**Proposal: Intelligent Shipping Routing Optimization System**

**Introduction/Description**

The shipping industry is the backbone of global trade, however, inefficient routing can lead to increased costs, environmental impact, and delays in delivery. This thesis project aims to develop an Intelligent Shipping Routing Optimization System. By leveraging Python, Django for web deployment, integrating QGIS for spatial analysis, and utilizing historical databases, the system will optimize shipping routes for enhanced efficiency, cost-effectiveness, and environmental sustainability.

### Similar or Relevant Work

**Marine Traffic: Real-Time Ship Tracking and Routing**

* Marine Traffic provides real-time ship tracking and offers suggestions for optimal routes based on current conditions.
* https://www.marinetraffic.com/en/ais/home/centerx:-12.1/centery:24.2/zoom:4

**NavalRoute: An Intelligent Routing System for Naval Vessels**

* NavalRoute addresses the need for efficient routing of naval vessels, employing advanced algorithms for route optimization.
* <https://porteconomicsmanagement.org/pemp/contents/part1/interoceanic-passages/main-maritime-shipping-routes/>

**OptiRoute: Optimizing Shipping Routes**

* OptiRoute is a similar project focusing on optimizing routes through advanced algorithms and GIS integration.
* https://devpost.com/software/optiroute-plwdcg

Main Functionality

* User Interface:
  + Web-based interface developed using Django framework.
  + User authentication and access control.
  + Interactive map interface powered by QGIS for visualizing shipping routes and data.
* Data Management:
  + Integration with historical shipping databases.
  + Real-time data retrieval and updates.
  + Data preprocessing and cleaning for route optimization algorithms.
* Route Optimization Algorithms:
  + Development of efficient algorithms for route optimization.
  + Consideration of multiple factors such as distance, time, weather conditions, traffic, and fuel consumption.
  + Incorporation of machine learning techniques to learn from historical data and improve route selection.
* Environmental Sustainability:
  + Integration of environmental impact assessment models.
  + Calculation of carbon emissions and fuel consumption for different route options.
  + Identification of environmentally friendly routes to minimize the ecological footprint.
* Cost Optimization (Optional):
  + Incorporation of cost-related parameters such as fuel prices, port fees, and tolls.
  + Optimization of routes to minimize transportation costs.
  + Comparison of different route options based on cost-efficiency.
* Performance Monitoring (Simulation):
  + Tracking and monitoring of shipping vessels in real-time.
  + Generation of reports and visualizations to provide insights into the system's performance.
* Integration and Deployment:
  + Integration of the system with external APIs and services for data retrieval and analysis.
  + Deployment of the system on a web server for accessibility and scalability.