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Route planning app for electric vehicles

Application overview



- Battery range calculation
- Charging stations designation
- Optimal itinerary preparation

EV route planner application importance

- Overcoming “Range Anxiety”
- Reducing pollution
- Transition to using renewable energy sources



Used technologies

BackEnd

- C# .Net Core

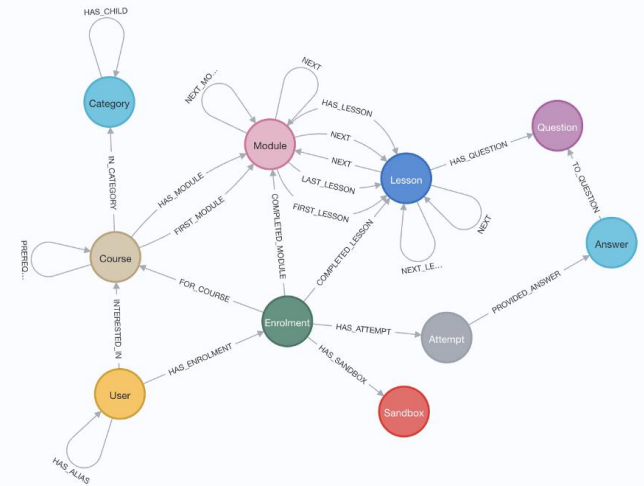
.NET Core

Database

- Neo4j graph database
- Data processing : Python – Jupyter Notebook

BackEnd-FrontEnd communication

- REST API





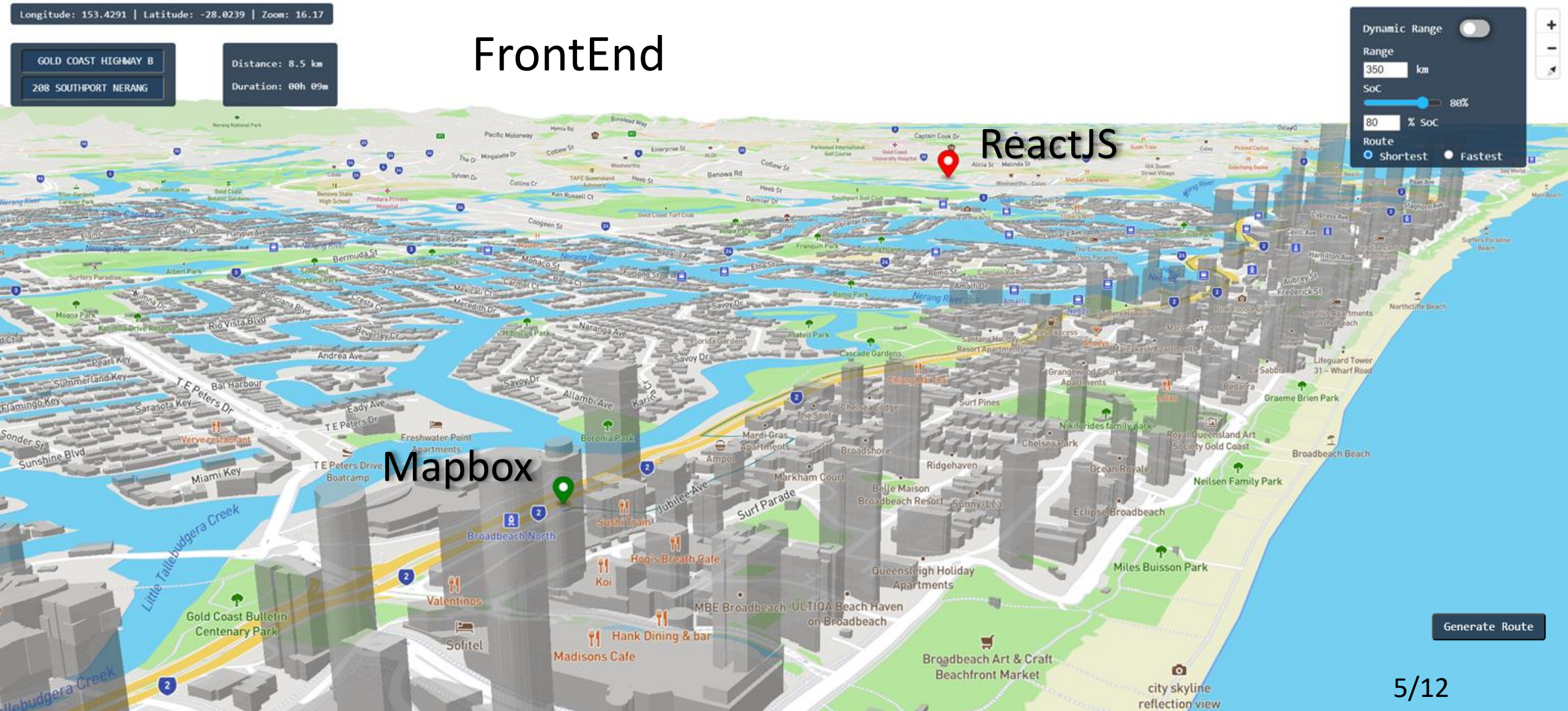
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Used technologies

