EleNA : Elevation Based Navigation

Indentation&Semicolon

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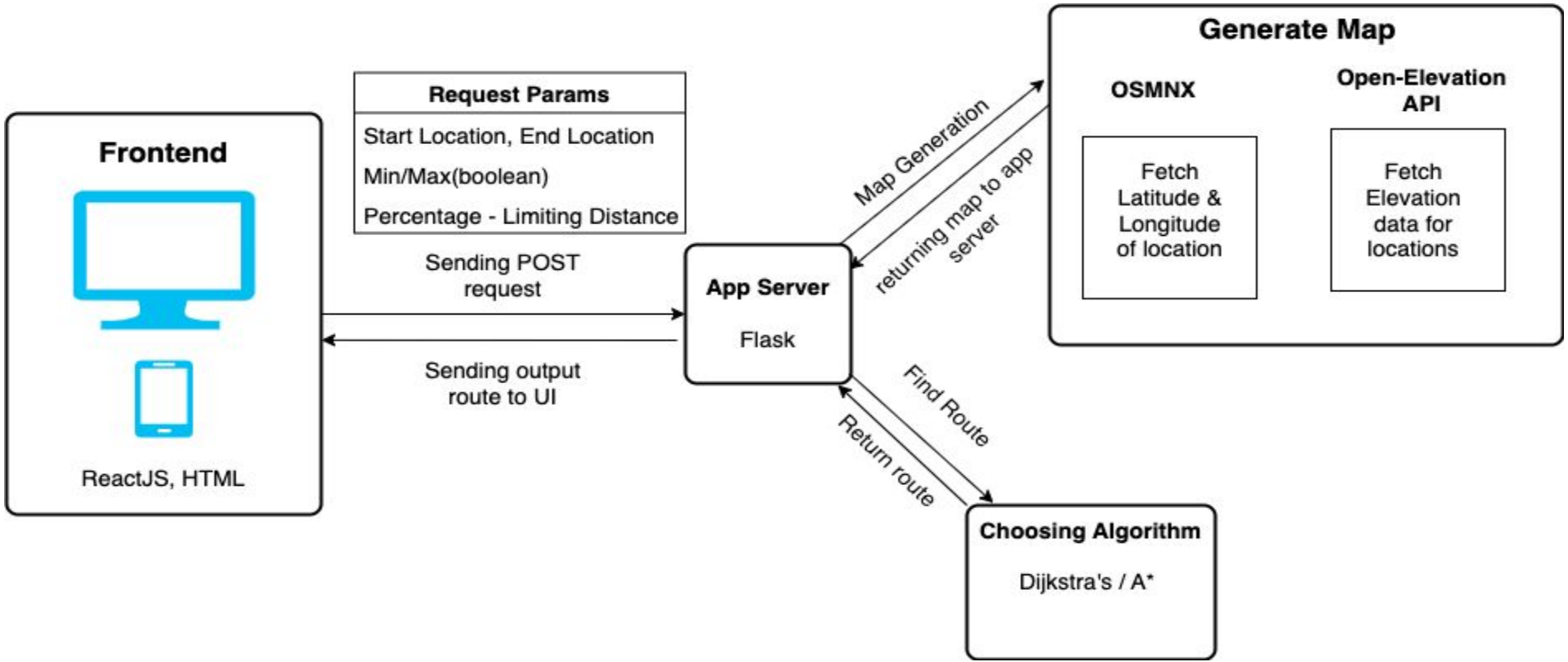
Problem Statement

Elevation-based Navigation (EleNa) is an application that, given a start and end location, computes a route that maximizes or minimizes the elevation gain and limits the total distance between the locations to x% of the shortest path.

Maximizing the elevation gain could be useful to joggers/bikers who may be looking for an intense workout. On the other hand, minimizing the elevation gain could be useful for those who don't prefer steep climb in the the route.

Architecture



Backend Algo

- App server receives the user's POST request containing source, destination, min/max(boolean) and shortest path percentage.
- Generates the Map using OSMNX(finds latitude and Longitude of locations) and Open-Elevation API(provides elevation data of locations)
- App server receives the Map Information and passes it to a routing algorithm(Dijkstra's or A*) to find the route
- App server receives the route and sends the response to UI

Tools:

- Flask API (Python)

Frontend GUI

UI contains following components

Inputs:

- Source and destination address
- The shortest path percentage
- The max or min elevation button selection

Outputs:

- The Map
- The Output Route

Tools:

- ReactJS, HTML

Evaluation

Testing scope includes

- Location Validation
- Path Elevation
- Path Length
- Path Validation
- Location Coordinates
- Dijkstra Algorithm
- A* Algorithm

The Plan

Development

Front End: Tushita Singh, Sai Vineeth Kumar Dara
Timeline - 2 weeks

Back End: Rohith Siddhartha Reddy Bheemreddy, Rachana Ponagandla
Timeline - 6 weeks

Testing (Functional and Non-Functional)

Unit Tests
Timeline: 1 week