ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1336

FasTrack - A Speedy Geo Based Attendance Tracker

[1] Jaya Kumari D; [2] Murari Venkata Sai Mahesh; [3] Karthik Samana; [4] Shaik Imam Pasha;
[5] Madasu Mani Chandu; [6] Anil Kumar Battula
[1] Professor, [2,3,4,5,6] Final Year BTech
[1,2,3,4,5,6] Dept of CSE, Sri Vasavi Engineering College, Tadepalligudem

Abstract:- To ease the process of doing 10 min tasks i.e, taking attendance in under 40 seconds.This Location-Based Attendance Web Application is a boon for Educational Institutions utilizing Django, HTML, CSS, and JavaScript to streamline attendance. Faculty members generate unique codes for students, who input them along with their roll numbers. The system validates attendance using location data, comparing student and faculty coordinates within a 10-meter threshold.This innovative system significantly reduces attendance tracking time from 5- 10 minutes to 30 seconds, optimizing overall academic workflow. Faculty efficiency is enhanced, allowing for better utilization of class time. The application offers a swift and accurate attendance management solution for educational institutions.

I. INTRODUCTION

Every institute's mandatory step is to maintain a record of their employees or students. When it comes to records, attendance plays a key role in such cases. However, imagine taking attendance name by name, which takes lots of time in today's advanced era. So, here is the solution: "FasTrack." The important point to consider in noting the attendance is ensuring that proxy attendance doesn't happen. The faculty, or more precisely, the attendance taker, should acknowledge the valid person. Here, the traditional approach comes into the picture. The thing about the traditional approach is that it is not only time-consuming but also inefficient in maintaining the records. Considering these points in mind, here we are with the solution.

Our idea is to maintain proper authorization at both ends, i.e., faculty and students. So, here we employ an admin to maintain the authorization; he creates the faculty and student accounts by default. Then, the respective faculty will take their part in getting authorized. Upon successful authorization, the faculty will have to switch on their location and provide inputs on which class they want to take note of. Upon a clear selection, a unique code is generated on the faculty's window. Then, by word of mouth, they will share the code with the students who have already completed their authorization and location part. The students enter the code within no time when the faculty announces it. Within the faculty's range of 5-10 meters (Depending on the distance we allot initially), the students who enter the code will be marked present.

II. LITERATURE SURVEY

The efforts for automating attendance are being pushed way long in different ways. Two approaches most basically found everywhere in automating one is using hardware like taking fingerprints and the second one is leveraging the beauty of OTP or Unique codes.

In 2020, Apporva Gani and team developed an android based attendance system using OTP in which they have used PostgreSQL for performing the data related activities. The student and faculty can access the attendance information 24/7 for various decision-making analysis. They implemented this by sharing OTP between faculty and student upon their successful authorisation the attendance will be marked. Our a good database schema was followed by the team to maintain data redundancy.

In 2021, Luai Ahmed, Julia and Shabbir developed the system in which they have implemented the automated attendance system using OTP which will be shared among students using email which will take a quite few time open up and check on. And the difference when compared to our approach is the student within class whose faculty shared OTP to all the students. Can punch the code even outside the class. They implemented this by leveraging web technologies.

- *Motivation*

The motivation behind the proposed project stems from the growing need for efficient attendance management systems in educational institutions. Traditional methods of manual attendance tracking are time-consuming, prone to errors, and often result in significant administrative burden for faculty members. Additionally, the widespread adoption of web-based technologies has created an opportunity to modernize and streamline attendance processes.

