SIEMENS Gamesa
RENEWABLE ENERGY
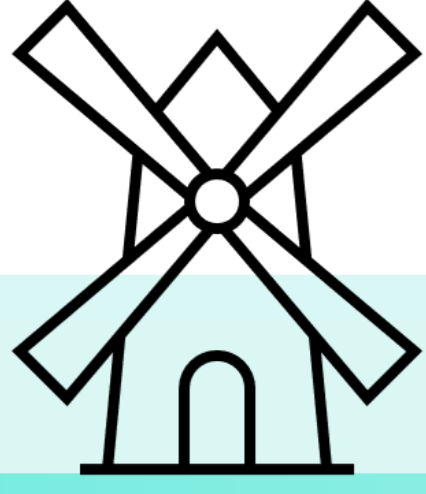
FISHING FOR EXPERIENCE

Development of Routing Tool for High and Heavy Cargoes

Problem Statement

Transportation of large and heavy components like wind turbines weighing 95t and height of 4,50m needs prior route planning. Normal routing systems (e.g. google maps) only consider restrictions for a standard truck (max 4,00m height) and can therefore not be used for oversize trucking. Data available (company + publicly available) can be used to develop a routing tool that considers different potential obstacles and finds a suitable route from a defined point of entry to any site in Germany. In addition, SGRE is highly interested to find out, which parts of Germany can be reached with given component dimensions from different port of import

Objective & Challenges

1. Provide GPS navigation for heavy cargo considering different potential obstacles.
2. Avoid weight and height-restricted roads, Prioritising autobahn.
3. Comprehending public-available data.
4. Comparing and merging public and private data.
5. Defining the constraints to be used
6. Scaling the developed tool

Methodology

1. **Data**: Aggregates data from bund.de and Siemens Gamesa, including road restrictions, bridge heights, and truck weight limits. Constructs a custom graph-based model using existing datasets for optimal route planning.
2. **Technologies**: Backend: Python (Flask) for API and data processing. Frontend: HTML, CSS, JavaScript for user interaction. Libraries: networkx, OpenStreetMap for graph-based navigation and leaflet.js for map visualisation.
3. **User Input**: User input start and destination coordinates. Option to specify vehicle height and required bridge clearance. Supports multiple route calculations based on user preferences.
4. **Testing**: Simulated testing using predefined datasets.

Key Features

1. **Truck-Safe Routes:** Avoids restricted roads and bridges to ensure safe navigation for heavy cargo.
2. **Height Consideration:** Provides custom routing based on different truck sizes and cargo height.
3. **Bridge Condition Analysis:** Evaluates bridge conditions when data is available, helping drivers avoid potential hazards.
4. **Autobahn-Focused Routing:** Prioritizes major highways (Autobahns) for better road conditions and efficient transit, minimizing reliance on local roads.