FrontEnd

ReactJS

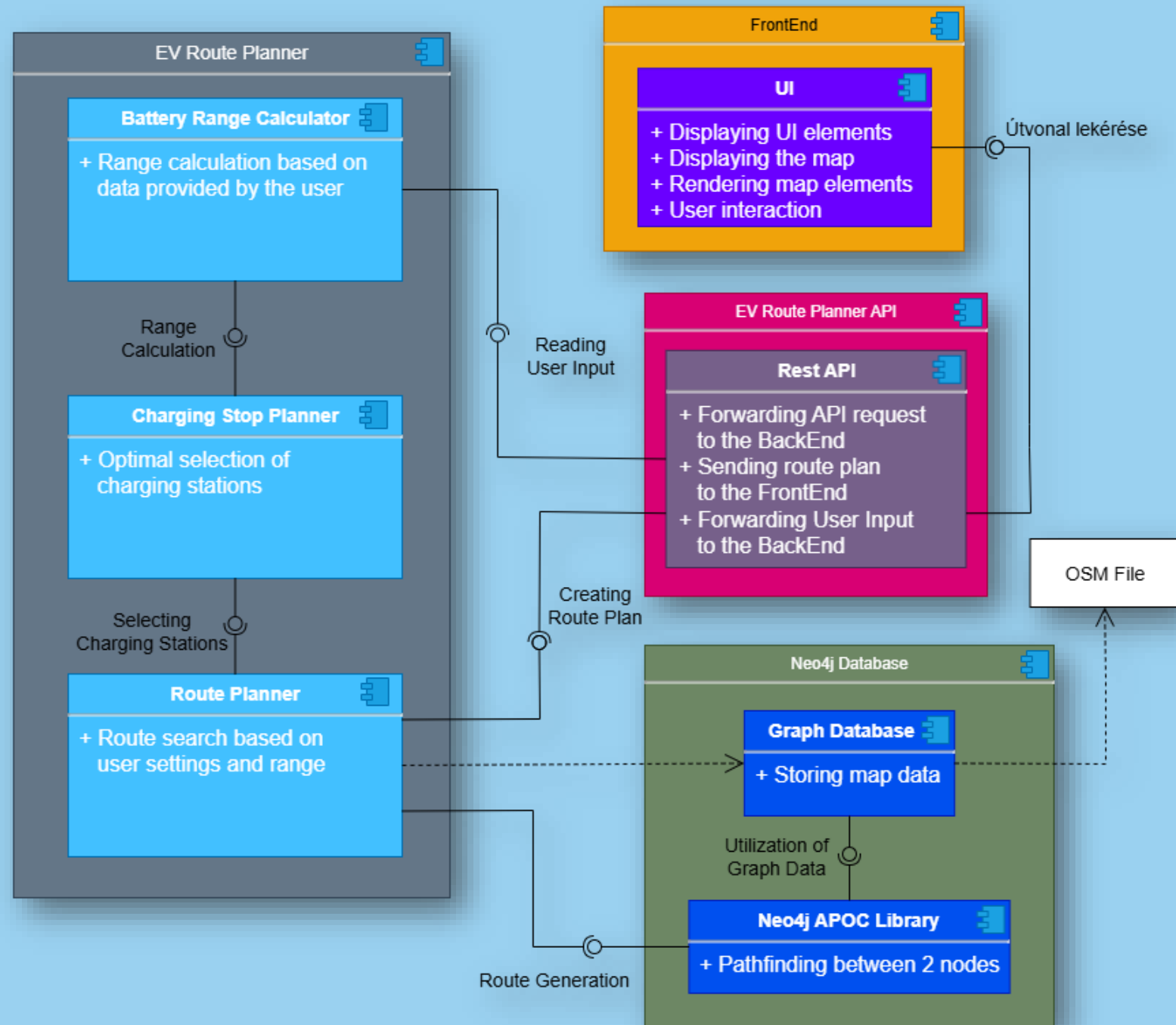
Mapbox



System plan

Components

- Neo4j Database
 - Graph Database
 - Neo4j APOC Library
- EV Route Planner
 - Battery Range Calculator
 - Charging Stop Planner
 - Route Planner
- EV Route Planner API
 - Rest API
- FrontEnd
 - UI

