Imperial College London

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Weekly Meeting

Week 6

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Segmentation Progress

Tools

- Laspy
- Segment lidar : samlidar
- CloudCompare

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Result

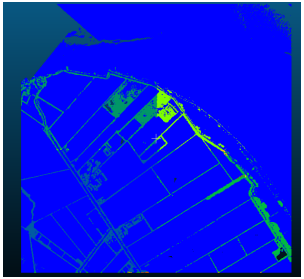

Figure 1: Segmented-LiDAR (Open with CLoudCompare)

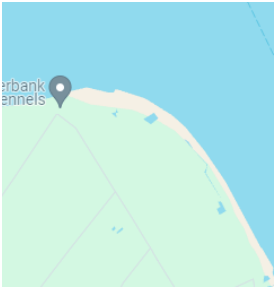

Figure 2: Location (source: Google Maps

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LiDAR Data Update

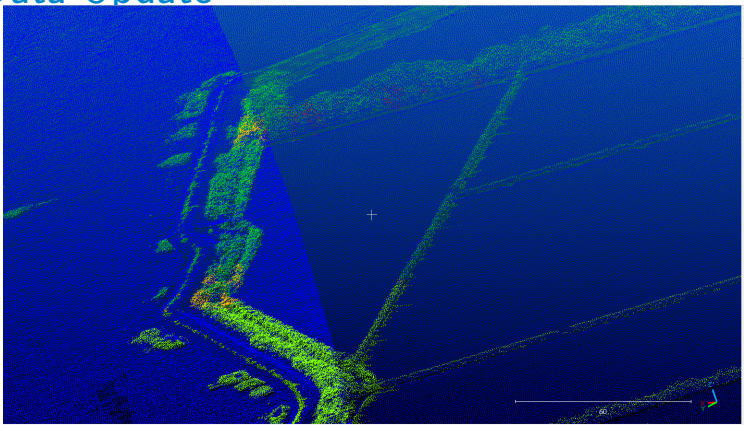

Figure 3: Segmented-LiDAR (Open with CLoudCompare)

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Data Normalisation

Min-Max Normalisation [1]

This linearly transforms data to fit the interval [0,1]

$$\tilde{x}_i = \frac{x_i - x_{min}}{x_{max} - x_{min}}. \tag{1}$$

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Data Normalisation

L2 Normalisation [1]

often used when fitting machine learning algorithms as a regularization method, e.g. a method to keep the coefficients of the model small and, in turn, the model less complex. L2 norm is the square root of the sum of the entries of the vector:

$$\begin{aligned} \|x\|_1 &= \sum |x_i| \\ \|x\|_2 &= \sqrt{\sum x_i^2} \\ \|x\|_p &= (\sum |x_i|^p)^{1/p} \end{aligned} \tag{2}$$

Classification

State-of-the-art: Decision Tree [1]

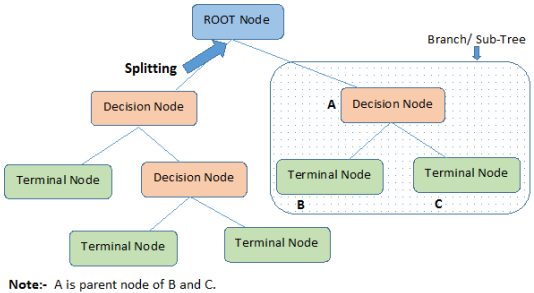

Figure 4: Decision Tree Illustration

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To Do List: Literature Review

- Deep Learning : concept of neural network, continuing learning in coursera.

Classification Methods:

- SVM Machine Learning
- K-Nearest Neighbours*
- Random Forest Classifier

Method:

- Point Cloud Segmentation

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Reference

[1] Nicholas Arnold et al. "Automatic extraction and labelling of memorial objects from 3D point clouds". In: *Journal of Computer Applications in Archaeology* 4.1 (2021).