



STUDENT ATTENDANCE TRACKING SYSTEM USING AWS CONNECTIVITY

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ABSTRACT

In educational teaching, monitoring Student Attendance is essential for academic success and authoritarian effectiveness. That said, using conventional strategies to track attendance can be labor-intensive and error-prone. As a result, there is a growing need for automation solutions that take advantage of cutting-edge advancements. The proposed Student attendance Tracking System (SATS) uses AWS network nodes to address this need and revolutionize engagement observation frameworks. This framework leverages Amazon Web Services (AWS) capabilities to build a flexible, secure, and high-performance platform to effectively track student engagement. With the integration of various AWS administration services such as AWS Lambda, AWS Dynamo-DB, and AWS S3, this framework provides real-time verification while ensuring the highest information security and openness. This framework securely collects and transmits student engagement information through a cloud framework using advanced Confrontation discovery and Geo-fencing strategies along with Face-detection technique This ensures unparalleled accuracy and security in tracking engagement while streamlining regulatory workloads and asset allocation.

Keywords-

Student Attendance Tracking System (SATS), Amazon Web Services (AWS), Automation Solutions, Advanced Technologies Face Detection, GeoFencing Strategies, Accuracy, Facedetection

1. INTRODUCTION

The innovation is right now creating exceptionally quick wherein the mechanical time 4.0 all exercises can be associated and gotten to by utilizing the web and smartphone. The participation framework is additionally developing to form it simpler for representatives to utilize and encourage the checking of representatives. Companies that have branches in different areas, information synchronization is the most thing. The framework is requested to suit each representative seem make a nearness at each department. As of now, numerous of the participation frameworks utilized in companies utilize nearness machines located at a specific area where each representative must take turns to create nonattendances both utilizing biometric acknowledgment such as fingerprints, Qr Code and by utilizing confront acknowledgment on the machine. Other companies have employees who works outside the office so the static attendance system is not feasible. Everybody needs to authenticate himself on his computer before using it, or even before using different applications Most of the times, the adopted authentication procedure is the use of a classical couple of login and password. In order to be efficient and secure, the user must adopt a strict management of its credentials, Authentication is one of the significant issues in the era of information system. Among other things, human face recognition (HFR) is one of known techniques which can be used for user authentication.

In this work, we are proposing that the Developing an effective attendance management system has always been a difficult issue for any company, ranging from schools to universities. Smartphones have



been used for attendance with technologies such as face recognition, fingerprint-based attendance, and other types. The attendance management system (AMS) and its problems are discussed in this study. The study presents a student attendance system for schools and colleges combining Geo Fencing using location services dependencies along with Face Recognition functionality. This is performed by acquiring live location of students and a geo-fence of the class area, the system also performs a face recognition for pre-registered student and attendance is automatically taken when a student has spent over 90% of the time within the set geo-fence (Classroom).

This paper develops a Web application to apply real time face recognition for the purpose of the above stated problem, using a combined backend of the MySQL database and Amazon AWS services. Applying our application to into classrooms, the results show that our solutions are immensely effective in both saving time and reducing error.

2. PROBLEM IN EXISTING SYSTEM

This IEEE proceedings paper is likely to focus on the broader aspects of attendance management systems using Aws Connectivity. It may discuss the importance of effective Attendance management in enhancing the performance of education sectors The paper could provide insights into the challenges specific to Attendance techniques and the strategies employed to address these challenges through Geo fencing and Face recognition methods.

2.1 Manual Attendance

Inefficiency: It takes time to maintain a physical book; someone has to gather and keep them.

Inaccuracy: When sign-ins are missed, early departures go unreported, or "buddy punching" occurs, errors occur.

Security Concerns: Because the book is tangible, information therein may be altered or accessed by unauthorized parties.

Unreliable Data: It is challenging to monitor trends or examine patterns in employee attendance when there are inaccurate recordings.

2.2 Biometric

Cost: Using and keeping up biometric software and readers can be costly.

Privacy Concerns: Employees may feel uneasy about their distinctive features being electronically preserved, which presents a privacy concern when biometric data is collected and retained.

