**GeoLarm**

Location based Alarm System for Travelers

**Abstract**

This paper presents *GeoLarm*, an Android-based mobile application that enables users to set alarms triggered by real-time geographic proximity rather than static time inputs. Unlike traditional alarm systems that depend solely on user-specified time settings, GeoLarm uses GPS data and the Google Maps API to monitor a user’s location continuously and activates an alarm when the user approaches a selected destination. The system is particularly valuable in contexts where public transportation, irregular travel schedules, or user fatigue may lead to missed destinations. Developed using Kotlin, Android SDK, and integrated with the Google Maps and Geocoding APIs, GeoLarm combines lightweight architecture with real-time location tracking to offer a reliable and user-friendly experience. This paper outlines the problem GeoLarm addresses, the solution’s core functionality, technical architecture, and its potential for future development and broader application.

**Introduction**

In environments where transit times are uncertain, particularly in early morning or long-distance travel scenarios, conventional time-based alarms often prove inadequate. Travelers may rely on public transportation systems where arrival times are inconsistent, resulting in the risk of missing stops despite setting alarms. GeoLarm is developed as a context-aware alternative to time-based alarms, providing a location-based trigger that aligns more closely with the dynamic nature of modern travel.

GeoLarm targets this problem space by leveraging geolocation data to provide alerts as users approach their predefined destinations. The system operates independently of network conditions once initiated, focusing on GPS-based geofencing and user-defined alarm radii to ensure high accuracy and minimal delay. The solution is designed to enhance user safety, reduce travel anxiety, and minimize the likelihood of travel disruptions due to missed stops.

**The GeoLarm Solution**

GeoLarm is a mobile application that allows users to define a geographic destination via map interaction or address input. Once the destination is selected, the application continuously monitors the device’s GPS coordinates in the background. When the user enters a defined radius around the selected destination (e.g., 200 meters), the system triggers an alarm sound on the device.

Core functionalities include:

* Location-Based Alarm Activation: Alarms are triggered when the user approaches the selected GPS coordinates.
* Interactive Map Interface: Users can either tap on the map to select a location or type an address, which is then resolved using the Geocoding API.
* Real-Time Location Tracking: Background GPS monitoring ensures timely and accurate alarm triggers.
* Custom Alarm Management: Users can enable, cancel, or stop the alarm with one-touch controls.
* Minimal UI/UX Design: The interface is optimized for ease of use, particularly in low-light or fatigued states during travel.

Unlike timer-based solutions, GeoLarm’s spatial context-awareness makes it adaptable to unpredictable travel patterns, delays, or accelerations common in public transit systems.

**Technical Foundation**

GeoLarm has the potential to serve a wide range of use cases beyond individual travel. Its geofencing logic can be extended into public transportation apps, logistics tracking, and travel safety solutions. Future planned enhancements include:

* Offline Mode: Caching maps and pre-processing geocoding results for areas with poor internet connectivity.
* SMS-Based Backup Alerts: Allowing users to set an emergency contact who receives a message when the alarm is triggered.
* Transit-Aware Scheduling: Integration with train/bus APIs to dynamically adjust alarm zones based on ETA and delays.
* Multi-Stop Alarms: Supporting multiple sequential location alerts for complex travel itineraries.
* Battery Optimization with ML: Predictive power management using device context and travel history.

GeoLarm’s scalability and lightweight architecture make it suitable for integration into broader smart travel ecosystems.

**Conclusion**

GeoLarm introduces a practical, real-world solution to a common pain point in modern travel: missing destinations due to unreliable alarm methods. By replacing time-based alarms with a location-aware system, the application offers enhanced reliability, especially in contexts where timing is variable and user awareness is limited. Developed using a robust Android-based tech stack, the application is simple, intuitive, and highly functional. With clear pathways for future improvement and a wide range of potential use cases, GeoLarm represents a valuable step toward smarter, safer mobility solutions.