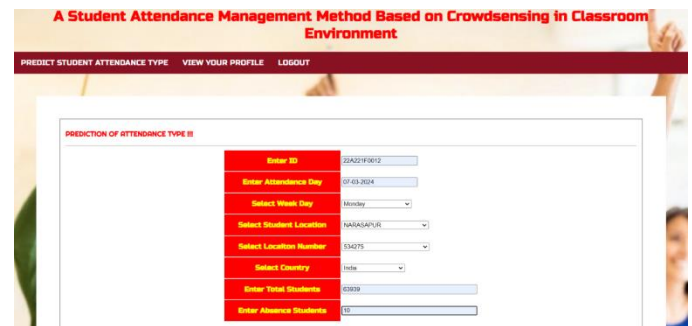
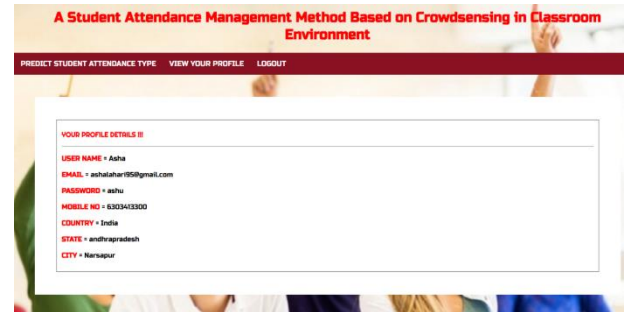
Students are often identified using biometric technology such as fingerprint or facial recognition via attendance checking systems that rely on biometrics. An attendance verification system that relies on fingerprint identification was created by Muchtar et al. The effectiveness of the attendance management is enhanced by using Arduino and Raspberry Pi for centrally managing the fingerprint data. This allows for the identification of each user using multiple fingerprint sensors.

The FaceTime system, developed by Arsenovic et al., is a deep learning-based facial recognition attendance verification

system. In order for FaceTime to gather and identify students' faces, they must first provide the identifying information from their ID cards. Yang et al. created a mobile app to go along with their intelligent attendance verification system that uses voiceprint recognition and real-time location tracking. As part of the attendance verification process, students read a paragraph of text while the app activates the microphone on their smartphone. They put this program through its paces in a computer science course for undergraduates, where about 120 students participated. The application might be restricted to 5 minutes for attendance verification as long as it fulfills the requisite accuracy.

4. RESULTS

Remote User Login:



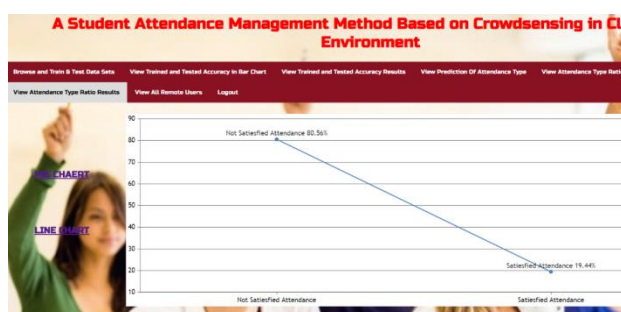
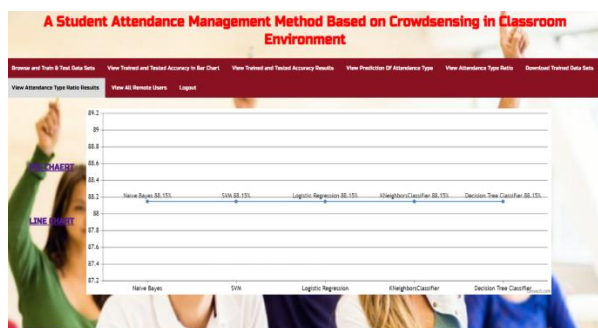
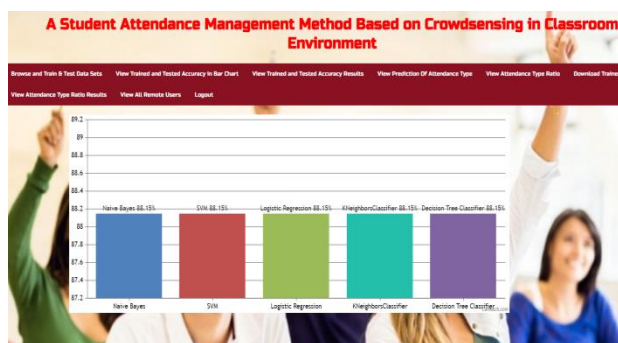
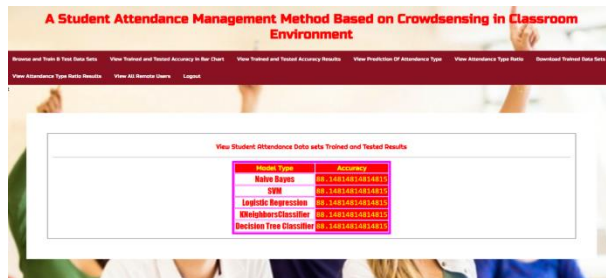
Service Provider Login:



5. CONCLUSION

We provide AMMOC, an intelligent attendance management system, in this research. Both the startup and authentication phases make up AMMOC. During the first stage of setup, every student is required to provide their own geographical details. As part of the authentication process, AMMOC optimizes the distribution of crowd sensing jobs before the MCTS algorithm chooses a subset of students to verify. Using the student number of sub regions provided by the verifiers, AMMOC will determine the veracity of the locations reported. The AMMOC's benefits of a low checking time and a high degree of accuracy were shown by the results of the experiments. Thus, taking attendance in a classroom setting is a good fit for AMMOC.

Our long-term goal is to bring the practice of taking attendance in traditional classrooms into the digital realm so that students may participate actively in their online education. To make it work for many kinds of learning circumstances, we're also aiming for continual non-disturbance attendance verification.



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