mlangles

CloudAngles

Optilogistics:
Revolutionizing Logistics with AI-Powered Solutions

About mlangles

mlangles is a comprehensive AI platform designed to manage the entire lifecycle of data and models, offering streamlined solutions for each stage of the process. It features two main modules: Predictive AI and Generative AI.

The Predictive AI module provides tools for efficient project development, including data engineering, deployment, and monitoring, with applications across healthcare, retail, logistics, and manufacturing.

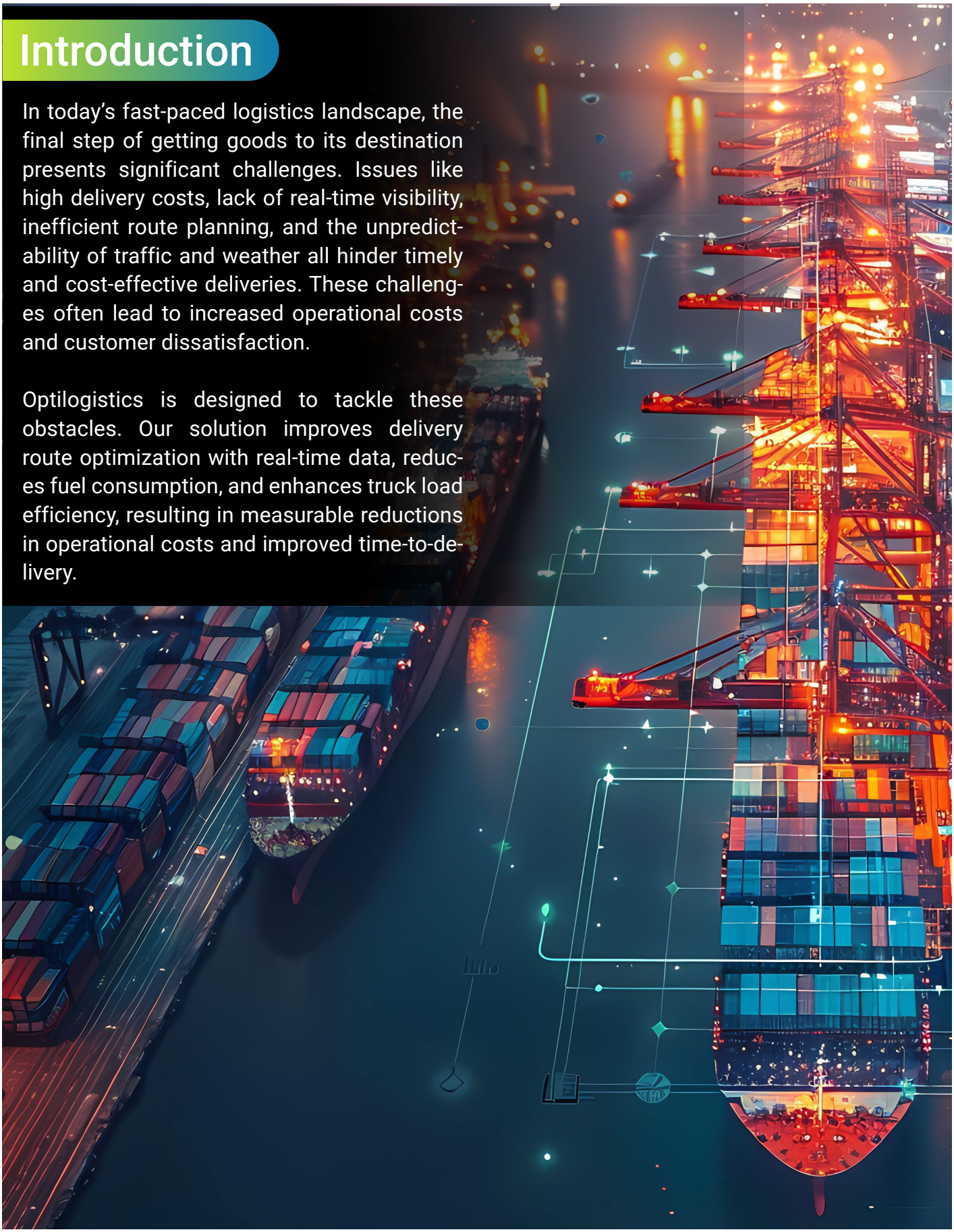
The Generative AI module enables enterprises to customize large language models (LLMs) using their data for specific use cases. It offers a range of model sizes to meet different speed and cost requirements and supports the creation of LLM-based chatbots through user-friendly low-code/no-code features.

