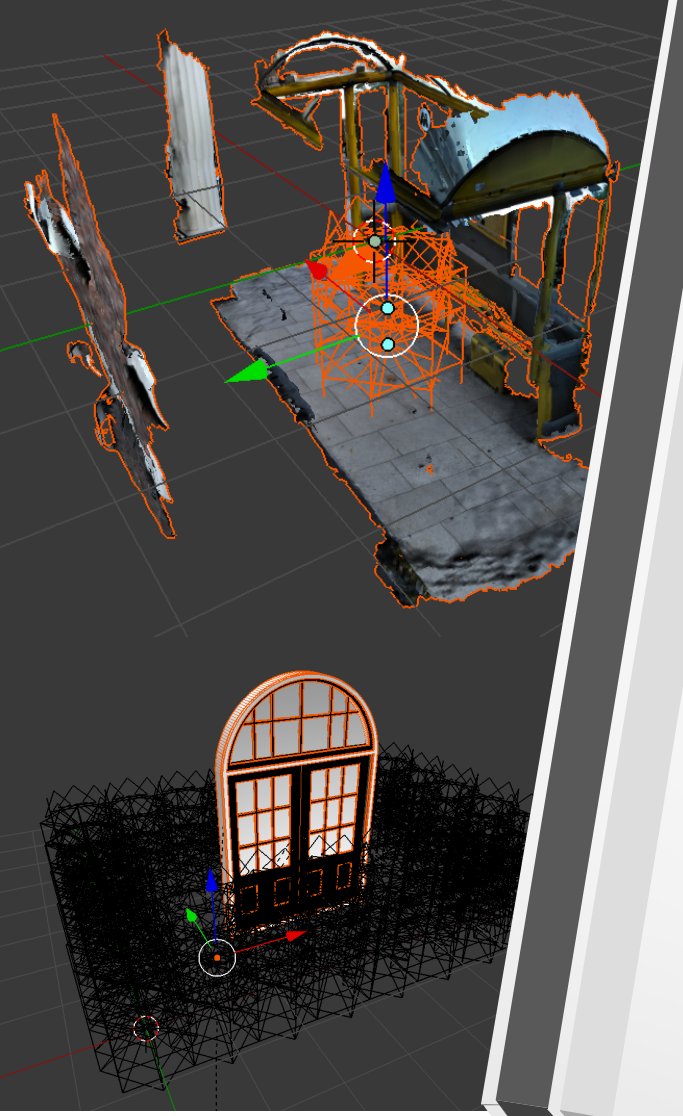
Creating a Geospatial Macro Level Feature Database

Final Presentation

Jason Brewer



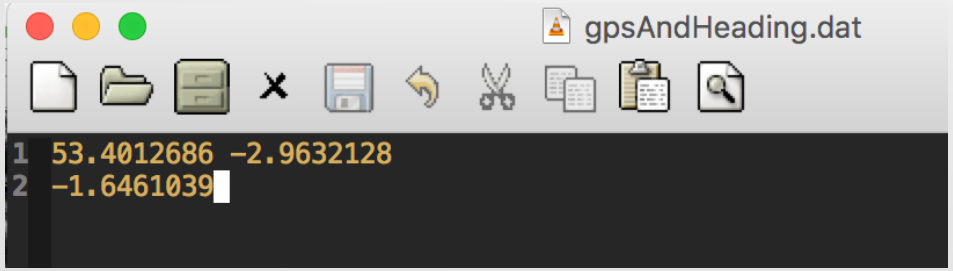
```
// Finds clusters in the initial D_se
// could be artifacts of the backgroun

void find_clusters(int normal_noise_thres
    {

    png_bytep row = NULL;
    png_bytep px = NULL;
    dataset cluster_dataset;
    cluster_analysis::dbscan cluster_finder(1.0f,
    cluster_analysis::dbscan_data clustering_resul
    cluster_analysis::cluster_sequence_ptr clusters_
```

