NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

School of Computer Science and Engineering
College of Engineering

Effective User Localization on Mobile Device

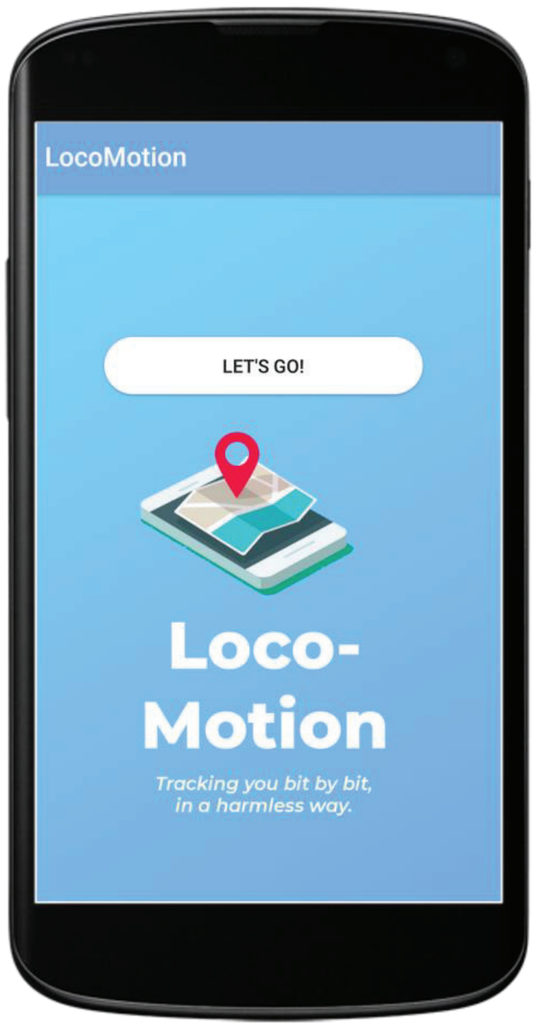
Student: Tan Shi Tong **Supervisor:** Asst Professor Lam Siew Kei

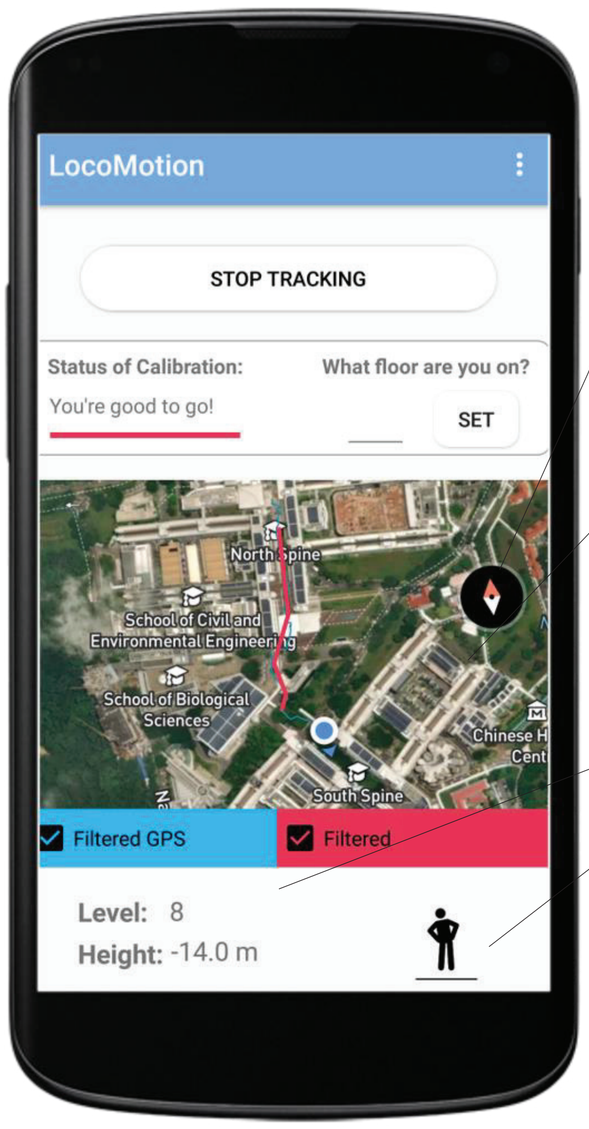
Existing localization applications

Existing applications mainly rely on GPS signals to identify the user's position in order to navigate the user to his/her intended destination. However, GPS signals may be unavailable especially in semi-indoor and outdoor environments, which will affect the accuracy of localization.

Project Objectives

This project aims to develop an application, LocoMotion, using Android Studio IDE, which integrates in-built android sensors and filters to improve the accuracy of user localization and provide route visualisation for the filtered route. It also enables a more complete view of the user's position through detecting user elevation and movement.





1 Sensors Integration

Sensors (accelerometer, gyroscope and magnetometer) were fused and integrated with filters to reduce noise and error from GPS readings

2 Map Matching

Tracked route of the user can be better visualized through Map Matching using Mapbox API

3 Detection of Elevation and Movement

Barometer and Step Sensor were used to track a person's level corresponding to their initial height set and movement (taking the lift, walking up/down stairs)

Future Work

The proposed localization framework which integrates sensors can be complemented with camera sensors in future, to explore the possibilities of AR/VR in further enhancing user localization methods. This can also be used to improve the navigation guidance system for blind persons.