Errors and Limitations: Physical changes, filthy hands, or faulty sensors might cause scans to be misinterpreted. Certain people may find biometrics unsatisfactory, particularly in manual labor positions where fingerprints are susceptible to wear and tear.

Suitability: Not every environment will be a good fit for these solutions. Workplaces that are damp or dusty can interfere with fingerprint scanners.

2.3 Pin- based systems

Security Risks: Unauthorized access may be possible due to PINs being leaked, forgotten, or stolen. In the event that someone clocks in for another employee, this could result in erroneous attendance records.

Convenience: Entering PINs can be slower than other ways, like swiping a card, and employees may need to memorize many PINs for different systems.

Not infallible: Although PINs are more secure than manual attendance, they can still be copied or seen by outsiders, which could lead to system compromise.

Restricted Functionality: PIN-based systems usually only log arrival and departure times; they are not able to record other information, such as project work or breaks.

2.4 RFID systems

"Buddy Punching": When someone clocks in or out for a coworker, this is a serious problem. Cards that are stolen or lost make this issue worse.

Card upkeep: As time passes, magnetic strips may deteriorate and new cards may be needed. Cards that are broken or dirty might not scan well.

Data Restrictions: Swipe cards only capture arrival and departure timings; certain more recent systems may catch information on breaks or project work.

Security Issues: Unauthorized individuals may use misplaced or pilfered cards, so jeopardizing security.

2.5 Timesheets

Inaccuracy: Intentional mishandling or forgetfulness can result in inaccurate data, which can affect project costs and payroll. **Time Drain:** Data entry, manual filling, and following up on submissions take up important work time.

Error Prone: When transferring timesheets, manual procedures increase the possibility of errors.

Limited Visibility: The absence of real-time data in timesheets makes it difficult to track projects and analyze employee performance.

3. PROPOSED SYSTEM

An attendance tracking system hosted on AWS using HTML and JavaScript allows students to mark their attendance and view their records, while faculty members can monitor student attendance. Using Amazon Cognito, users (students and faculty) can securely log in. Students can mark attendance through a user-friendly interface, while faculty members access a dashboard displaying student attendance data. **Students:** Students log in with their credentials and can mark their attendance with a click of a button. They also have access to their attendance history.

Faculty: Faculty members log in with their credentials and access a dashboard. The dashboard allows them to select a course or class and view the attendance status of their assigned students.

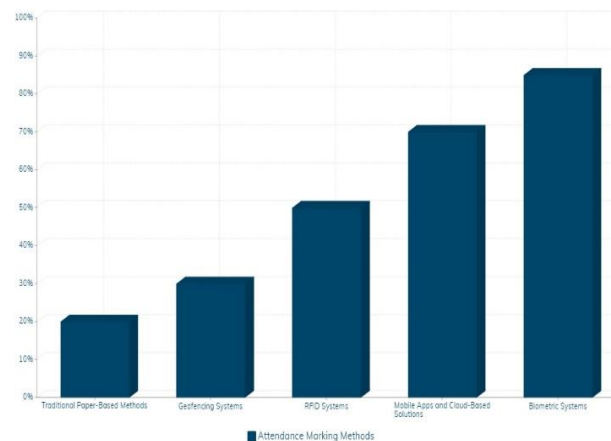


Figure 1. Graph(Various Attendance System)

3.1 Geo Fencing

1. Geofencing is a location-based service that draws virtual borders around actual geographic areas using technology. This is an explanation of how it functions:

2. Setting Up the Fence: GPS, Wi-Fi, or cellphone data are used to define a specific area. This could be a larger space, like a mall, or a smaller location, like your home.

3. Triggering Actions: A pre-programmed action is started or stopped when a mobile device (tablet, smartphone, etc.) enters or leaves the defined area (fence).

4. Applications: There are several purposes for geofencing, such as:

[1]Marketing: Companies are able to give clients that enter their geofence customized promotions (like a discount notice as they draw close to a store). [2]Asset tracking: Businesses are able to keep an eye on where equipment or cars are located inside a geofence. [3]Security & Safety: Parents can get notifications.