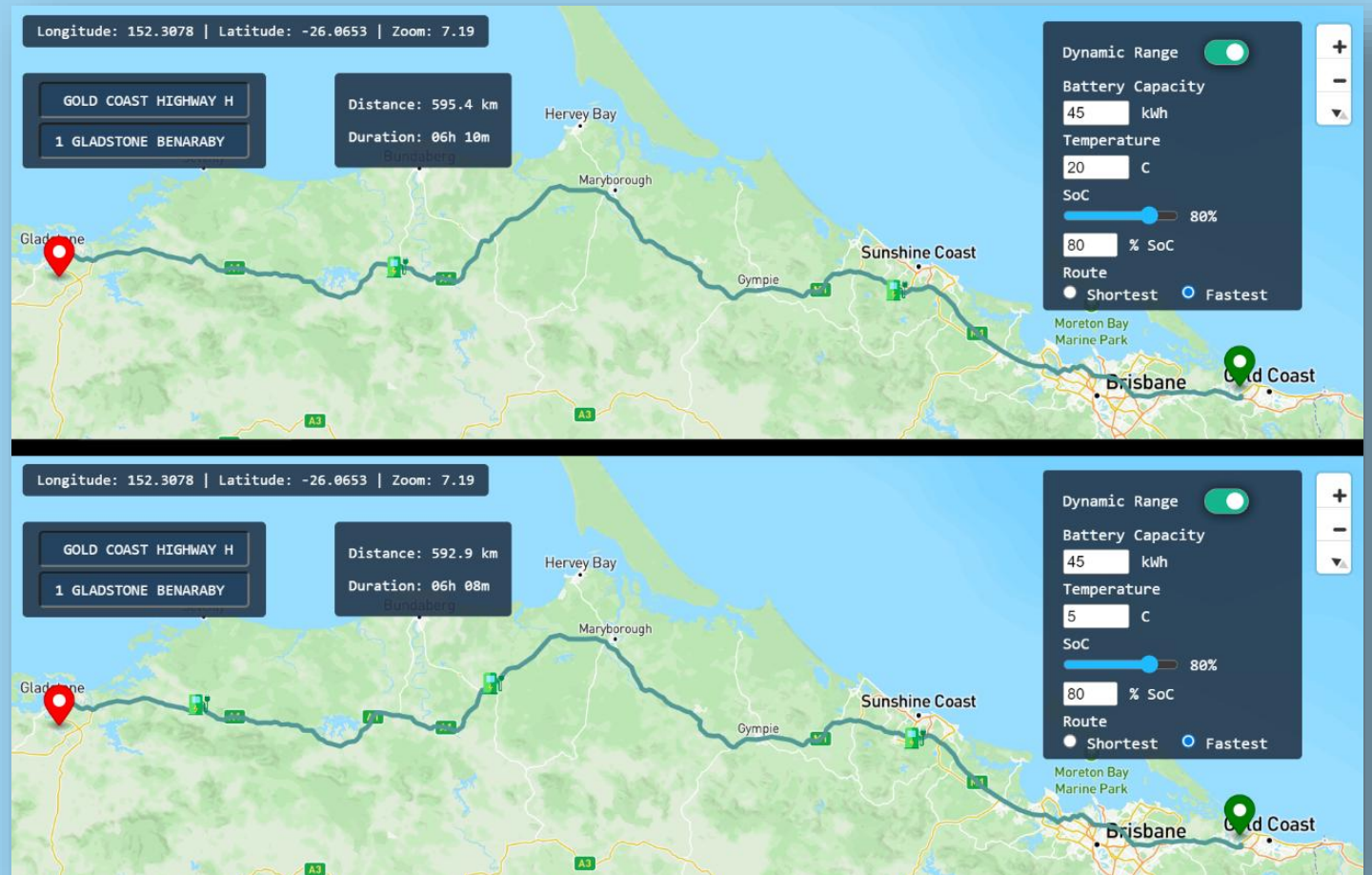


Program operation

Temperature effect the route planner

–Dynamic Range

- 20°C
2 charging stations
- 5°C
3 charging stations
Other chargers



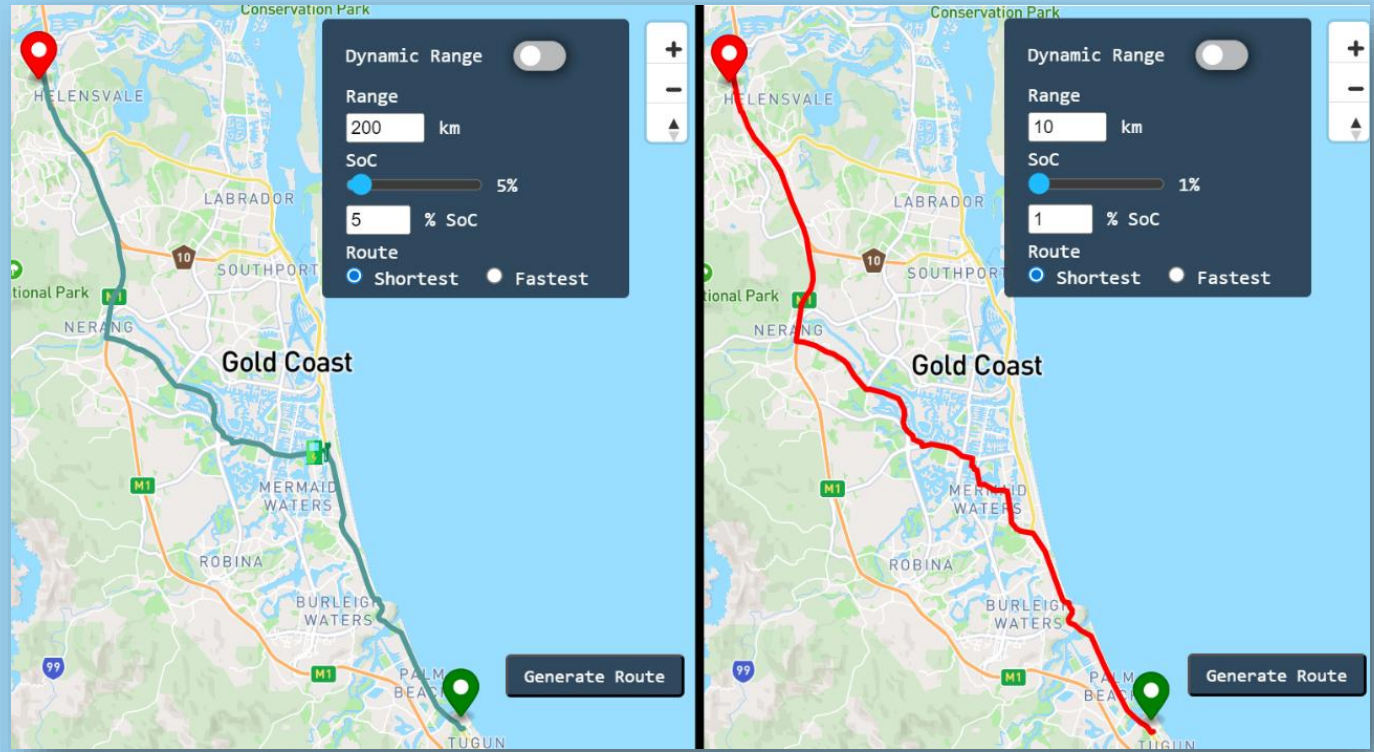
Program operation

