HYDERABAD SWM OPTIMIZATION

Integrated Submission Manual

Team RouteMind

nVisionX'26 Design Challenge

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1. Project Overview

Hyderabad Waste Optimization uses a Hybrid Genetic Algorithm - Simulated Annealing (GA-SA) solver to optimize 1,583 collection points. Our solution reduces carbon intensity to 0.57 kg CO2/T and achieves 100% GVP coverage with 108 vehicles.

Folder Structure

- /Website: Interactive Infographic & Live Simulation.
- /manual_run: Terminal-based analysis engine (Python).
- /QGIS_Visualization: Raw geospatial project files & datasets.
- /core & /data: Technical simulation components.

2. Interactive Infographic Guide

The interactive dashboard allows you to explore the optimized routes and live simulation telemetry.

How to View

1. Open the /Website folder.
2. Double-click index.html to open in your browser.
3. Ensure you have an active internet connection for map tiles and telemetry charts.

3. Technical Analysis Run (Terminal)

For technical verification, you can run the production-grade GA-SA solver manually from the terminal.

Execution Steps

1. Open your terminal in the /manual_run directory.

2. Install dependencies:

```
pip install -r requirements.txt
```

3. Run the analysis:

```
python run_analysis.py
```

Advanced Reporting

Running the analysis will generate three professional reports:
- detailed_project_analysis.xlsx: High-detail route telemetry.
- analysis_results.json: Technical metadata for verification.
- detailed_simulation_log.txt: Complete path traces.

4. QGIS Geospatial Visualization

Raw GIS datasets are provided for advanced geospatial inspection.

How to Load Project

1. Open QGIS (v3.16+).
2. Open QGIS_Visualization/QGIS Main File - Corrected.qgz.
3. The project includes styled layers for SWM Routes, Collection Points, and Logistics Hubs.

5. Submission Requirements

Instructions for completing the nVisionX submission form:

GitHub Repository

Push this folder to a public GitHub repo and provide the link. Ensure the .git folder is included.

Demo Video

The video should demonstrate the Interactive Infographic transition and the Manual Run terminal output.

.env File

The root .env file must be uploaded separately to the form as requested.

Team RouteMind

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