In summary, mlangles delivers a complete AI ecosystem to address diverse enterprise needs and challenges.

Introduction

In today's fast-paced logistics landscape, the final step of getting goods to its destination presents significant challenges. Issues like high delivery costs, lack of real-time visibility, inefficient route planning, and the unpredictability of traffic and weather all hinder timely and cost-effective deliveries. These challenges often lead to increased operational costs and customer dissatisfaction.

Optilogistics is designed to tackle these obstacles. Our solution improves delivery route optimization with real-time data, reduces fuel consumption, and enhances truck load efficiency, resulting in measurable reductions in operational costs and improved time-to-delivery.



AI Solution Summary

Overview

Optilogistics integrates advanced AI technologies, including the HERE Tour Planning API for solving the Capacitated Vehicle Routing Problem (CVRP) and a bin packing algorithm for optimized truck loading. These are unified in a single API that is orchestrated by a Large Language Model (LLM). This design simplifies integration, offering flexibility across multiple industries, from e-commerce to supply chain logistics.

Key Benefits

The solution accelerates decision-making by automating route and load optimization, leading to faster time to insights. By minimizing delivery time, reducing fuel consumption, and optimizing space utilization in trucks, it significantly improves operational efficiency. Additionally, LLM-driven manifests provide dynamic, tailored delivery schedules, enhancing driver productivity.

Let's Take a Closer Look

How It Works:

Optilogistics operates by first processing truck and item data provided in Excel or JSON formats by the user.

What the truck data should include-> fixed costs, costs per distance traveled, and time-based costs, shift schedules, including start and end times, capacity and dimensions of the truck containers and the truck's starting and ending locations.

What the item data should include-> the delivery location, the duration of the starting and ending time at which the item can be accepted at the delivery location and the dimensions and weight of each of the items. Here the item could be associated with a single stock keeping unit (SKU) or a group of items that are combined into a single box.

Now that the algorithm has what it needs, it goes to the next step which is data preprocessing for the HERE tour planning API and bin packing algorithm.

Once the data is processed, it is passed to a LangGraph agent. This agent has access to various tools and large language models (LLMs) and uses a chain of thought approach to generate LLM outputs and make tool calls. The key tools available to the agent include the HERE Tour Planning tool and the bin packing tool for route optimization and load management.