Successful route

- Green line
- Found filling station

Unsuccessful route

- Red line
- No sufficient filling station

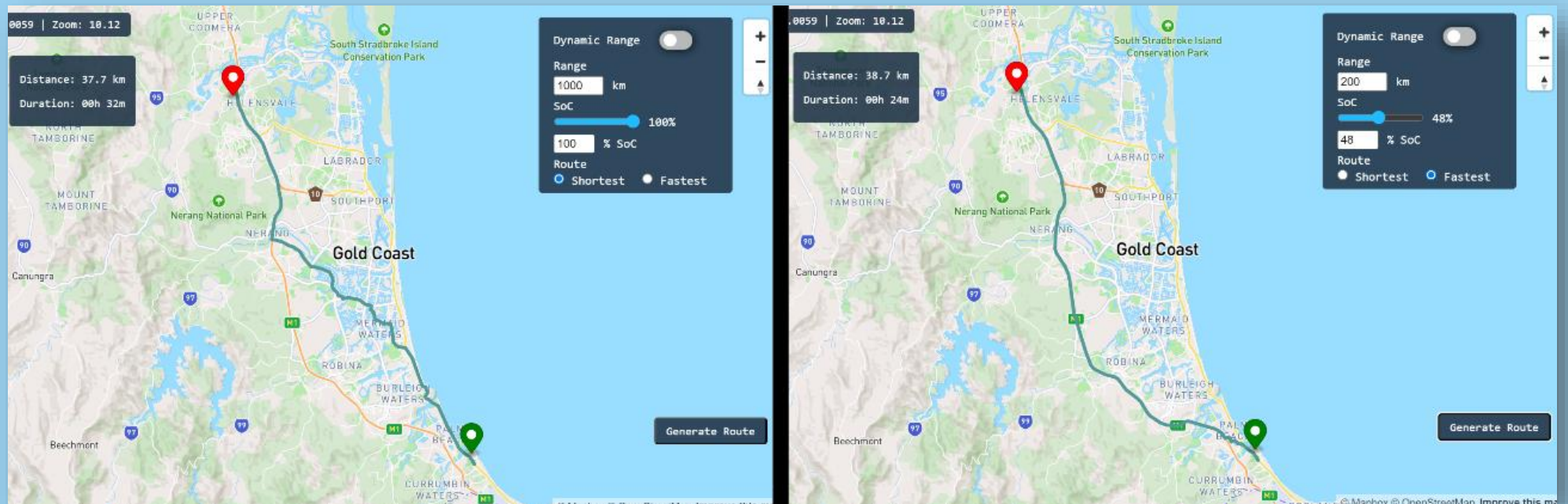


Program operation

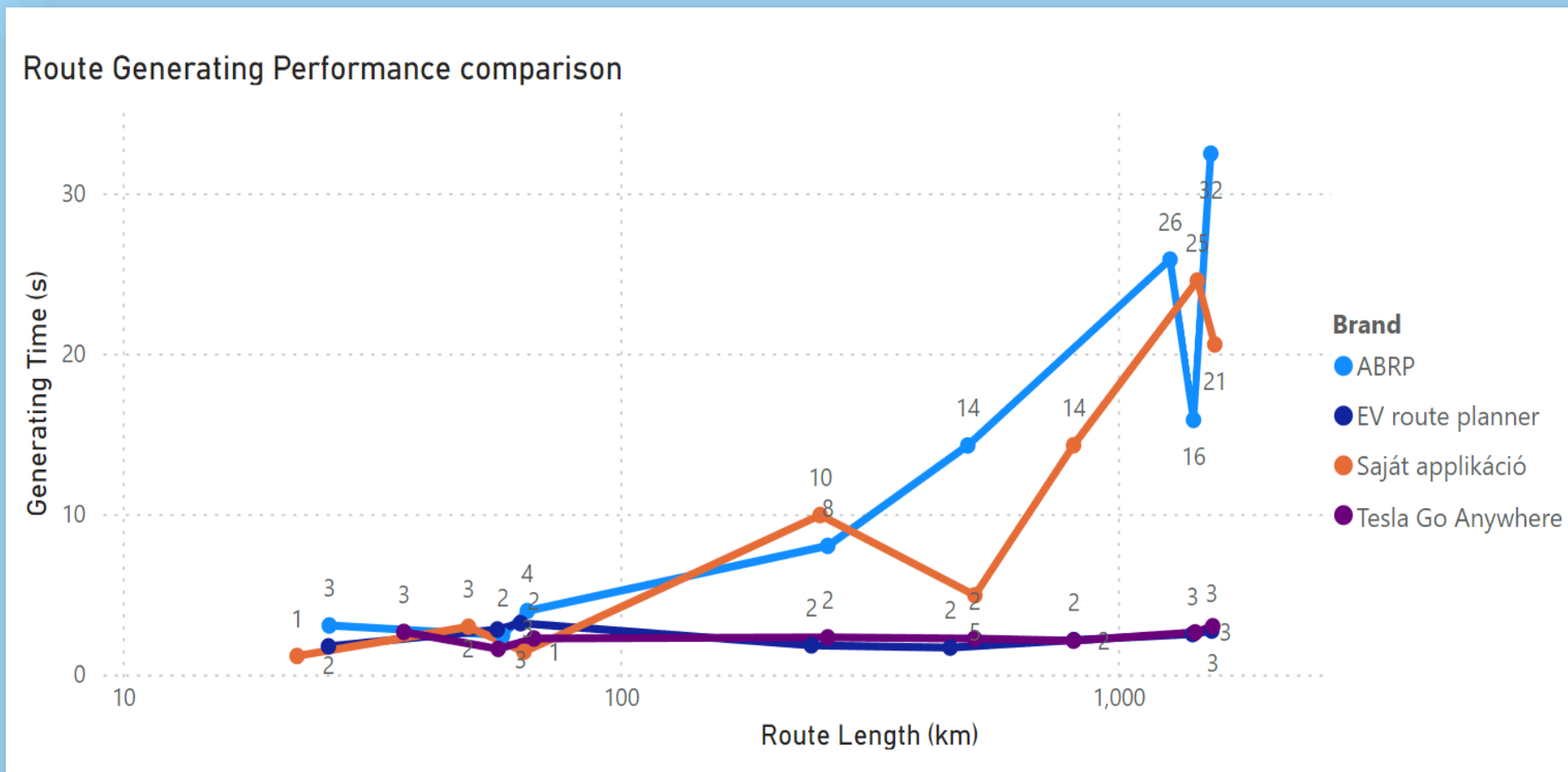
Route generation ways

- Shortest route

- Fastest route



Path generation performance



Further development opportunities

- EV database
 - Use simplification
 - More accurate range calculation
- Range calculation
 - New parameters
 - Weight load
 - Air resistance
 - Individual driving style
 - Real time weather
- Performance increase
 - A*, Yen's algorithms
 - Generation logic
 - Shorter road sections
- Real time traffic
- Map database extension



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Thank you for your attention!