

Experiential Wayfinding Team

Deliverables Summary

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Projects and Feature Development

Project	Features
NUS Maps	<ol style="list-style-type: none"><li data-bbox="794 347 1161 385">1. Address saving<li data-bbox="794 399 1566 437">2. Location-based Promotional Pop-ups<li data-bbox="794 452 1392 490">3. Photo-based Location Input<li data-bbox="794 504 1779 594">4. Sign Recognition and Location Input with Optical Character Recognition
E-scooter Errant Rider Detection	<ol style="list-style-type: none"><li data-bbox="794 647 1769 737">1. Fall Detection using Bounding Box Aspect Ratio Analysis<li data-bbox="794 751 1624 840">2. E-scooter and helmet object recognition (Shashwat, Kinshuk)
Capacitated Vehicle Routing Problem	<ol style="list-style-type: none"><li data-bbox="794 898 1721 936">1. Minimize the total time travel for each vehicle<li data-bbox="794 951 1779 1040">2. Balance the time of all the vehicles to make sure that they come back around the same time

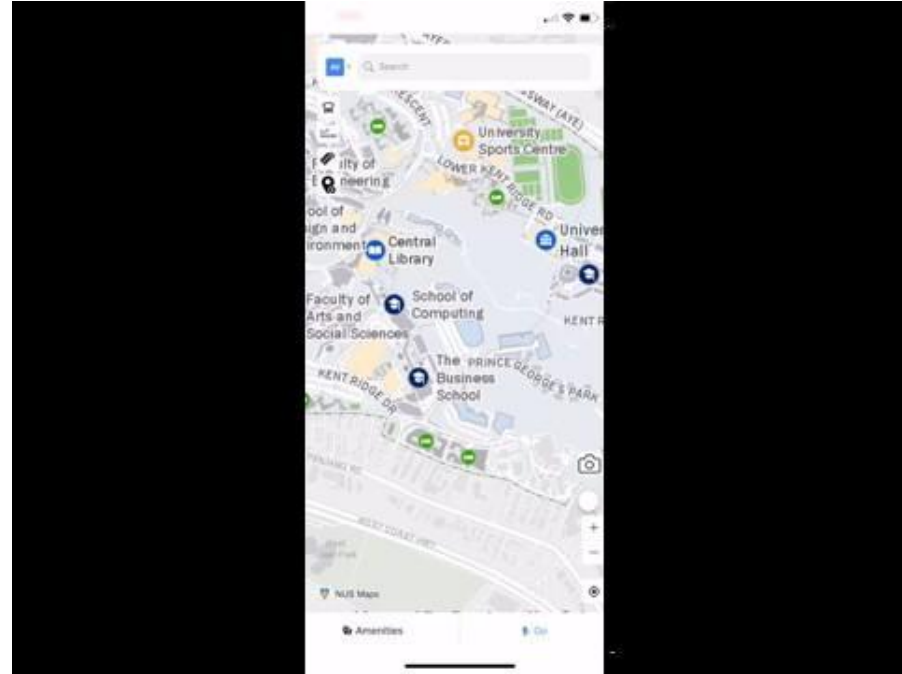
NUS Maps - Saving address of home, work, etc.

- Motivation:
 - Allow user to type less and get directions faster to commonly used locations
- How to use the feature:
 - Tap on designated address
 - Tap on the “i” button
 - Type the name of the address
 - Tap save



NUS Maps - Location-based Promotional Pop-ups

- Motivation:
 - Let users know about store promotions in the local area
- How to use the feature:
 - No direct user action required
 - Promotions will pop-up when user walks with certain distance of participating stores



