Effective User Localization on Mobile Device

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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.

Sensors Integration

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

Map Matching

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

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.