Recap

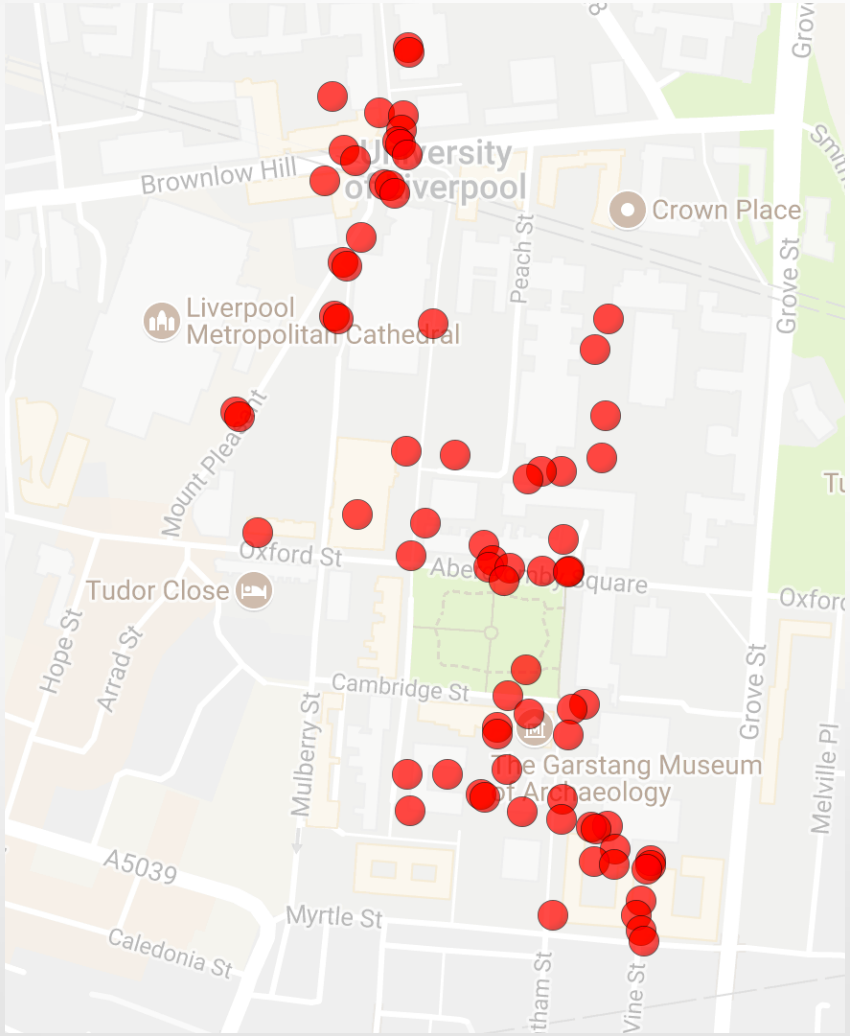
- The Siloam system aims to provide a data collection and analysis platform to assist BoVI users in their exploration of new outdoor areas
- Comprised of three parts:
  - Google Project Tango powered raw data collection app (SiloamSee)
  - Offline machine learning component (SiloamLearn)
  - Couchbase server powered online database (SiloamSilo)

