

COMPSCI 520
THEORY AND PRACTICE OF SOFTWARE ENGINEERING

FINAL PROJECT: ELEVATION-BASED NAVIGATION SYSTEM

by

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Software Requirements Specification (SRS)

Overview

The elevation-based navigation system is aimed at developing a system that determines the best route between two locations while taking into account elevation gain or loss. The system provides options to either maximize or minimize elevation gain, while also limiting the total distance between the two locations to a certain percentage of the shortest path.

Stakeholders

End Users: The primary stakeholders of the elevation-based navigation system are the end users, which could be hikers, cyclists, drivers, runners, or outdoor enthusiasts. They are the ones who will be using the system to plan their routes based on elevation gain or loss and distance limitation. The system should cater to their needs and preferences, providing an intuitive interface and accurate route recommendations.

List of Features

The elevation-based navigation system will have the following features:

- 1) Start location, end location and elevation input
- 2) Displaying all possible routes between source and destination
- 3) Displaying min and max elevation along the path for all routes
- 4) Distance limitation
- 5) Map visualization
- 6) Select the route and write reviews
- 7) See reviews from other users

Functional Requirements

The functional requirements of the elevation-based navigation system are as follows:

- 1) Input of start and end locations: The system allows users to input their desired start and end locations.

- 2) Route finding: The system displays all possible routes between the start and end locations with a choice of different algorithms (including Dijkstra, BellmanFord and GoogleMaps API algorithms).
- 3) Elevation display: The system displays minimum and max elevation along the path for each possible route.
- 4) Distance limitation: The system shall limit the total length of suggested paths between the two locations to a certain percentage of the shortest path as specified by the user.
- 5) Map visualization: The system shall display the optimized route on a map with elevation profiles for visualization.
- 6) User customization: The system would allow users to customize their preferences for elevation gain, distance limitation, and route options.
- 7) Save and load routes: The system would allow users to save and load previously optimized routes for future reference.
- 8) Sort suggested routes: The system shall allow users to sort the suggested routes with respect to total distance or total elevation.
- 9) Reviews : The users will be able to review the path by clicking on the route information displayed beside the map.
- 10) Add review: The user will also be able to write a review by clicking on the add review button.

Non-functional Requirements

The non-functional requirements of the elevation-based navigation system are as follows:

1. Performance: The system provides fast and efficient route finding while displaying min and max elevation along each route.
2. Reliability: The system provides reliable and accurate route recommendations based on
3. Usability: The system would be user-friendly, with an intuitive interface and easy-to-understand navigation options.
4. Scalability: The system would be scalable to handle a large number of users and routes.
5. Security: The system would ensure the security and privacy of user data, including start and end locations.