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E-Mail :
editor.ijasem@gmail.com
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A STUDENT ATTENDANCE MANAGEMENT METHOD BASED ON CROWD SENSING IN CLASSROOM ENVIRONMENT

A. NIRMAL KUMAR[1], MOHD ABRAR ALI BAIG[2], MANNEM FANISH REDDY[3], PADALA MAHENDRA REDDY[4]

ASSISTANT PROFESSOR[1], UG SCHOLAR[2,3&4]

DEPARTMENT OF CSE, CMR INSTITUTE OF TECHNOLOGY, KANDLAKOYA VILLAGE, MEDCHAL RD, HYDERABAD, TELANGANA 501401

ABSTRACT—Intelligent learning environments are a key application scenario in smart cities, and class attendance monitoring is a crucial tool for encouraging students to arrive on time and guaranteeing the caliber of instruction. This study suggests a student attendance management technique called AMMoC (Attendance Management Method based on Crowdsensing) in order to address the issues with class attendance checks that already exist, such as low efficiency and ease of cheating. Initialization and authentication are the two stages that make up AMMoC. A instructor requests that the server monitor attendance during the startup process. Following receipt of the request, the server instructs students to provide their location data. Once the server has all of the responses from the students, it creates the student location map. The server sends queries to many students to count the number of students in order to confirm the accuracy of the location data during the authentication step. The job assignment module and the attendance verification module are the two components that make up the authentication phase. The job assignment module asks the verifiers to count the number of students in the subregion after AMMoC uses the Monte Carlo technique to determine the optimal sequence of subregions and verifiers. Lastly, the attendance verification tool will confirm the statistical findings. AMMoC has the advantages of good anti-cheating performance, quick speed, minimal disruption to class, and is appropriate for attendance checking applications in a classroom setting, according to comparisons and analyses of experiments.

Index Terms—Attendance management, mobile crowdsensing, Monte Carlo tree search, attendance verification.

I. INTRODUCTION

Given the widespread use of mobile devices, creating an interactive mobile learning environment has emerged as a significant challenge in the development of smart cities. In today's educational systems, mobile learning is quickly emerging as a crucial paradigm. Numerous issues with traditional classroom learning systems, such as time-consuming class management, delayed feedback in the teaching impact, and inadequate teacher-student communication, can be resolved by implementing mobile computing technology in the classroom (also known as mobile education). One of the hottest topics in the world of modern education these days is mobile education. One important metric for assessing a course's quality is the class attendance ratio. Regression analysis and clustering were employed by Lukkarinen et al. to investigate the connection between academic achievement and the class attendance ratio of college students [1]. They discovered that attendance ratio and scores are positively connected, and that a high student attendance ratio will enhance the impact of instruction. Additionally, missing class will impact not only individual grades but also the classroom environment [2]. Consequently, a key component of school administration has always been attendance. There are two types of current class attendance checks, which are often done manually: one without instructor supervision and one with teacher supervision. Students fill out a

check-in form in the classroom to complete the attendance check during unsupervised class attendance checks, but this not only disrupts the class order but also contributes to some degree of fraudulent attendance checking [3]. Teachers (or teaching assistants) verify students' attendance by calling each student by name during the teacher-supervised class attendance check. The roll-calling procedure will consume a significant amount of instructional time when there are many students [4]. Students are unable to complete the attendance checking activities simultaneously because they must do them one at a time, according to our analysis of the manual attendance checking procedure. Thus, increasing the efficiency of the attendance verification process requires parallelizing it. Installing multiple RFID (Radio Frequency IDentification) readers in a classroom is a workable approach. Students use their RFID cards to complete their attendance checks [5]. This scheme's flaws are also readily apparent, despite the fact that it can significantly increase the effectiveness of attendance checks. First off, installing RFID readers in classrooms comes at a hefty price. Second, we are still unsure if someone is logging in as an impostor because RFID readers are unable to confirm the cardholder's identification. As mobile smart gadgets become more widely used, new methods for resolving the aforementioned issues are starting to appear. For instance, mobile devices can be used to construct applications linked to attendance checking, which students can use to perform attendance checking [6]. Although this technique significantly lowers system implementation costs, it is still unable to detect fraudulent login attempts. In order to complete the attendance check for others, students are permitted to bring their phones into class. In order to address this issue, some academics suggested integrating biometric technologies—such as voiceprint, facial, and fingerprint recognition—into the attendance checking system [7]-[9]. Class attendance monitoring systems are more suited for facial recognition and voiceprint recognition since these biological traits may be gathered via mobile devices, which can lower expenses. While biometric authentication eliminates the issue of fraudulent attendance verification, it may jeopardize students' property safety and privacy [10].

II. LITERATURE SURVEY

A) Real Time Face Recognition Based Attendance System using Multi Task Cascaded Convolutional Neural Network by Vrushaket Chaudhari, Shantanu Jain, Rushikesh R. Chaudhari, Tanvesh Chavan, Priyanka Shahane Published in International Conference (1 March 2023) - Facial recognition has been an important research direction in computer vision. There are countless algorithms presented in related disciplines, and the precision that may be achieved is increasing. However, the implementation of facial recognition technology is hard. In this paper, combination of facial recognition and facial recognition algorithms to build a video-based facial recognition system to efficiently and accurately mark participant attendance. Utilizing FaceNet to extract characteristics and use MTCNN to detect the image of the student for recognition. Lastly, the output is analyzed by a Support Vector Machine (SVM) that recognizes the person of interest in the image. Studies reveal that this technique still yields accurate detection results when the dependent variable has no data and the image quality is unreliable. On the self-generated data set used in this article, the accuracy of the procedure may reach 94.85%.

