REVOLUTIONIZING LOGISTICS: FROM COMPLEXITY TO EFFICIENCY

A comprehensive approach to optimizing logistics through effective warehouse management, route optimization, accurate forecasting, and tailored delivery solutions.

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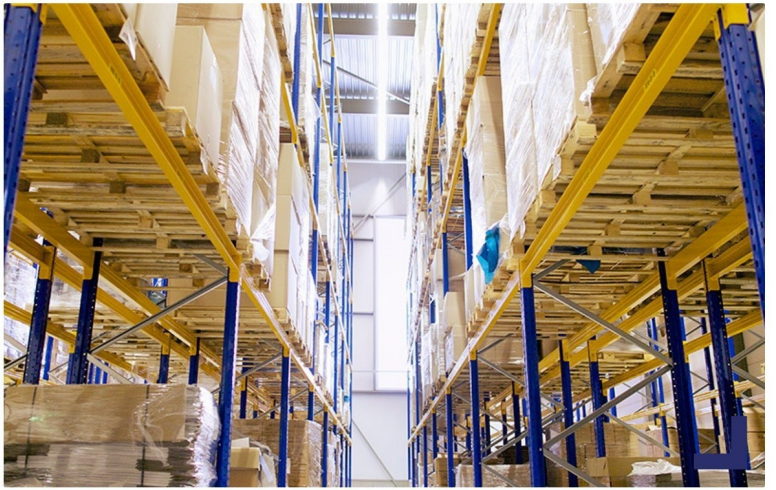
WHY LOGISTICS OPTIMIZATION MATTERS



Importance of Efficiency in Logistics

Efficiency in logistics leads to significant cost savings and enhances customer satisfaction.

Project Goal Introduction

The goal is to create an innovative, data-driven logistics solution.

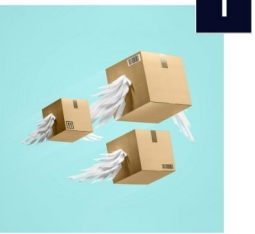
THE COMPLEXITY OF WAREHOUSE OPERATIONS

Warehouse Management Challenges

Human limitations in package sorting and clustering

Warehouse operations face significant challenges due to the limitations of human workers in effectively sorting and clustering packages.

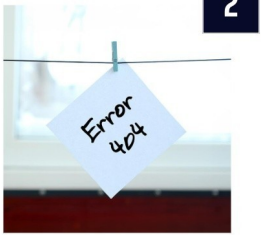
1

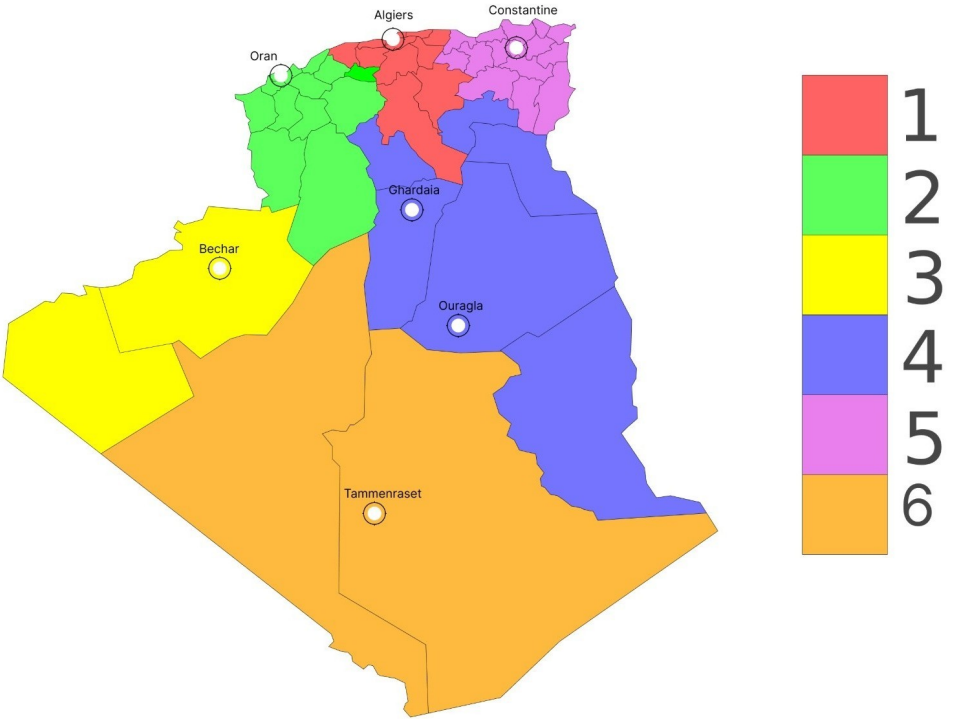


Increased errors and delays during high package volumes

High volumes of packages can lead to increased errors and delays in warehouse operations, impacting overall efficiency.