3.2 Face Recognition



Figure 2: Face Detection

Attendance marking systems in educational institutions have benefited from facial recognition technology. Biometrics, specifically facial features, are used for identification purposes in this innovative approach. Students mark their attendance via a dedicated platform. By choosing this option, the system asks for camera access. A real-time image of the student's face is captured once permission is granted. Such characteristics are transformed into a digital signature that enables accurate identification. Amazon Web Services (AWS) and other cloud-based platforms securely save facial recognition data to guarantee privacy and security. Consuming storage capabilities are provided by AWS, providing that data is protected from breaches and unauthorized access. By leveraging AWS, the system can efficiently store and retrieve facial recognition data, enabling seamless integration with other components of the attendance marking system. Additionally, AWS offers scalability, allowing the system to accommodate a growing number of users and data volume without compromising performance.

Overall, the implementation of facial recognition technology for attendance marking systems enhances efficiency, accuracy, and convenience for both students and educational institutions. It represents a significant advancement in attendance management, offering a modern alternative to traditional methods while prioritizing data security and privacy.

3.3 Amazon Web Services

Using Amazon Cognito, you can manage, approve, and verify users for your web and mobile applications. The system allows only registered faculty members and students to login and capture attendance for student.

Using AWS RDS which stands for (Relational Database Service), you can manage relational databases that support MySQL, PostgreSQL, and SQL Server, Student names and attendance records, among other data, can be safely kept on Amazon RDS, guaranteeing data reliability and integrity.

Using Amazon S3 (Simple Storage Service), you can save multimedia files such as pictures and documents pertaining to the attendance marking system. To aid in visual confirmation during attendance marking, student images or documents that have been scanned can be saved on Amazon S3.

AWS Lambda: This tool allows developers to run code without provisioning by enabling serverless computing. It can be used to carry out activities that are brought about by attendance events, like sending instantly updating the attendance data in a database.

1. **Amazon DynamoDB:** At every size, Amazon DynamoDB provides single-digit second efficiency as a completely managed MySQL database service. Real-time attendance information can be stored on it, making it possible to find and evaluate attendance records easily and efficiently.

2. **Amazon-CloudWatch:** Amazon CloudWatch offers tracking and monitoring for uses and servers on AWS. The system can be utilized to track its effectiveness, identify deviations, and initiate notifications in case of any problems.

4. DESIGN FLOW

1. Student Login:

a. Login Successful:

Forgot Password: If a student forgets their password, they can reset it.

Create New Password: Allows students to create a new password if needed.

b. Home: The main dashboard or landing page for students after logging in. In login page there are two click buttons Student login and Faculty login where student will enter in login page of student and faculty will enter the login page of faculty

c. Services: Access to various features and services. In these services, student can view the notices and remainders sent from faculty.

d. Attendance Tracking/Marking: Allows students to view and mark their attendance. In this we used Geofencing technique to mark attendance. It works according to latitude and longitude of the student if he/she enters the radius a popup window will appear to mark the attendance and the radius will be set by the faculty.

e. Logout: Logs the student out of the system.

2. New Registration: Enables new students to sign up for the system. In new registration student will have to enter their details like Name, Email Id, Department, Class, Unique Id and Password