Outputs

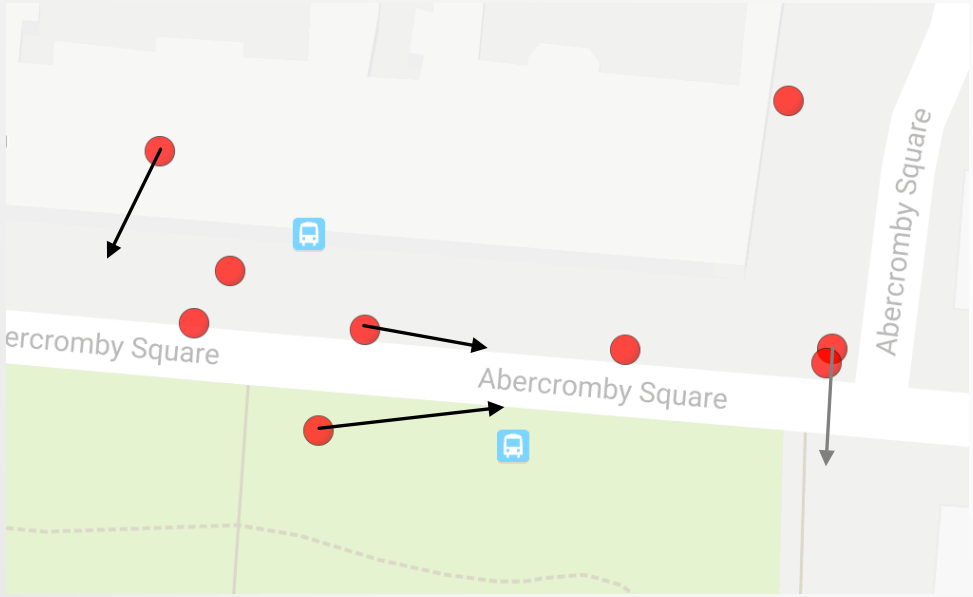
- SiloamSee
  - An extension of the RTAB-Map Android app by introlab (Interdisciplinary Robot Lab @ Université de Sherbrooke)
  - Adds GPS and magnetometer data logging
  - Each model captured in the wild is exported as an OBJ along with an associated .dat file with the GPS point of the capturer and angle from magnetic north in the range $-\pi < \theta < \pi$
  - This information is used by SiloamLearn to geocode each macro level feature