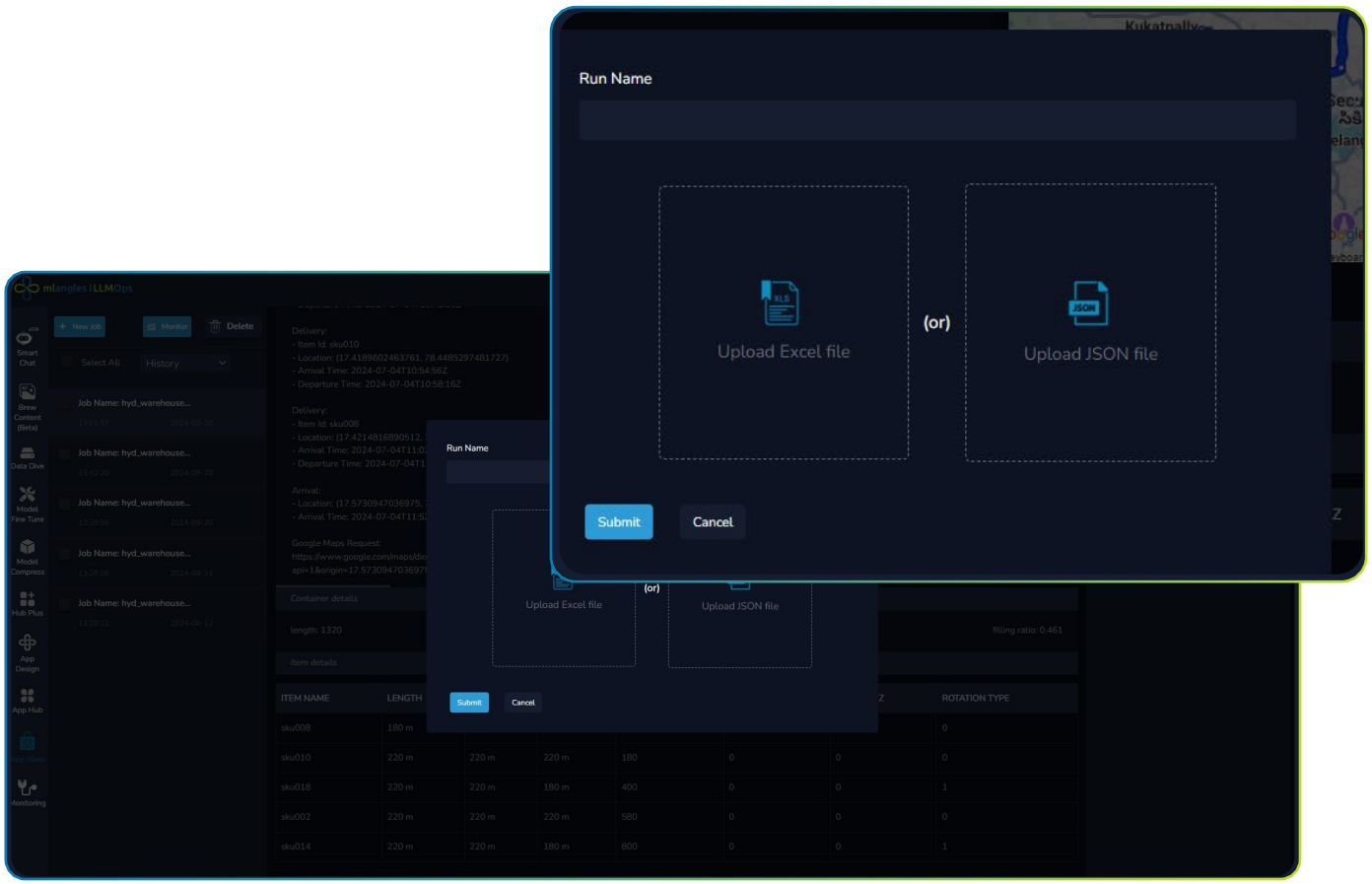
Based on an initial prompt and data provided to the LLM in the LangGraph agent, the AI system identifies that it needs to solve the Capacitated Vehicle Routing Problem (CVRP) using a bin packing algorithm to generate a manifest for each truck. First, the LLM activates the HERE Tour Planning tool, which utilizes the HERE Tour Planning API to solve the CVRP. The tool generates an optimal delivery sequence with timestamps for each delivery point assigned to the trucks. Additionally, it provides key statistics related to cost, time, and distance for both individual trucks and the overall operation.

After processing all the data, the LLM generates a detailed manifest for each truck, intended for the drivers. This manifest includes the optimal delivery sequence, estimated delivery timelines, and a Google Maps link to visualize the route.

The User Journey

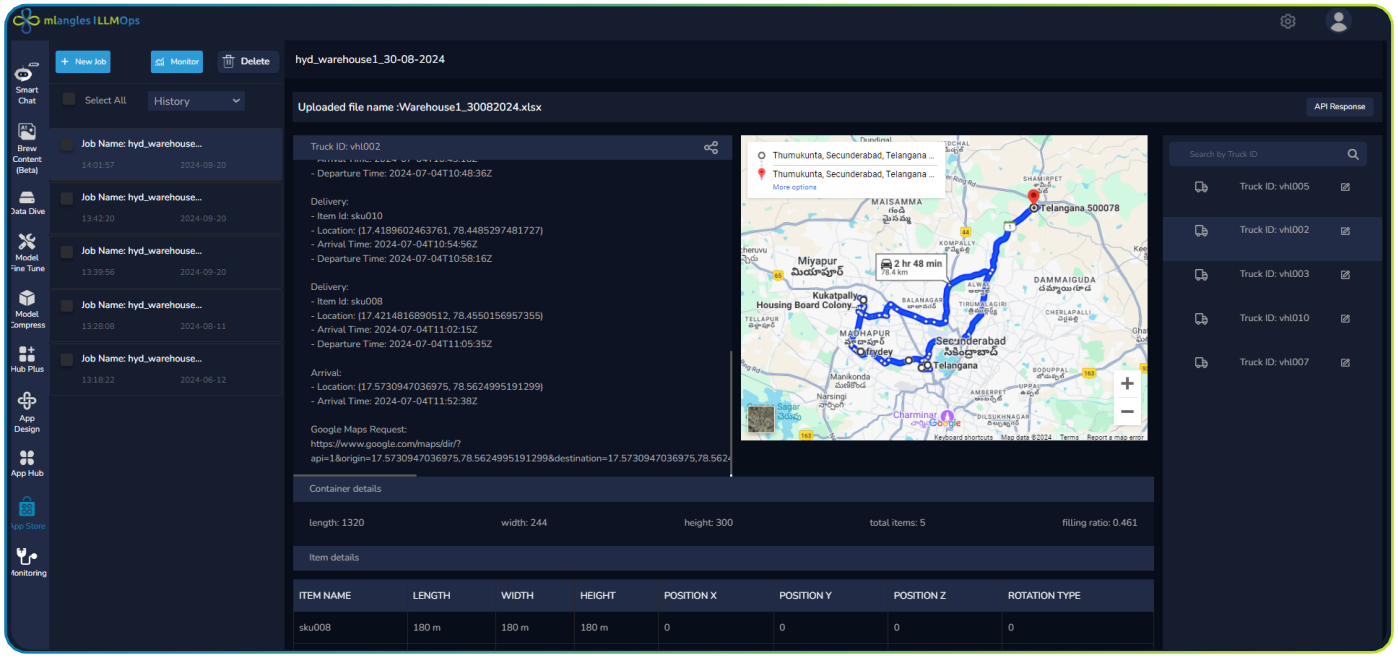
Creating a new Job:

Each new request sent to the Optilogistics API is referred to as a "job." To create a job, the user simply clicks on the "+New Job" button, provides a job name, uploads the truck input details in either Excel or JSON format, and submits the request.

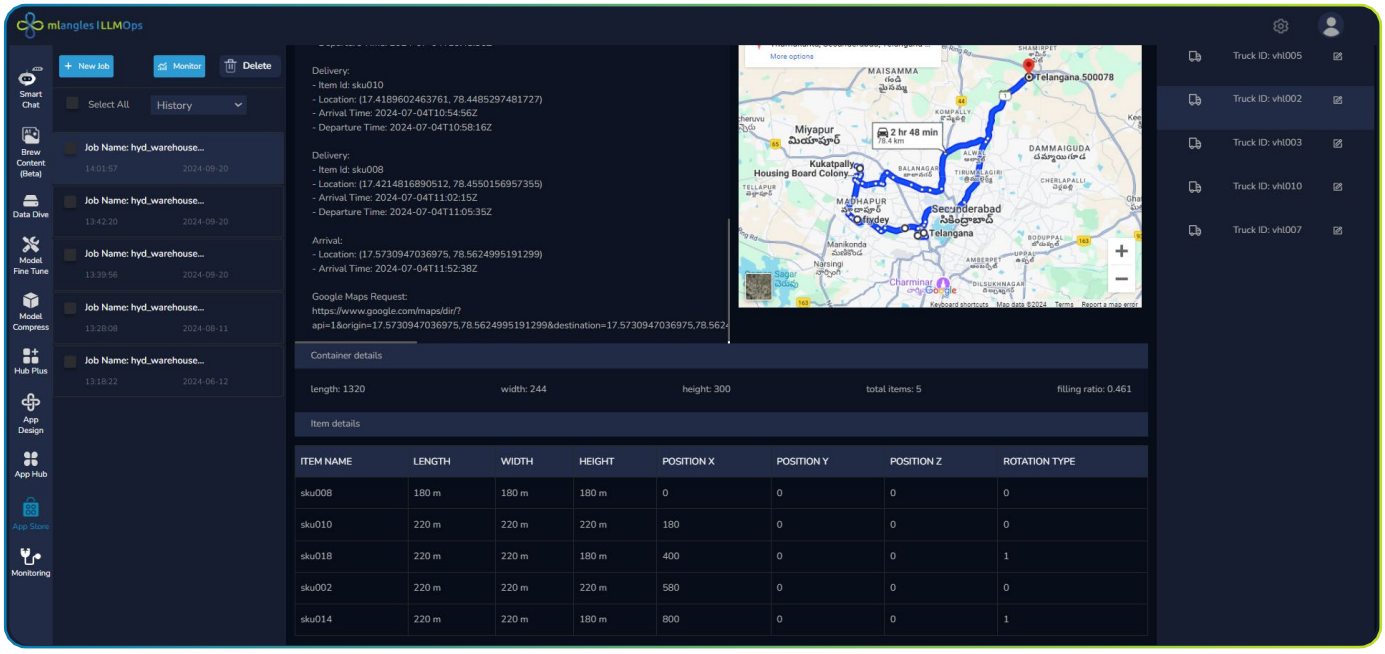


Response to a given job:

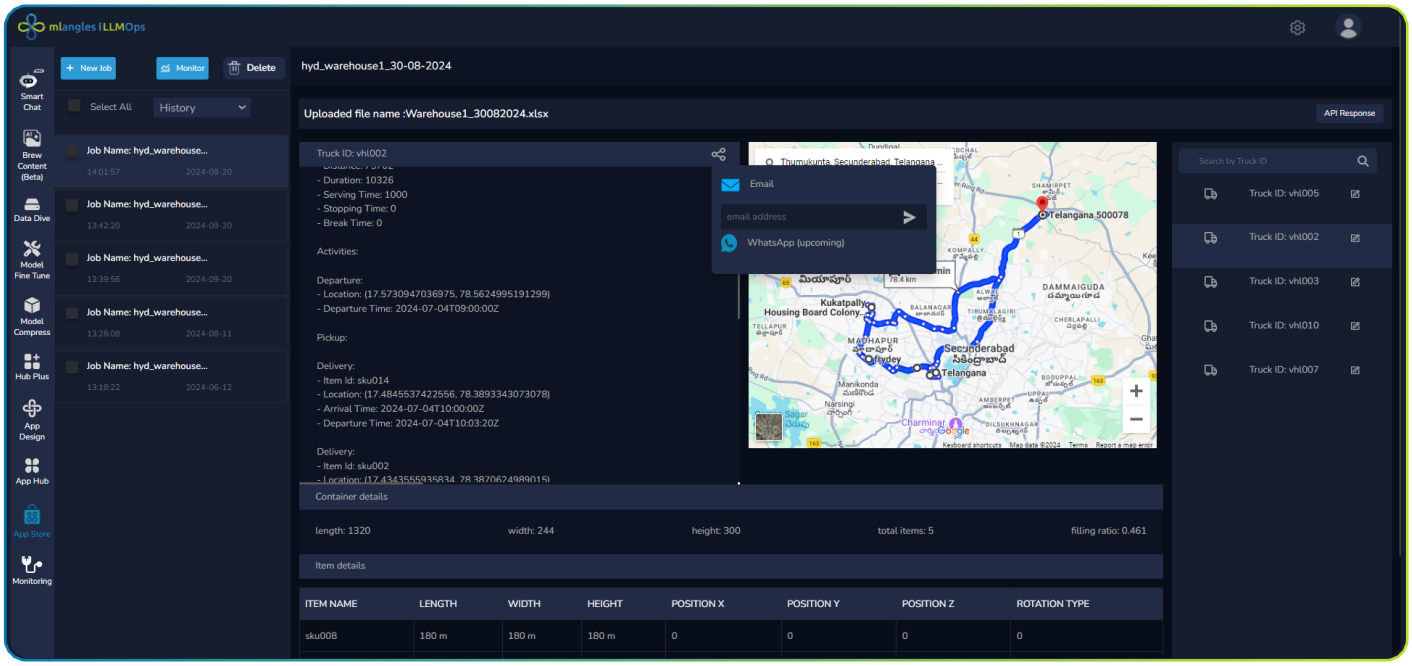
Once a new job is created, the system processes the data and generates a response. This response includes a manifest for each truck, detailing the optimal delivery sequence and timelines. The manifest also provides an interactive map, allowing drivers to visualize their routes and delivery points. The user can view these details by accessing the job's response, which includes both the manifest and a link to the map for easy navigation and efficient route management.



Additionally, the system also displays the loading sequence for each truck. This sequence outlines how items should be loaded based on the optimal delivery order, following the "First In, Last Out" principle. The image associated with the response visually represents the placement of items within the truck, ensuring efficient use of space and proper item orientation.



In addition to the core functionality, we've incorporated several useful features into the Optilogistics API:



Monitoring:

Users can track the number of prompts, completions, and total tokens consumed by the LLM to execute each job. This can be done by selecting specific jobs and clicking on the "Monitor" option.