3. Faculty Login: Provides access for faculty members to the system.

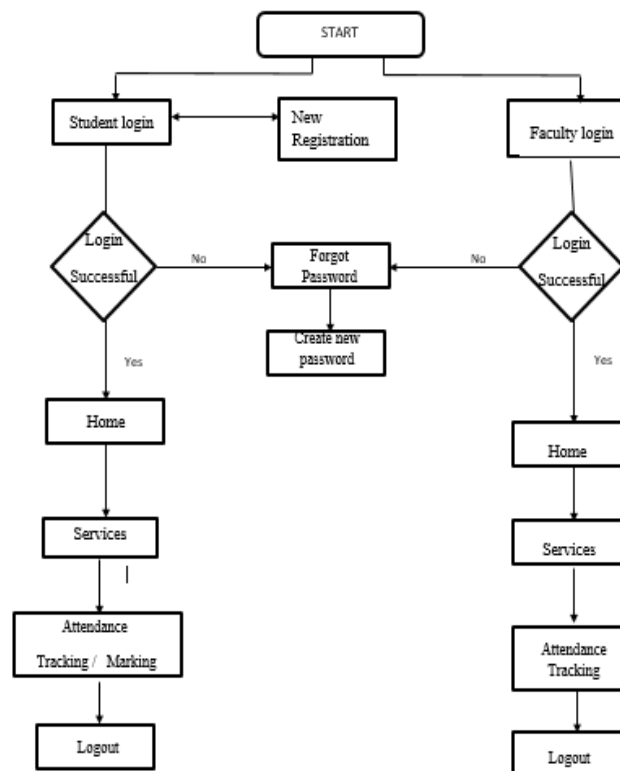


Figure 3.Design flow

5. RESULTS

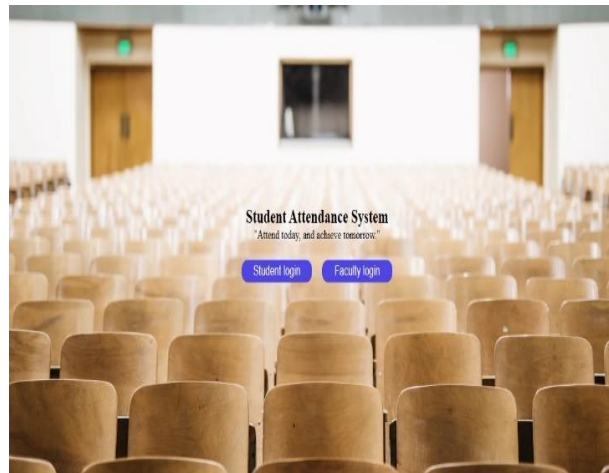


Figure 4: Home page

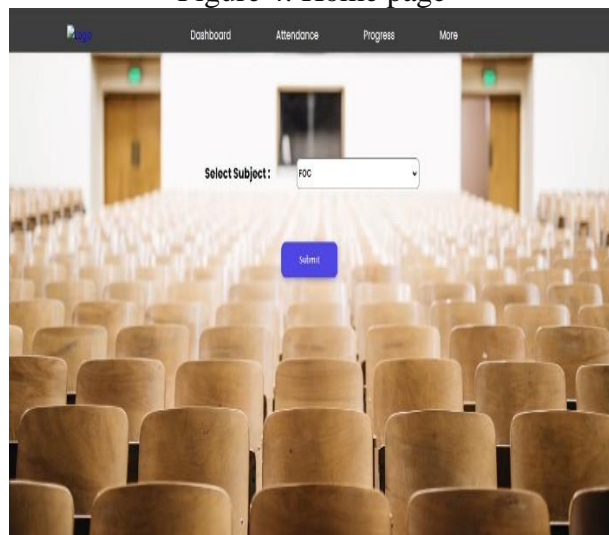


Figure 5: Student Dashboard

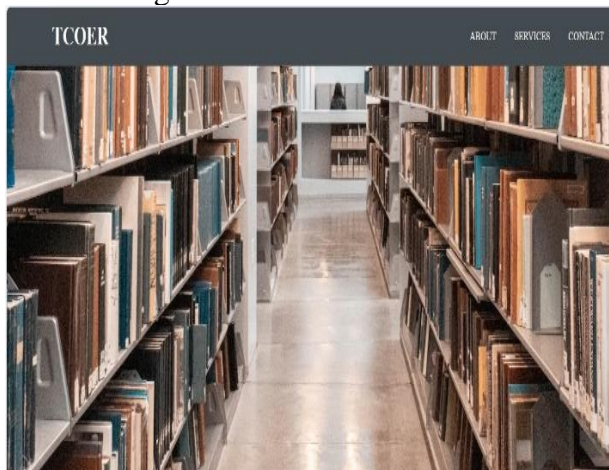


Figure 6: Faculty Dashboard

6. CONCLUSION

In conclusion, an excellent solution for instructors and students can be found in the development of an AWS-based attendance monitoring system that combines Python, HTML, and JavaScript with other AWS services. The project includes important components that improve the overall effectiveness of the attendance management process, such as role-specific access control, geofencing and facial



recognition tracking, and attendance marking. The solution gains scalability, dependability, and security by utilizing AWS services, guaranteeing a stable and seamless user experience.

7. REFERENCES

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