2



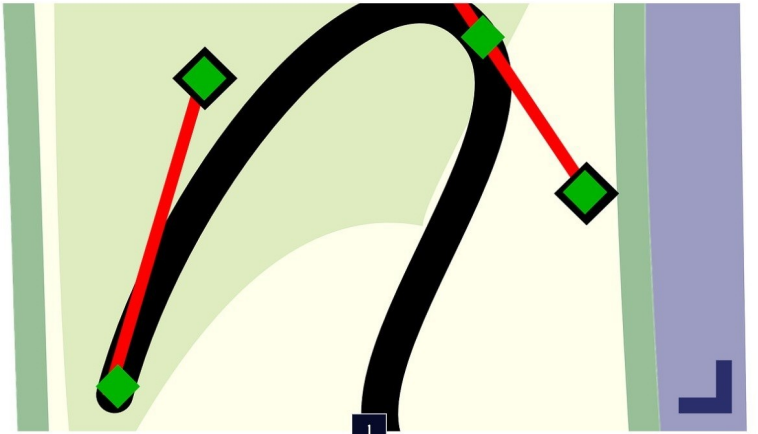


REGION DIVISION AND HUB PLACEMENT

Vehicle Type	Capacity (kg)	Speed (km/h)	Cost per km (€)	Number of Vehicles	Use Case
Commercial Vans	1000	80	0.5	25	Local deliveries within regions.
Delivery Trucks	5000	60	0.8	15	Medium shipments between hubs.
Heavy Trucks	20000	50	1.5	3	Large bulk shipments between distant hubs.
Specialized Vehicles	Variable	60	1.2	7	Fragile or time-sensitive items (e.g., medical supplies, sahara conditions).

SETTING UP THE ENVIRONMENT

INEFFICIENCIES IN TRADITIONAL ROUTE PLANNING



1

Route Optimization Challenges

Manual planning leads to longer delivery times and higher costs.

2

Handling of Custom Cases

Poor handling of custom cases (e.g., multi-stop deliveries) exacerbates inefficiencies.

!N

For n packages you will have n! cases

A LOT OF CONSTRAINTS

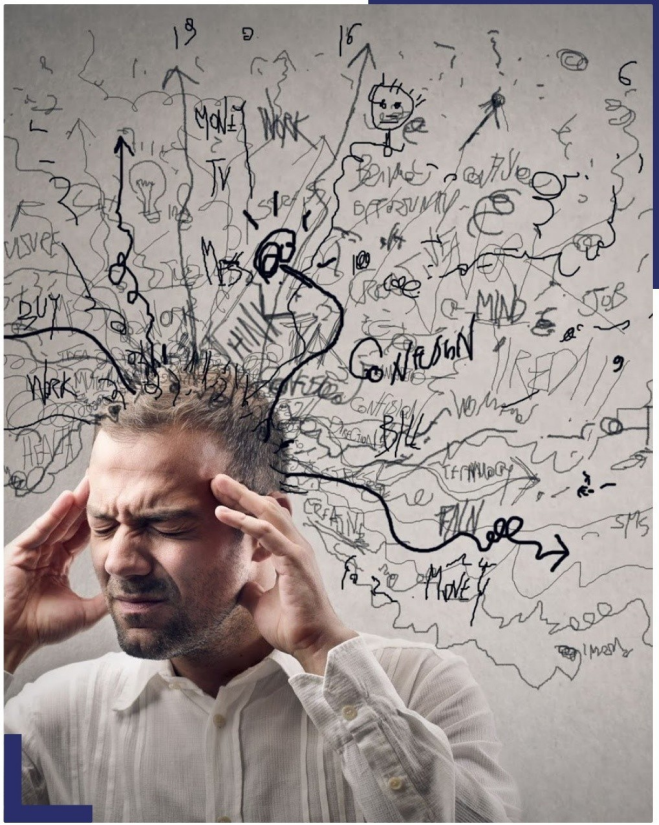
Package priority

Time windows

Drivers number

Regions division

Package size...



THE USE OF GOOGLE OR-TOOLS

Google Maps API Integration

Utilizes Google Maps API to provide real-time traffic updates and optimized paths for better logistics management.

Google or-tools

integrate google or-tools with google maps so we can achieve the best performance possible

OR-tools with WMS

define the clustering at the warehouse for better orginazation

HUMAN VS COMPUTER

This is how using route optimization affect time and fuel. approximtely **20%**

Time:

Fuel:

Time:

Fuel:

PREDICTING AND PREPARING FOR HIGH DEMAND

Addressing Demand Forecasting Challenges

1

Demand Forecasting Challenges

Identifying the difficulties in accurately predicting demand, which can lead to significant operational issues.

