Imperial College London

Department of Earth Science and Engineering

MSc in Environmental Data Science and Machine Learning

Independent Research Project
Final Report

Building a route optimisation system that takes elevation into consideration

by

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Abstract

Roughly 200-word.

1 Introduction

1.1 Discription of the problem

Summary of the problem.
Brief literature review.
Objectives and Hypotheses.
Tasks.

1.2 Literature Review

State-of-the-art solutions to the problem (including commercial and academic approaches).
How my project go beyond the state-of-the-art solutions, and original work I've done.

2 Methods

Technical back-end of solutions, describe if it is standalone code or an extension of a pre-existing code and ecosystem I made.
List development, operation tools, development methodologies, why.
Architectural design diagram of your solution if relevant.
Design rationale, implementation strategy, data structure, routine, verification and validation.
Algorithm, pseudo-code.
Creativity
Implementation platform, programming language, libraries.

2.1 Building 3D road network

Collecting 2D road information from OpenstreetMap, collecting elevation data from **** website. Integrate these two information tegother to do interpolation so that every node has assigned its elevation value. !The figure to show how to do interpolation. The integrate 3D road data is in json format.

Building network based on the point, tag data of the 3D road json file with NetworkX to build a graph network. This network can be used to calculate several information between any pairs of points in the graph. Information including 2D distance, 3D distance, traveling time. And this information can be added according to the purpose of the user.

2.2 Pointer Network for TSP problem of 3D road network

3 Results

Quantify the results.

4 Discussion and Conclusions

The most difficult tasks to resolve.
Strengths and limitations.
Next steps.

References