Results

1. **Best Route Finder:** Provides optimal routes for heavy cargo transportation.
2. **Autobahn Priority:** Focuses on major highways (Autobahns) for smoother and faster transit.
3. **Heavy Cargo Navigation:** Tailored for trucks with specific height requirements.
4. **Bridge Alerts:** Highlights routes in red where bridges are present, but clearance heights are unknown.
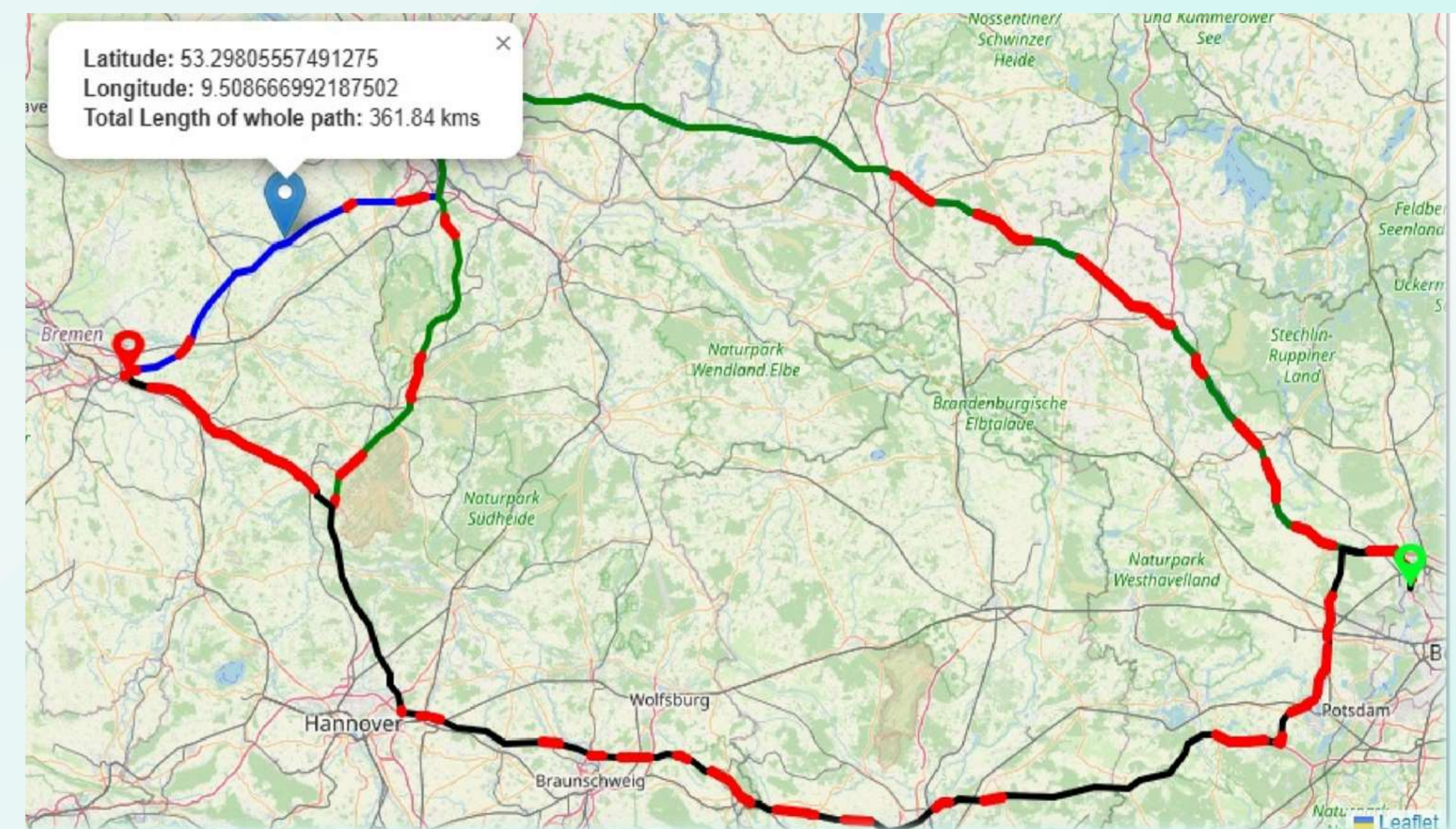
Future Scope

1. Software can be extended to consider -
   - Permissible total weight
   - turning circles at highway exits and crossings
   - construction sites on highways
   - real-time traffic obstructions
2. Extension to other EU countries could be considered

Team

Team members	Task areas	Devoted time
Shivam Suri	Scrum Master, Developer	120 hrs
Nayana Umashankar	Product Owner, Developer	105 hrs
Doğa Bahar	Developer	110 hrs
Mayank Nagar	Developer	110 hrs
Raksha Prasad Aggunda	Developer	105 hrs
Sparsha Aralaguppe Channabasavanna	Developer	100 hrs

Demo Video

SCAN ME