Delete:

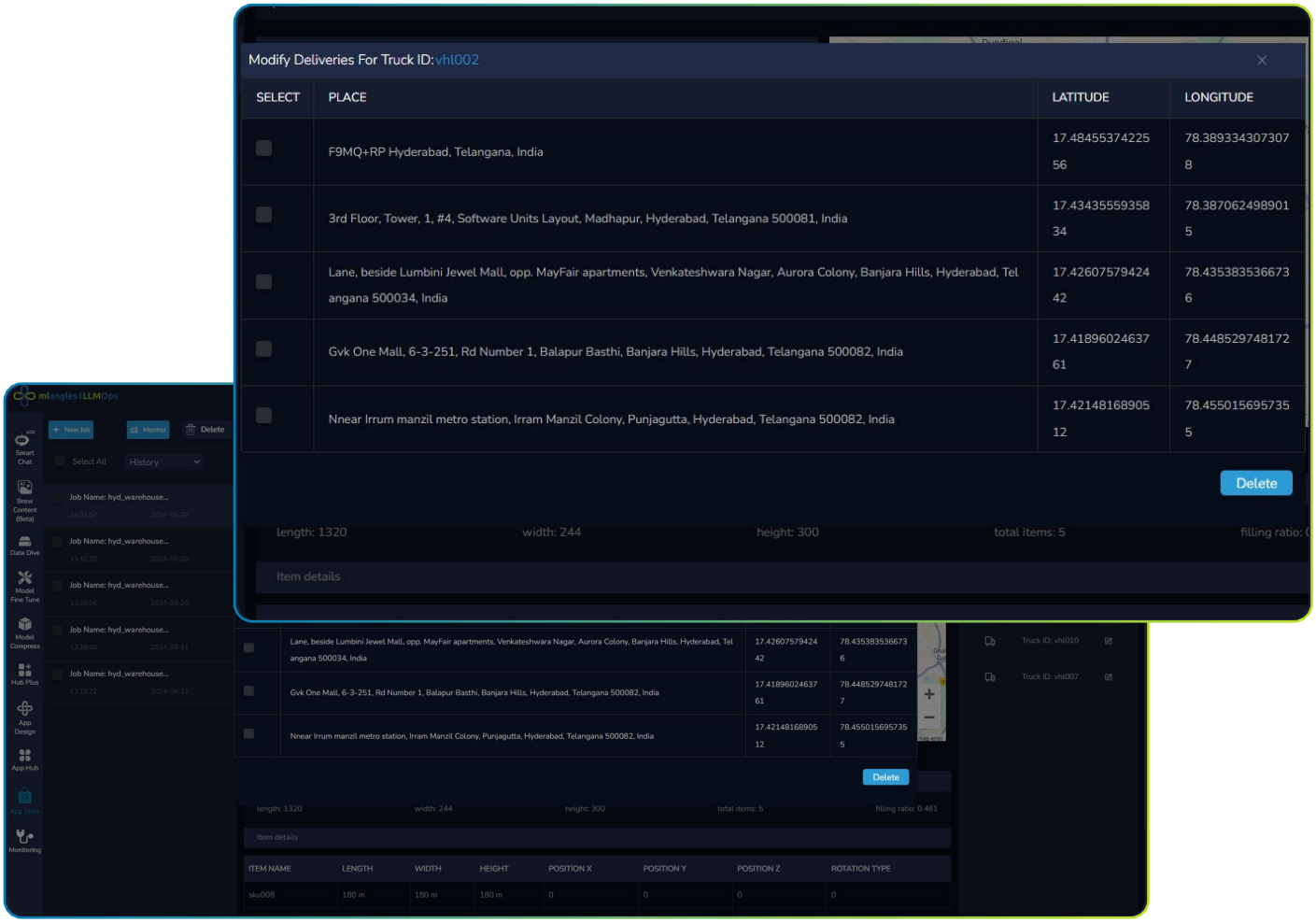
Users can remove selected jobs by selecting them and clicking the "Delete" button, simplifying management.

History:

The history feature allows users to view all past jobs or filter by specific time frames, such as the last 30 or 90 days, or even within a custom date range, using the history dropdown.

Share:

At the top of the manifest, there is a "Share" option, enabling users to share job details with drivers via email or, in the future, WhatsApp.



Edit Details:

Users can modify truck details after the optimization process, such as removing specific delivery destinations if a location is no longer accepting deliveries. To do this, users can click the "Edit" button next to each truck, select the destinations to remove, and the system will regenerate the manifest, maps, and loading strategy based on the updated route. This ensures flexibility in responding to last-minute changes.

In conclusion, this use case illustrates how advanced algorithms and AI-driven tools can revolutionize logistics operations by streamlining planning and enhance decision-making.

The key benefits include reduced transportation costs through optimal routing and loading, time savings from automated planning, improved delivery accuracy that boosts customer satisfaction, maximized truck capacity and resource allocation, and enhanced monitoring for continuous improvement.

By embracing this innovative approach, logistics companies can meet market demands and gain a competitive edge, paving the way for a smarter, more efficient future in the industry.

Get Started with mlangles

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