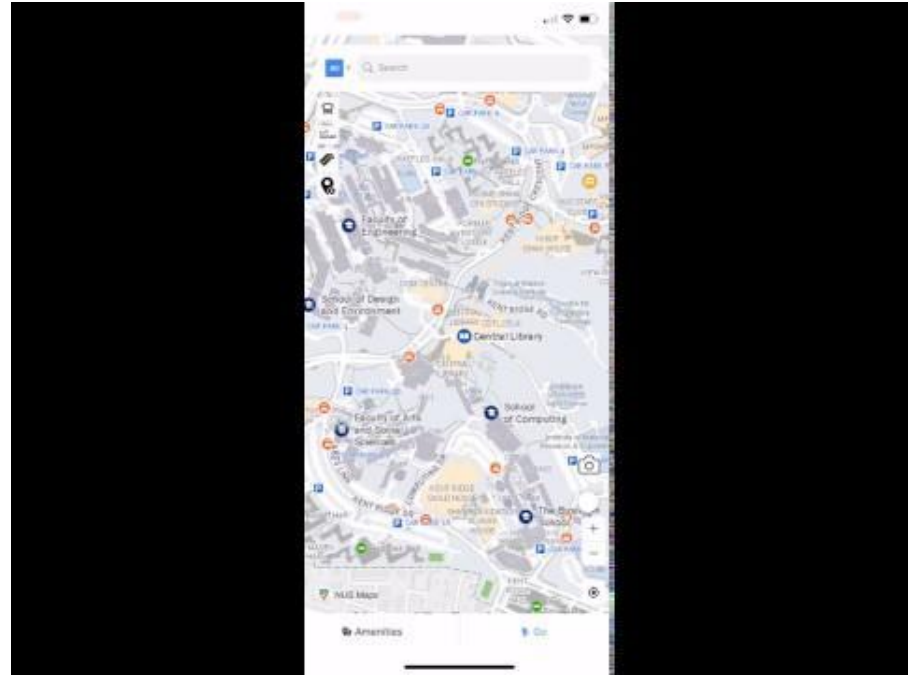
NUS Maps - Photo-based Location Input

- Motivation:
 - Allow user to upload the location of a photo saved on the mobile device
- How to use the feature:
 - Tap on the “get direction with picture” button
 - Tap on the desired picture from the phone’s camera roll
 - Tap “Choose”
 - Navigation information will pop up

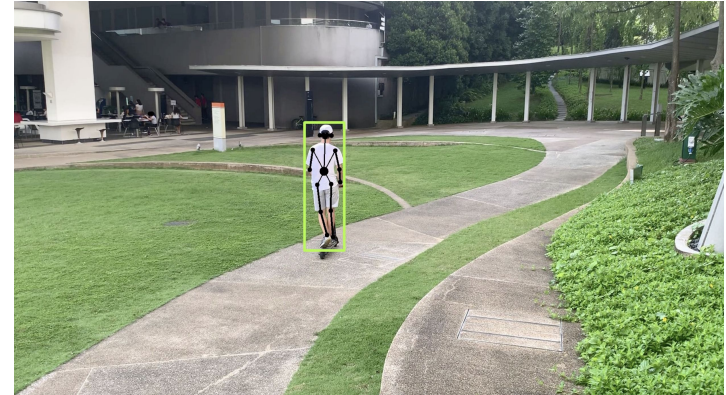
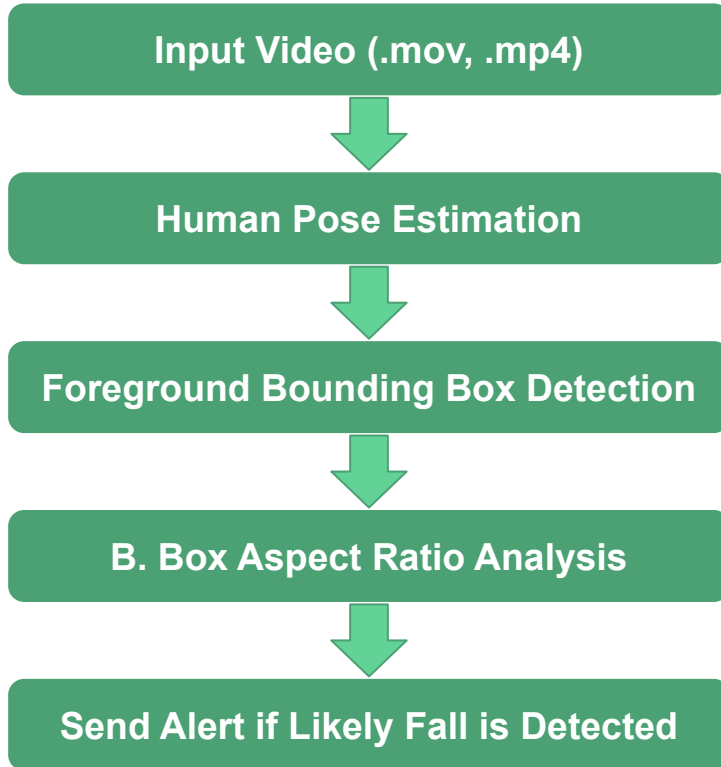


NUS Maps - Sign Recognition and Location Input with Optical Character Recognition

- Motivation:
 - Allow user to type less and get directions faster to commonly used locations
- How to use the feature:
 - Tap on designated button
 - Take photo or select photo from library
 - Tap “ok”
- Backend:
 - TesseractOCR Engine from Google



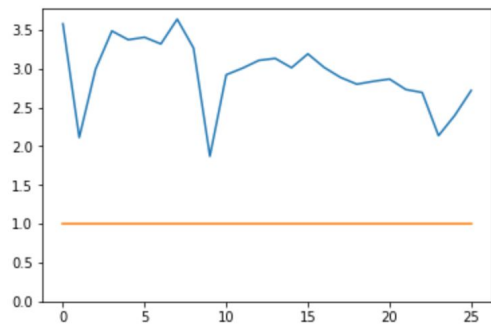
E-scooter Fall Detection using Bounding Box Aspect Ratio Analysis



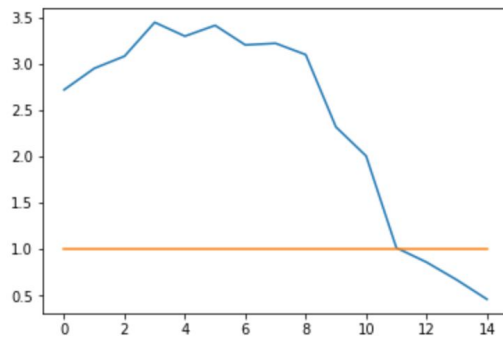
- Aspect ratio threshold to predict fall
- Aspect ratio rate of acceleration to distinguish between real fall versus crouching