By developing the Location-Based Attendance Web Application , we aim to address these challenges and provide a solution that offers several key benefits. Firstly, the proposed system will significantly reduce the time required for attendance tracking, allowing faculty members to allocate more time to instructional activities. By leveraging real-time location data and advanced algorithms, the system can effectively verify student presence within designated class locations, mitigating the risk of attendance fraud and manipulation.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1336

III. SYSTEM ARCHITECTURE

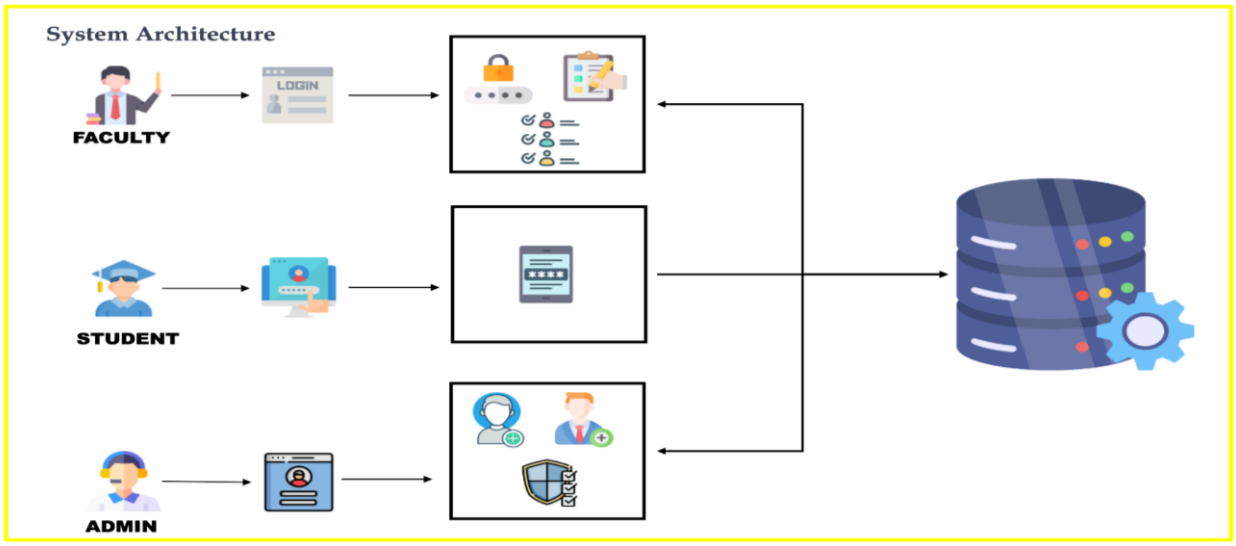

Fig 1 System Architecture

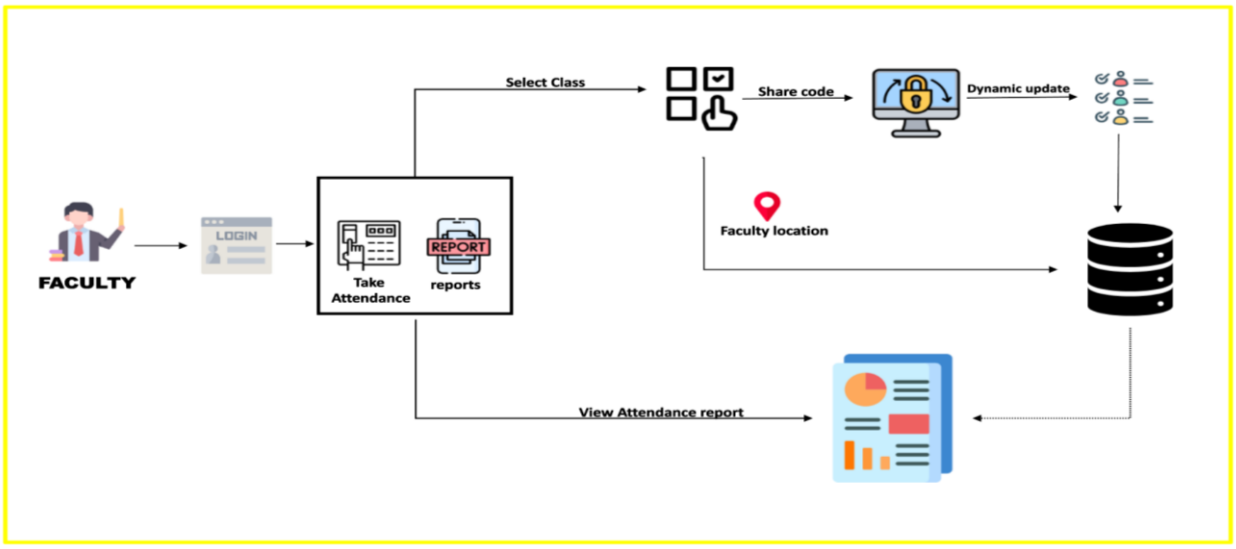

Fig 2 System Architecture

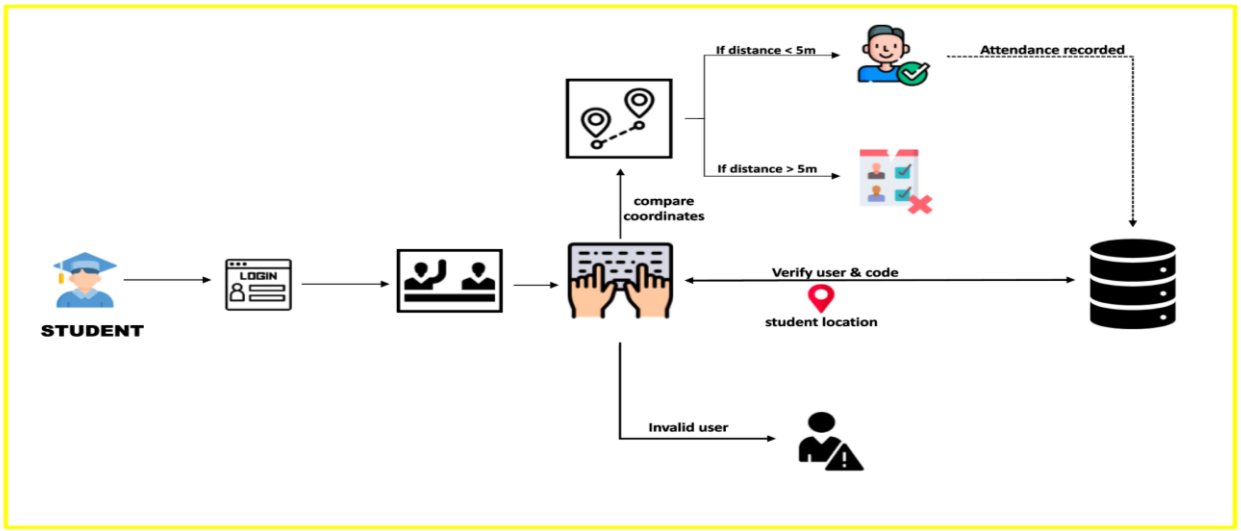

Fig 3 System Architecture

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1336

➢ *Problem Definition*

The problem we're chasing down in our project is that why can't we replace the time taking inefficient manual practices with the technology advancement in this digital era. Our problem is not that unsolvable but needs a proper approach and upon habituation it saves lots of time and the power of automation will be experienced in maintaining large student records in the institution. Even we have found that in our day to day class room as well .Where takes off valuable time allotted in a period but yet its unavoidable Seeing all these we started to hunt this problem down keeping the authorisation factors in mind to avoid proxy all through the way.

➢ *Proposed Work*

The initial stage of our project involves the authorization of users, wherein their accounts are created beforehand by the administrator. Upon authorization, faculty members will be presented with two options: they can either review previously recorded attendance or initiate a new attendance session. To proceed with the latter option, faculty members must grant location access on their systems; failure to do so will impede further progress. Thus, enabling location services is imperative for managing attendance effectively.

In the backend, location data is collected based on latitude and longitude coordinates (x1, y1). A unique code is then generated at the faculty's end, which remains valid for a specified duration. On the student's side, they must also authenticate themselves and provide their location coordinates (x2, y2). Internally, our algorithm utilizes the distance formula to determine proximity.