B) Face Recognition Using Multitasking Cascading Convolutional Networks by A. G. Musikhin, S. Yu Burenin, Published in IOP Conference Series (1 June 2021) - The face recognition has many applications in such areas like intelligent security and access control, biometrics, safeguard, verification, attendance accounting, machine vision, etc. Identification of a personality by the face has a number of advantages over other methods: the person does

not need to be contacted physically, which is the most acceptable way for mass applications and no complicated or expensive equipment is required. This article discusses the problem of recognition and identification of a person's face using convolutional neural networks that process frames from a camera in real time or from a recorded video file with the subsequent entry of the identified person into the database. Multitasking Cascade Convolutional Neural Network (MTCNN) has three convolutional networks (P-Net, R-Net, and O-Net) and is capable of outperforming many face detection tests while maintaining real-time performance. The proposed method for human face recognition was developed as a software product, tested and showed the probability of correct recognition in real time 96.02%.

C) CrowdLoc: Robust image indoor localization with edge-assisted crowdsensing by Maoxing Tang, Yanchao Zhao, Qixiang Ma, Jiangshan Hao, Bing Chen, Published in Journal of Systems Architecture (13 July 2021) – Image indoor localization, which is advantageous in infrastructure-less deployment and high positioning accuracy among various indoor localization schemes, is usually deployed in a lightweight end (shooting picture) and heavyweight server (searching image for location in the database) manner. Such a scheme is suffered from two major drawbacks: (1) The uploading and searching of the shooting pictures cause a severe burden to the server. (2) The image map will become defected as time elapse, such as missing features in initialization maps and continuous changes in the scene. To keep the image map up-to-date, a labor-intensive site survey is required with dedicated devices. The frequent updating will further exhaust the limited resources in the server. These two drawbacks have greatly hindered the image-based indoor localization from large-scale deployment. To this end, we study how to use crowdsourcing data to mitigate map defects and optimize location computation and map storage through edge architecture. In this paper, we propose CrowdLoc, an edge-assisted image localization architecture with lightweight multi-view localization on clients and crowdsourcing map-cache on the edge. Our method is mainly innovative in three parts. Firstly, CrowdLoc provides a lightweight multi-view localization on the client-side and the low-confidence localization can be offloaded to the edge server to use the crowdsourcing map for more accurate calculation. Secondly, CrowdLoc uses a map defect perception algorithm to recognize the update of the scene during user localization and update the crowdsourcing map-cache automatically on the edge side. Thirdly, in order to improve cache utilization, we propose a cache elimination strategy that runs periodically on the edge side. It can classify cache data according to the frequency of cache hits on a regular basis, remove invalidation data, and persist long-term updated data to the client map to reduce clients' computing offload. We evaluate the performance of our method based on the real data in the lobby of an experimental building with a map missing rate of 20% and a map update rate of 40%. The results show that the mean localization error of CrowdLoc is 1.54 meters, which is 59.4% lower than that of multi-view localization without crowdsourcing maps, and only 0.56 meters higher than localization in non-defective maps.

III. PROPOSED SYSTEM

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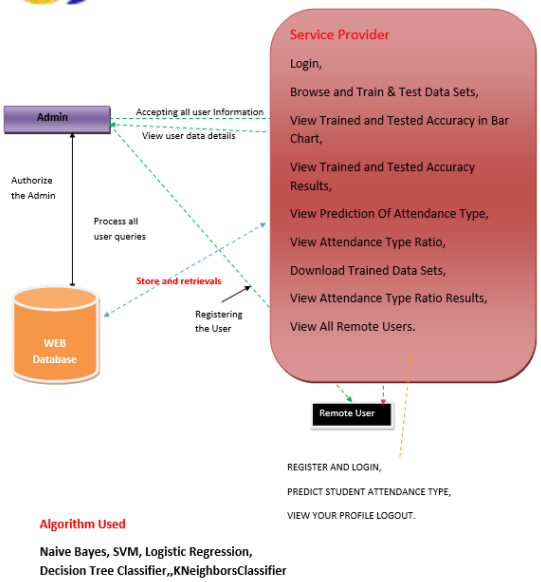

Modules

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 Login, Browse Data Sets and Train & Test, View Trained and Tested Accuracy in Bar Chart, View Trained and Tested Accuracy Results, View All Antifraud Model for Internet Loan Prediction, Find Internet Loan Prediction Type Ratio, View Primary Stage Diabetic Prediction Ratio Results, Download Predicted Data Sets, 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, there are n numbers of users are present. 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, PREDICT PRIMARY STAGE DIABETIC STATUS, VIEW YOUR PROFILE.

CONCLUSION

In this paper, we present AMMoC, an intelligent attendance management technique. The initialization and authentication phases make up AMMoC. Every student will provide his location information during the initialization step. In the authentication phase, AMMoC first optimizes the assignment of crowdsensing jobs, and then the MCTS algorithm picks selected students to undertake student verification. Based on the student number of subregions that the verifiers submitted, AMMoC will examine the veracity of the locations that were submitted. The findings of the trial demonstrate that the AMMoC offers the benefits of high accuracy and a brief attendance

checking time. Thus, it makes sense for AMMoC to conduct attendance checks in a classroom setting. In order to expand the on-site classroom attendance checking to the online learning environment, we intend to move the attendance checking scene into the virtual one in subsequent work. In order to be appropriate for the implementation of various learning scenarios, we also want to accomplish continuous non-disturbance attendance verification.

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