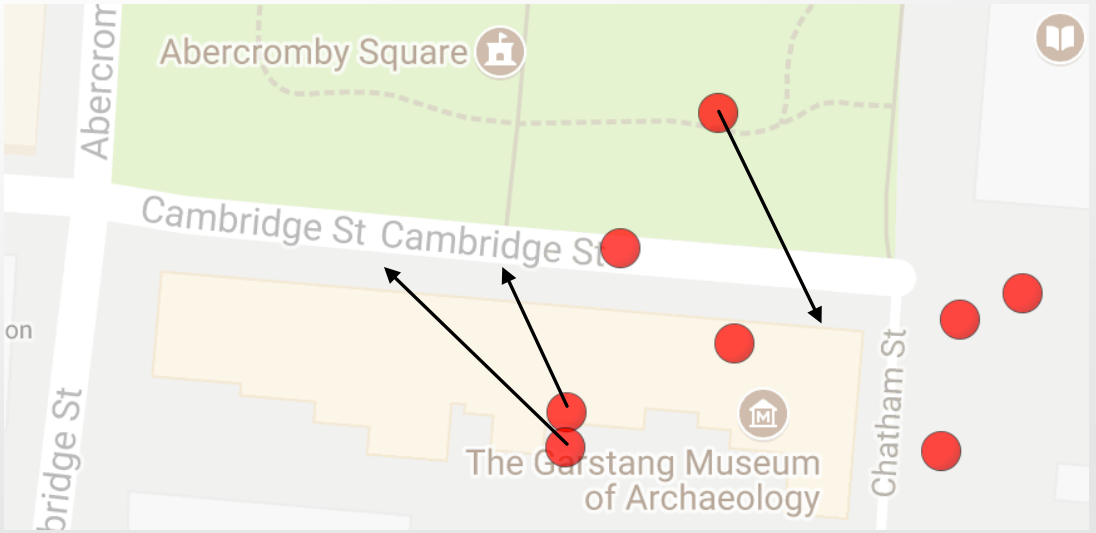


Data collection points



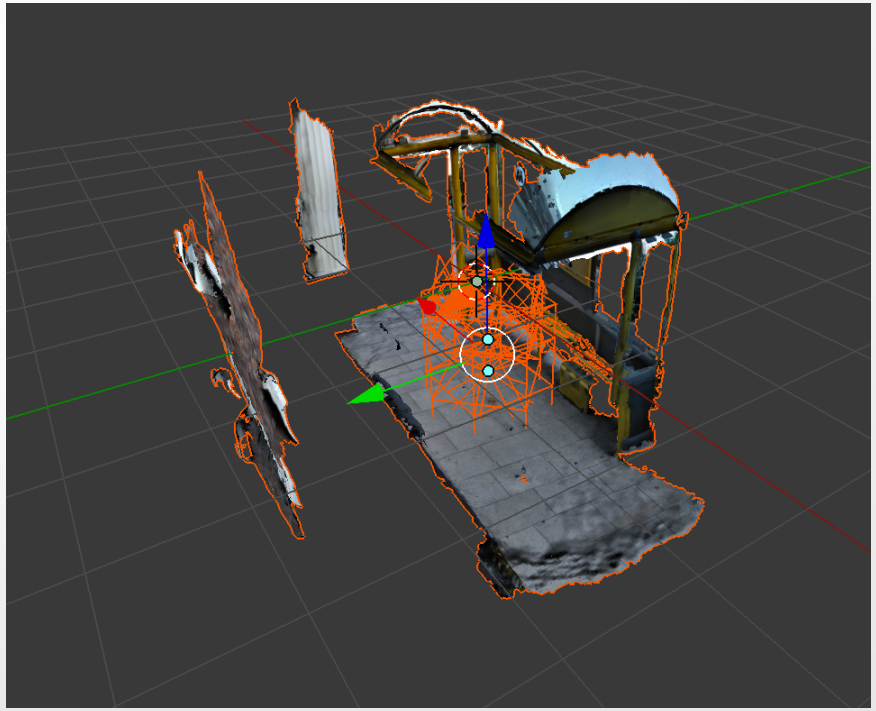
GPS inaccuracy





Data preparation: OBJ to RGB-D

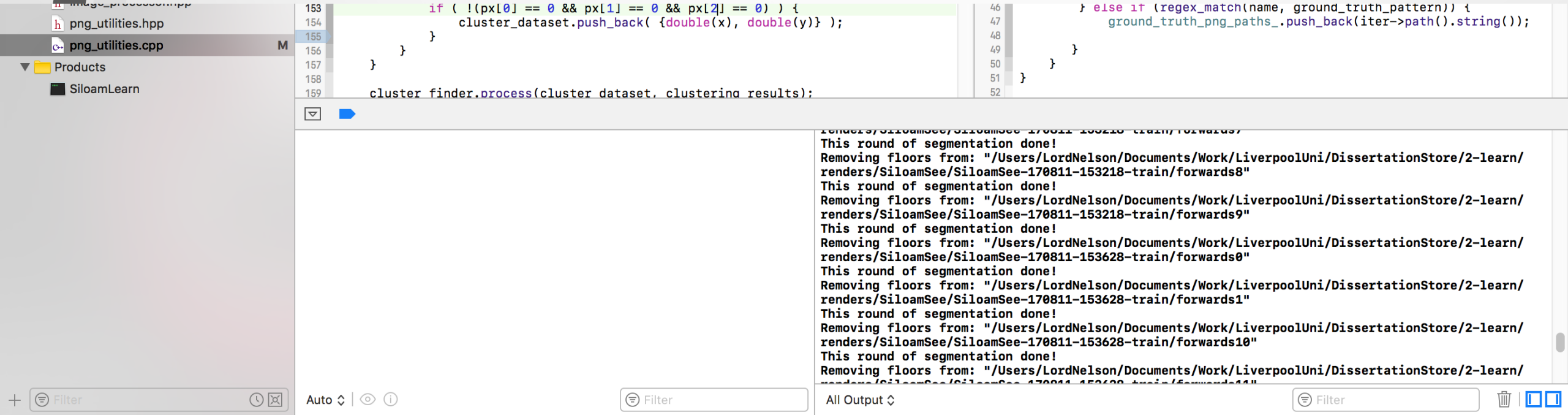
- The transition is completed via Python scripting in Blender, an open source 3D modelling application
- Generates RGB-D from SiloamSee models automatically
- Generating RGB-D data from Trimble Warehouse DAE models is a more interactive process