Bounding Box Figures

Bbox Aspect Ratios against Time



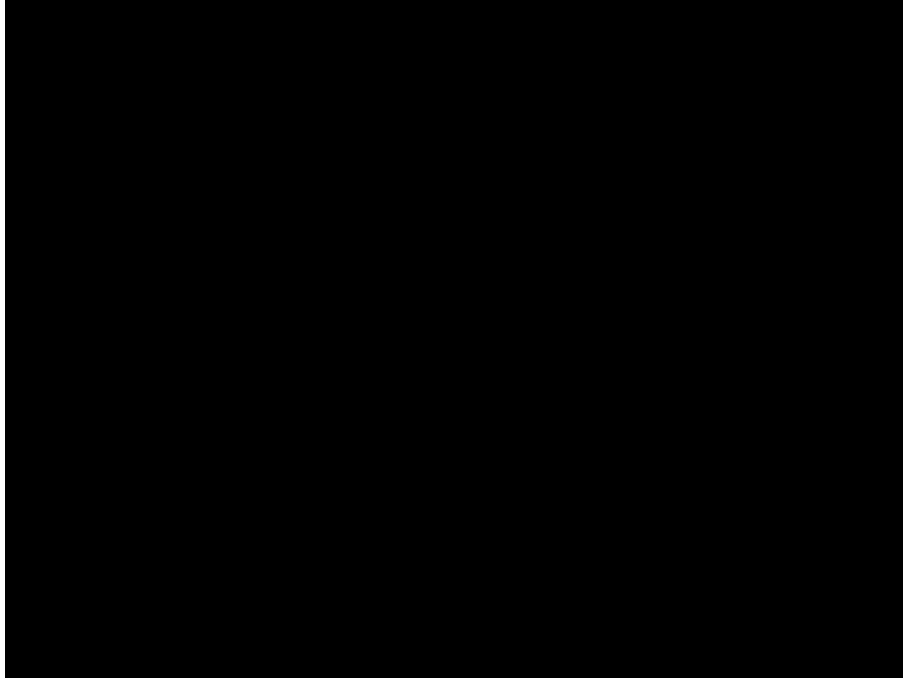
No Fall



Fall

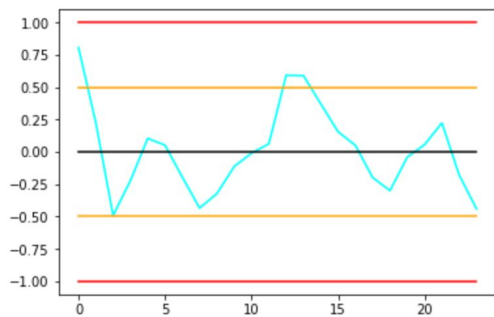
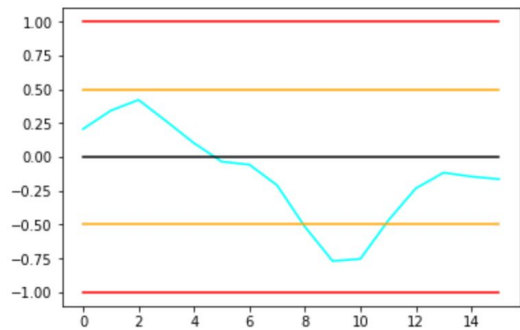
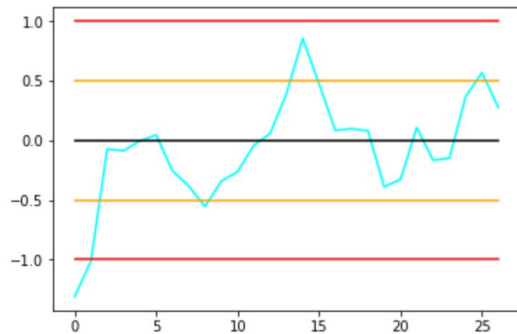
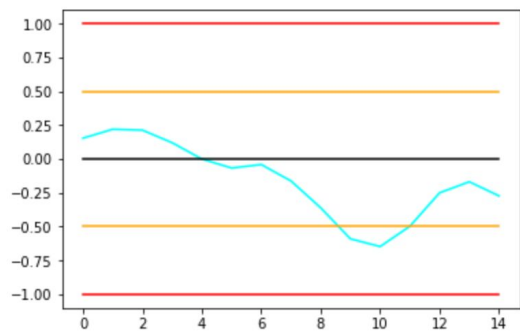


Video Demos



Bounding Box First Derivative Figures

- Distinguishing between falling and crouching
 - Intuition is that falling would cause faster rate of bounding box compression



Other Works in Progress

- Background Subtraction
 - Issues recognizing human figures
- Object (human) tracking with kernelized correlation filter
 - Bounding box does not compress during fall
 - Computationally expensive (i.e. significant processing and lag time)