2

Seasonal Spikes

Seasonal spikes can overwhelm hubs and vehicles, causing logistical challenges.

3

Reactive Responses

Reactive responses to demand fluctuations can result in increased costs and delays in service.

AN AI MODEL FOR DEMAND FORECASTING

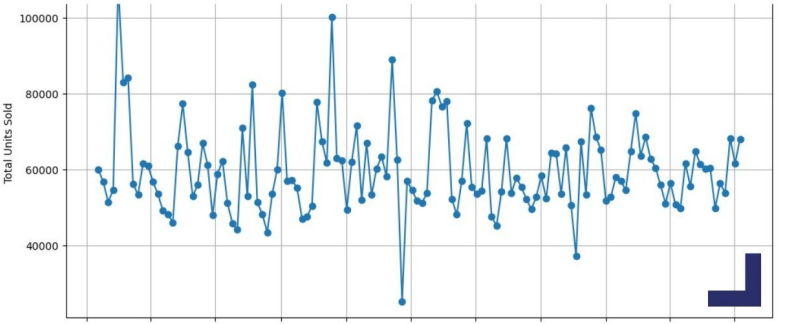
Forecasting Solution Overview

Demand Forecasting

Utilizes historical and real-time data for accurate demand forecasting.

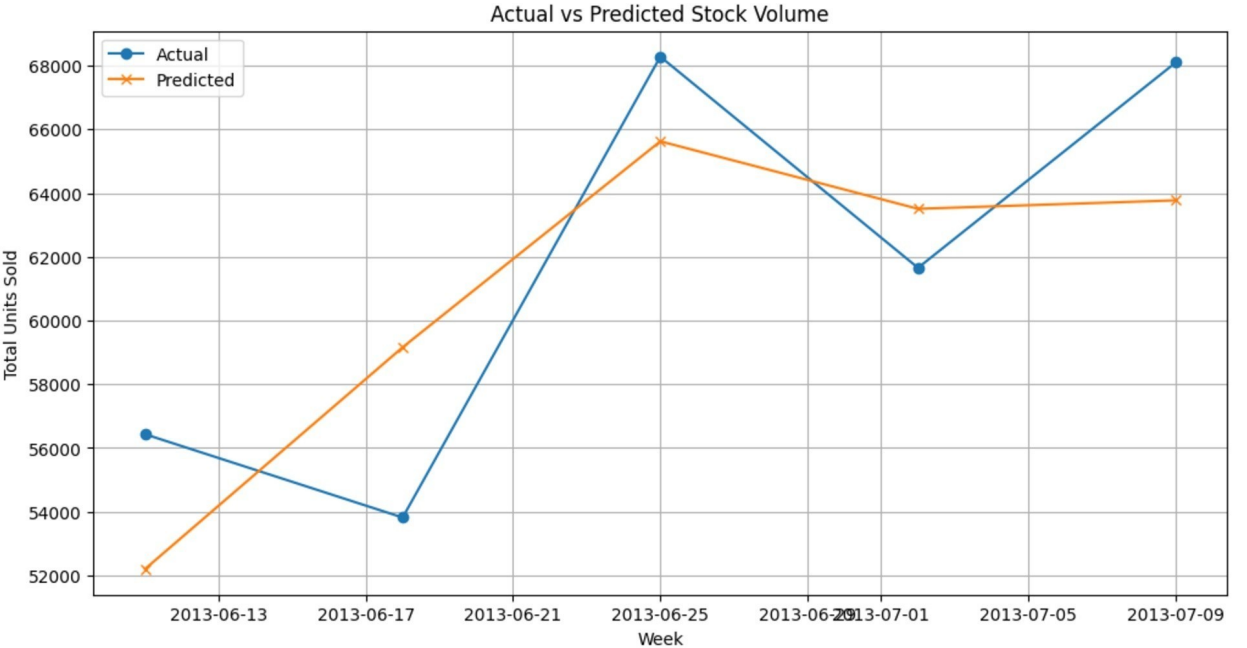
Preparation of Hubs

Prepares hubs with extra space, vehicles, and workforce to meet demand.



THE RESULT

This image shows the difference between real values and predicted ones.