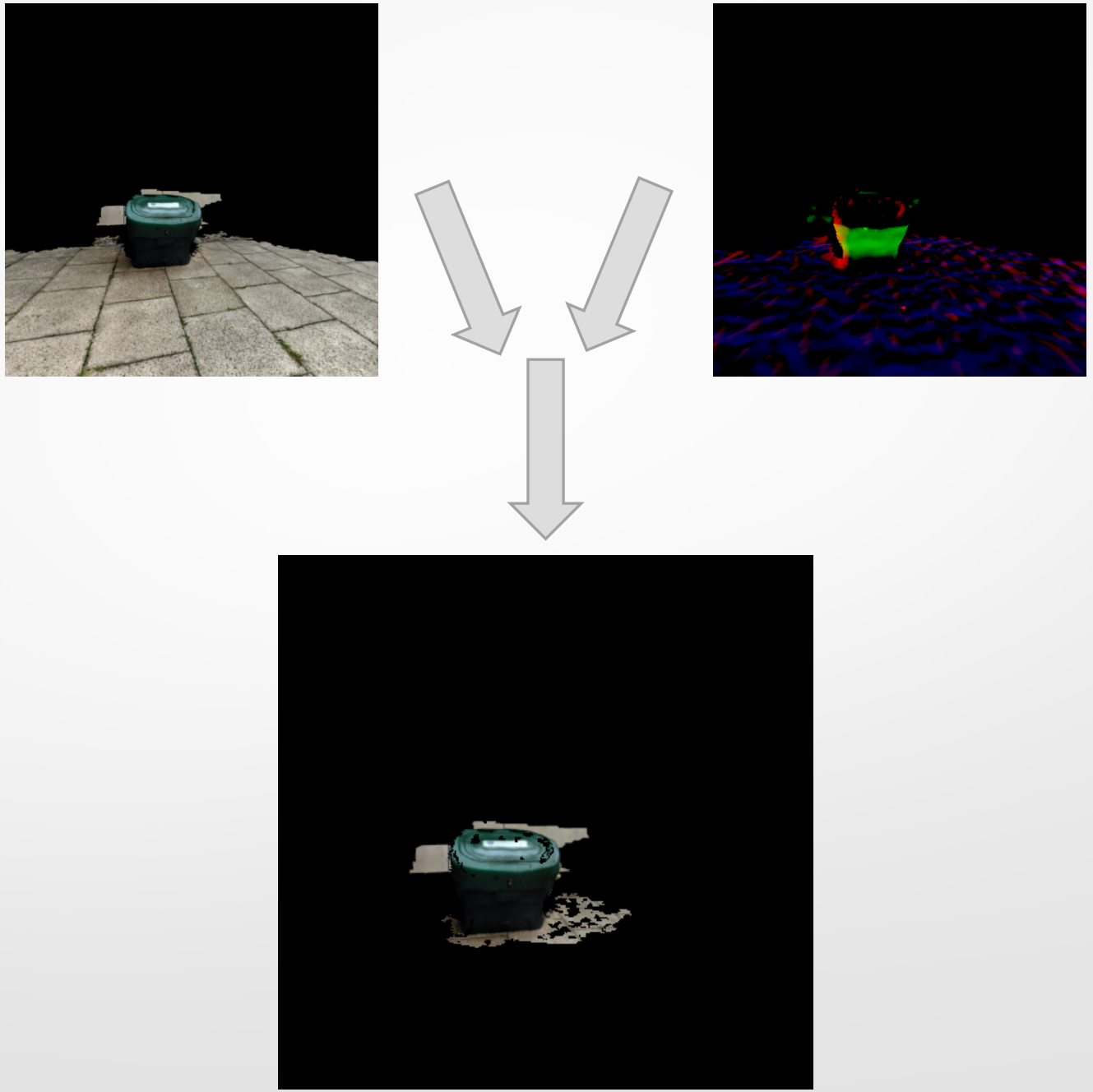
Outputs

- SiloamLearn
  - Prepares the data for the SVM using:
    - libpng
    - OpenCV
    - pyclustering (despite the name it is also a C++ library)

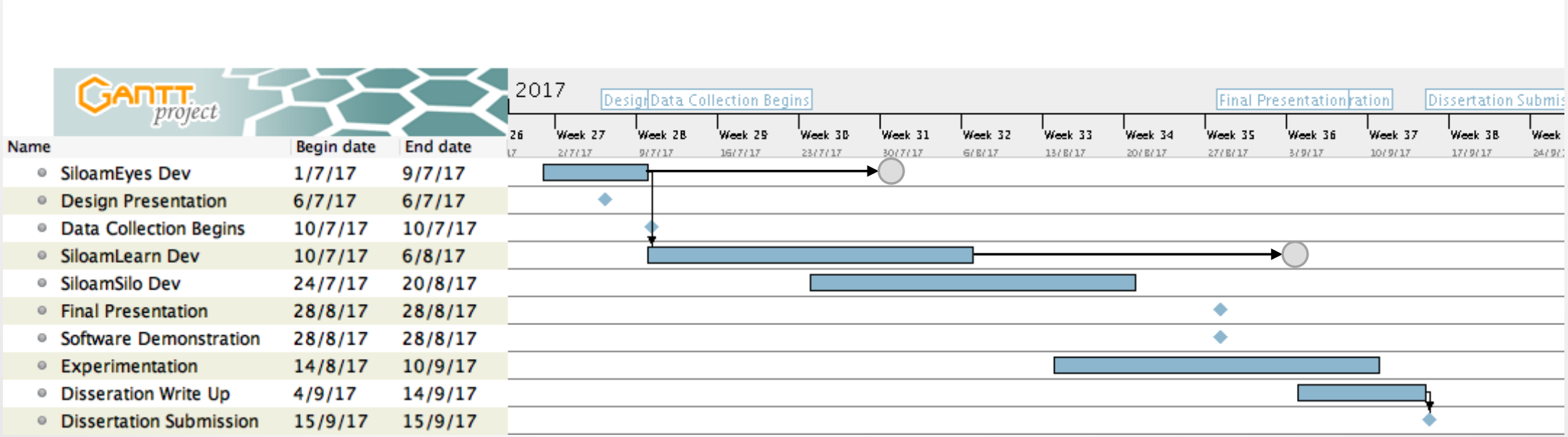
- The idea is that the SVM will be trained to detect four categories of feature from the RGB-D dataset:
  - Bus stop
  - Crossing
  - Doorway
  - Steps



Floor Removal



Evaluation



Name	Begin date	End date
SiloamEyes Dev	1/7/17	9/7/17
Design Presentation	6/7/17	6/7/17
Data Collection Begins	10/7/17	10/7/17
SiloamLearn Dev	10/7/17	6/8/17
SiloamSilo Dev	24/7/17	20/8/17
Final Presentation	28/8/17	28/8/17
Software Demonstration	28/8/17	28/8/17
Experimentation	14/8/17	10/9/17
Disseration Write Up	4/9/17	14/9/17
Dissertation Submission	15/9/17	15/9/17

- MoSCoW
  - Data collection and preparation 👍
  - Machine learning – very close to completion but experimentation with image segmentation required 👎

Further demonstration?