OceanNext Consulting

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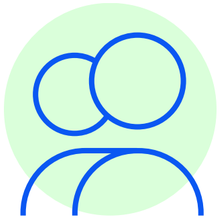
Our Mission Statement

Deliver innovative solutions to prioritize ecological preservation for non-programmers.

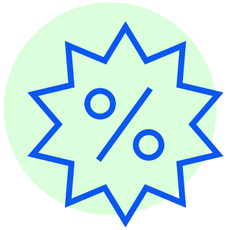
Objectives



Provide a accessible software for F.I.N.

Increase profits while minimizing costs

Optimizing resource use



Optimize resource collection while preserving natural resources

Provide flexibility in customer input

Simple, Insightful, Efficient

Overview

- Read and process CSV data server-side
- Process into internal data schema leveraging custom metrics for algorithmic analysis
- Hybrid algorithm: Dynamic Programming and Greedy algorithm
- Minimax approach to determine if square is ideal for drilling locations
- Present heat-map user interface for strong visualization

Dataset analysis

- All resources and preservers were used in the analysis
- User can select resources, and preservers to customize resource preferences
- Wind data is used to ensure safe drilling and avoid risk of damaging preserves

Algorithm

- Dynamic and heuristic hybrid approach to optimize performance and accuracy
- Divided large solutions into sub problems which were evaluated and acted on accordingly
- Each move the rig has to make is dependent on its previous move
- Next location with the maximum net value of resources minus preserves, considering the constraints, such as land and location range

Tech Stack

React

Flask

NumPy

pandas

Frontend Design

- Responsive frontend UI built with Javascript using React and MaterialUI
- Queries backend using Axios
- Easy to navigate single page application
- Allows for desired resources and preserves to be selected and used in calculation
- Displays heat map of ocean grind
    - Updates heat map data based on day
    - Displays optimal location of drilling rig
    - Displays location of land masses

Backend Design

- Flask is a lightweight web application framework in Python
- Enables building web apps quickly with minimal setup
- REST API endpoints
- Flask Blueprints
- Flask Application Factory Pattern

Software Architecture

- Scalability
- Increase Cohesion
- Product Management
- Abstract business logic from UI

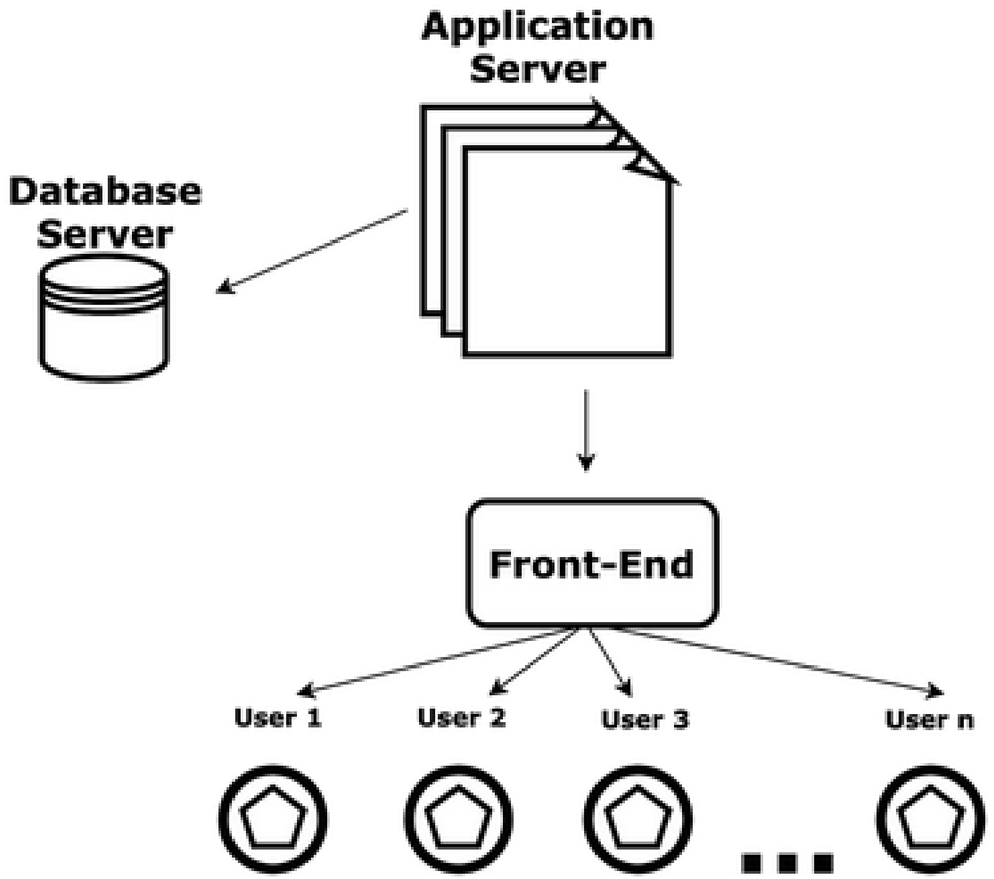


Figure from openclassrooms.com

Our Next Steps

01.

Improve algorithm analysis

02.

Improve code modularity

03.

Improve resource representation and track rig path

04.

User data input