



**PRESIDENCY UNIVERSITY**

Private University Estd. in Karnataka State by Act No. 41 of 2013

Itgalpura, Rajankunte, Yelahanka, Bengaluru – 560064



## **GEOSYNC**

### **Development of Geolocation Based Attendance Tracking System**

#### **A PROJECT REPORT**

*Submitted by*

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*Under the guidance of,*

**Ms. STERLIN MINISH T N**

## **BACHELOR OF TECHNOLOGY**

**IN**

### **COMPUTER SCIENCE AND ENGINEERING (CYBER SECURITY)**

**PRESIDENCY UNIVERSITY**

**BENGALURU**

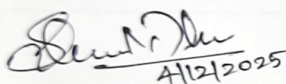
**DECEMBER 2025**



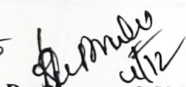
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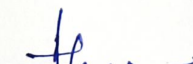
Certified that this report "GEOSYNC - Development of Geolocation Based Attendance Tracking System" is a bonafide work of "Shaik Rida (20221CCS0117), Dinesh T (20221CCS0133), Prem Singh B Rajput (20221CCS0142)", who have successfully carried out the project work and submitted the report for partial fulfilment of the requirements for the award of the degree of BACHELOR OF TECHNOLOGY in COMPUTER SCIENCE ENGINEERING, CYBER SECURITY during 2025-26.

  
4/12/2025

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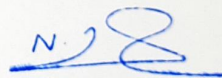
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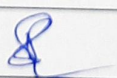
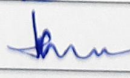


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# PRESIDENCY UNIVERSITY

## PRESIDENCY SCHOOL OF COMPUTER SCIENCE AND ENGINEERING

### DECLARATION

We the students of final year B.Tech in COMPUTER SCIENCE ENGINEERING, CYBER SECURITY at Presidency University, Bengaluru, named **Prem Singh B Rajput, Dinesh T, Shaik Rida**, hereby declare that the project work titled **“GEOSYNC - Development of Geolocation Based Attendance Tracking System”** has been independently carried out by us and submitted in partial fulfilment for the award of the degree of B.Tech in COMPUTER SCIENCE ENGINEERING (CYBER SECURITY) during the academic year of 2025-26. Further, the matter embodied in the project has not been submitted previously by anybody for the award of any Degree or Diploma to any other institution.

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PLACE: BENGALURU

DATE: 03 December 2025

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## Abstract

Accurately recording attendance remains a major challenge in schools and organizations that still rely on manual procedures to record attendance like paper-based logs, signing ID, and teacher roll calls. These activities are time-consuming, prone to errors, and can be manipulated by fake attendance and proxy punching. Some research results using RFID, GPS, Bluetooth, or NFC have shown that there have been some improvements, however, they have often lacked real-time spatial validation, automated geofencing, or scalable software-based solutions independent of external hardware. These shortcomings highlight the necessity for a modern, accurate, software-driven attendance automation system that is time-efficient and less prone to error. To that end, the project GEOSYNC, proposes a mobile phone-based location attendance system that uses **GPS, geofencing, PostGIS spatial queries, and a hybrid model** combining automatic location-triggered with manual fallback for special cases. React Native is used for the mobile client, **Node.js/Express.js** for the backend, and **PostgreSQL with PostGIS** for geospatial processing. The implementation of Geofencing is carried out using the PostGIS **ST\_DWithin** function in order to check the presence of a user within the predefined boundary, with a default radius of **200 meters** to compensate for the **GPS signal drift** in semi-urban and indoor locations. A transition model based on a state machine is used to eliminate duplicate **ENTER/EXIT** events, and offline caching allows attendance to be continuous during a connection drop. Multi-tenant separation is realized through token-embedded **company\_id** attributes so that data isolation is maintained across organizations. Experimental results show that GEOSYNC can detect the geofence correctly with a probability of about 98% over different controlled environments, with average API response times being **approximately 200 ms** and offline sync **reliability of about 99%**. The proposed solution versus the RFID-based and GPS-only systems of the past, which either necessitate specialized hardware or lack spatial visualization, presents a scalable, completely software-driven solution that increases the accuracy, lessens the administrative overheads, and at the same time reduces attendance fraud. Thus, **GEOSYNC** to large extent transforms the management of attendance into a modernized form by integrating geospatial intelligence, mobile computing, and automated logging to provide a dependable, secure, and hardware-free attendance tracking platform. The system's firm accuracy metrics and stable real-time functionality are proof of its appropriateness not only for academic institutions but also organizations that want to digitally shift towards a location-aware attendance ecosystem.