The distance, denoted as 'd', between the faculty and the student is calculated, and this value is compared against a predefined threshold. For instance, if the threshold is set to 6 meters, any student within this distance upon entering the code will be marked as present. This process is repeated for every student, with the faculty's coordinates (lat1, lon1) remaining constant throughout the calculations, while the student's coordinates are represented as (lati, loni) for each individual.

To calculate_distance(lat1, lon1, lat2, lon2):

- R = 6371.0 * 1000
- lat1_rad = radians(lat1)
- lon1_rad = radians(lon1)
- lat2_rad = radians(lat2)
- lon2_rad = radians(lon2)
- dlat = lat2_rad - lat1_rad
- dlon = lon2_rad - lon1_rad

a = sin(dlat / 2)*2 + cos(lat1_rad) * cos(lat2_rad) * sin(dlon / 2)*2

c = 2 * atan2(sqrt(a), sqrt(1 - a))
distance = R * c

To illustrate the functionality, consider the following threshold criteria:

“d” will define the distance between faculty and student. And the distance d will be compared with the limit . Suppose the limit is set to 6 meters. Then if the code entered by the student distance less than or equal to 6m will be considered as present.

Every student needs to undergo the same.

But the coordinates of the faculty which will be the same throughout the calculation for every student. For students the coordinates will be varied in the calculation. Here's an example of how actual the context of our project works:

Let's say you decide on the following threshold values:

- If distance ≤ limit, Mark as Present
- If limit > distance, Mark as absent

Given potential challenges such as server issues or connectivity problems at the student's end, some users may fail to input the code promptly. In such cases, faculty members have the option to manually record attendance for those students. This ensures that attendance is accurately documented, notwithstanding technical difficulties.

Upon completion of the attendance session, faculty members may choose to finalize the process by submitting the report to the database. This action triggers the generation of a comprehensive attendance report, highlighting absentees and presentees in red and green, respectively. The entire process, from initiation to report generation, typically takes less than a minute to complete.

IV. CONCLUSION

In conclusion, our pioneering solution in the realm of attendance management for educational institutions paves a path to significant reduction in attendance tracking time, from 5-10 minutes to just 30 seconds. This marks a substantial improvement in faculty efficiency and classroom productivity. By generating unique codes and validating attendance based on location data within a Prescribed 5-10-meter threshold, our system offers a swift and accurate solution to an age-old administrative challenge. Our study underscores the importance of leveraging modern technologies to optimize academic workflows and enhance the educational experience. Moving forward, we envision further advancements and refinements to our system, ultimately contributing to the ongoing evolution of attendance management practices in educational settings.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24MAR1336

REFERENCES

[1]. "Web-based attendance system with OTP implementation",Luai Ahmed Haidar Al-Mesbahi,Julia Jurem,Mohamed Shabbir Hamza,Journal of Applied Technology and Innovation (e -ISSN: 2600-7304) vol. 5, no. 2, (2021).
[2]. "Attendance Management System an Android Application", Dipankar Kundu, IJCSE,volume 4,Issue 6, Aug 2016,ISSN:2347-2693.
[3]. "Android-based Smart Student Attendance System", Mohammed A. Jabbar Hameed, IRJET,Volume 4,Issue 12, Dec 2018.
[4]. "Mobile Phone Based Attendance System", Gujan Mankar, IOSRJCE,Volume 10,Issue 3,PP 48-50 April 2013.
[5]. "Django the python web framework",Prof. B Nithya Ramesh,Aashay R Amballi,Vivekananda Mahanta,International Journal of Computer Science and Information Technology Research,Vol. 6, Issue 2, pp: (59-63), Month: April - June 2018.
[6]. "Mobile Based Attendance Management System", Sriram, Indian Journal of Science and Technology,Volume 9, Sep 2016 10.
[7]. www.tutorialspoint.com/sqlite
[8]. https://www.w3schools.com/django/django_admin.php