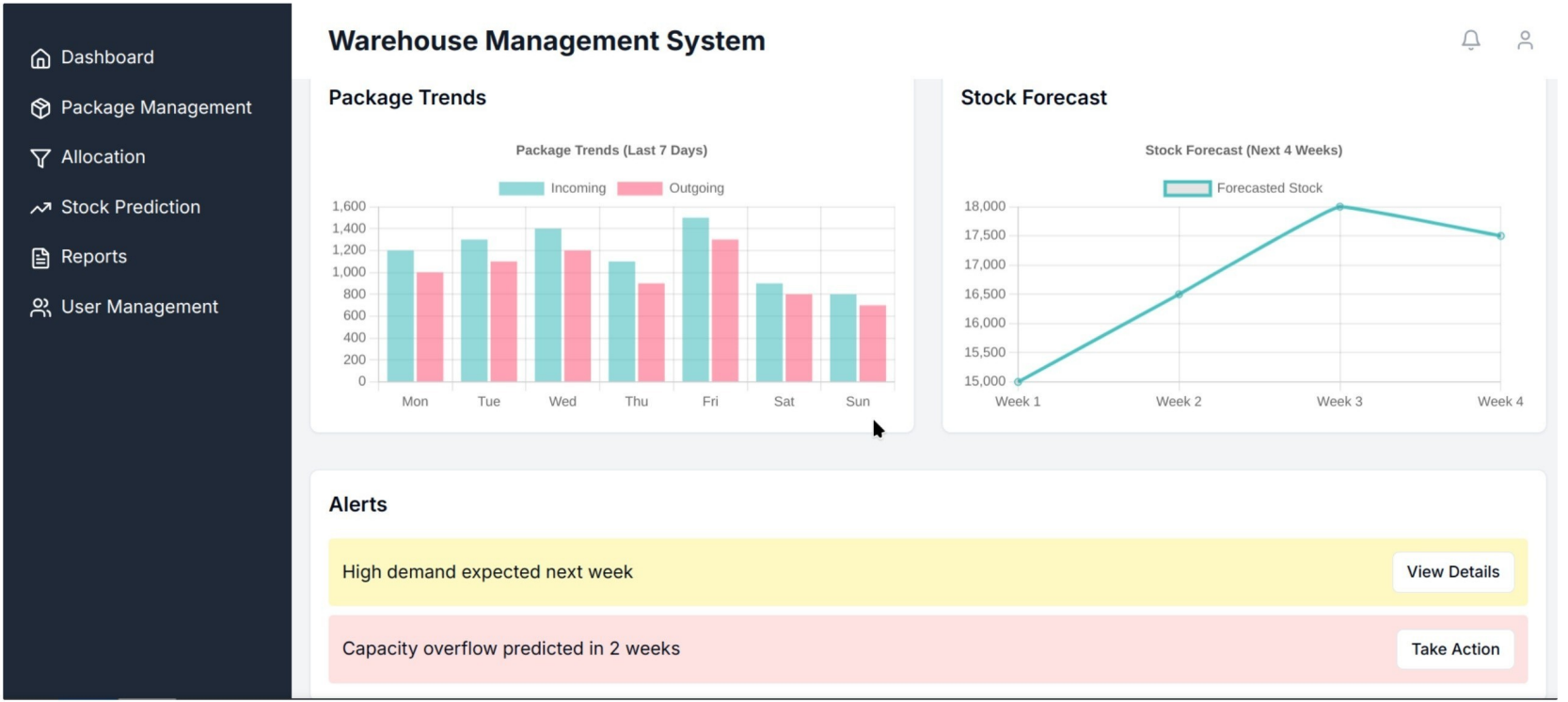
Custom Delivery Cases

Hub-to-hub deliveries with en route annex drop-offs, such as the route from Oran to Algiers with Chlef as an intermediate stop.

HANDLING COMPLEX DELIVERY SCENARIOS

WMS

A study shows that using AI to optimize picking routes, combined with a robust WMS, can increase workforce productivity by about **30% while also reducing operational costs**.



WMS

- Dashboard
- Package Management
- Allocation
- Stock Prediction
- Reports
- User Management

Warehouse Management System

Generate Reports

Weekly Report | Monthly Report | Custom Report

Key Performance Indicators

Average Processing Time	On-Time Delivery Rate	Inventory Turnover Rate
2.5 hours	98.5%	12.3

MEASURING THE IMPACT

Results and Metrics

Improved Delivery Time

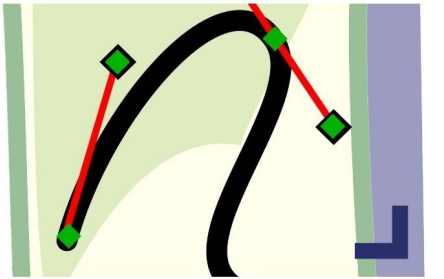
Achieved an enhanced delivery time by 20%, indicating greater efficiency in operations.

Cost Savings

Realized cost savings amounting to 30%, contributing to overall budget efficiency.

Optimized Routes

Implemented optimized routing strategies that led to better vehicle utilization.



THANKS FOR YOUR ATTENTION!

Any questions ?