ORACLE

From Data to Decisions: How Al is Helping Reshape Logistics

Dominic Regan 8th February 2024



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CASH RICH PORT OF FELIXSTOWE DOCKERS DESERVE BETTER

Unite – fighting for JOBS • PAY • CONDITIONS







Data Related Logistics Trends

MUS

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Supply chain data needs to drive actionable insights

Actionable insights drive supply chain value											
Problem	Solution	Impact									
Disrupted shipments increasing operations workload	Pre-transit and in-transit incident alerts by location, land and shipment	70% reduction in resource time ,casing shipments"									
Inaccurate ETAs driving high operational costs	Risk adjusted ETAs during planning up to 2 weeks before departure	1-5% improvement in on-time performance									
Unplanned disruption mitigation costs	Predictive pre-transit and in-transit disruption alerts per shipment	1-2% improvement in expedited freight									
High cost of refrigerated transport	Risk scores that provide guidance on when reefers are and are not needed	\$2M temperature sensitive									

optimization savings

Al-Powered Logistics

tional User Experience ocessing & Entity, Intent Recog	OTM Mobile App nition] Logistics Digital Assistants	
ed Redwood Smart UX Preference Analysis]	Enhanced UI Data Visualization	
& Execution	Strategy & Performanc	e Business Outcome
away Slotting	Volume & Budget Forecast	Better Contracts
Ier Routing &r ConsolidationTime Prediction	[AI Forecasting]	Lower Costs

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Embedding AI/ML into Logistics

Designed for change. Built for you.

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Predictive ETA (Estimated Time of Arrival) for shipments, both at planning as well as during in-transit

Oracle Transportation Management

Predictive order fulfilment times, to predict when an order will be shipped from the warehouse

Oracle Warehouse Management

Predictive warehouse slotting using market basket analysis, to locate and relocate items in the warehouse

Oracle Warehouse Management

AI/ML for Predictive ETA's (Estimated Time of Arrival)

- Calculate ML-based transit time ightarrowprediction via automatic processes or ad-hoc queries
- Applies both during planning and while • shipments are in-transit
- For each shipment, the ML algorithm: •
 - Analyzes shipment characteristics \bullet
 - Chooses the best business-specific model
 - Applies the ML Model and produces ML predicted transit time
 - Compares Planned, Predicted and Actual Transit Times side-by-side

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ML - Input Data Quality ML - Input Data with graph

Machine Learning Process Flow

Set up an ML Project

Create Scenarios

Train on historical shipment data

Machine Learning Admin (ML Admin)

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Implement models in production

Predict for future shipments

Regular TMS User

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Historical Records

Oracle Transportation Management

Apply Shipment Prediction Results Learning Module

Prediction Module

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Oracle Internet of Things Intelligent Applications Cloud

"Oracle Transportation Management's built-in machine learning capabilities have helped improve ETA accuracy from 64 percent to 93 percent, which is an invaluable result in terms of an improved customer experience."

About the presenter

Julio E. Magallanes is a Senior Logistics Analyst with 20 years of experience in logistics and supply chain operations.

A team member of the Western Digital Center of Excellence doing research and development to enhance Western Digital's competitiveness.

eads the team developing the Digital Assistant App for Logistics and Global trade compliance. and collaborates in the Logistics machine learning project.

My daughter Michelle was 15 years old when she started her online store, which motivated me to learn about chatbots to improve customer service at Western Digital

SCM Western Digital Presents Extending Logistics with Digital Assistant and Machine Learning

258 views · 1 month ago

0146.4 OracleSupplyChain

As part of Western Digital's journey into the most innovative 4th Industrial Revolution (4IR) technologies, Western Digital ...

----Link to presentation: Western Digital Extends Logistics with Digital Assistant and Machine Learning

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Western Digital

Order Cycle Time 38% Above Average 32 Hrs Average order cycle time in hours **Order Cycle Time Predictions** Store Ord Order ty ord and all Overview Order Cycle Time 38% Above Average

32 Hrs

Order Nbr

JPORD0410_

KHORD20190

ORDER09_17_

ORDER82920

GUORD04121

ORD1031900

KHORD20191 ORDER0828_

ORDWJ92519

AI/ML Predictive Fulfillment Dashboard

- Historical KPI data along with • predictions for the future, using ML algorithms
- Customer centric KPI's ullet
 - Order Cycle time •
- Anticipate changes in KPIs •
 - Predict an increase in order cycle • time

Average order cycle time in hours

Orders above target threshold

>	Order Status 🗘	Order Type 🗘	Predicted Time (Hour s)	Expected Shipped Da te Time	Required Ship D
5	Loaded	JP STORE FLW&WAVE	36.58	9/28/2022, 10:31:47 PM	6/28/2019
823A	Loaded	KH Order Type	36.42	9/28/2022, 10:21:47 PM	8/23/2019
1	Loaded	Store order without short	36.28	9/28/2022, 10:13:47 PM	8/22/2019
08	Loaded	Store Ord	36.13	9/28/2022, 10:04:47 PM	
907	Loaded	For pick and alloacte	36.10	9/28/2022, 10:02:47 PM	12/4/2019
12	Loaded	Store Ord Partial	36.07	9/28/2022, 10:00:47 PM	10/3/2019
109AD	Loaded	KHORDT02	35.70	9/28/2022, 9:38:47 PM	9/11/2019
SH1	Loaded	SHStore order	35.67	9/28/2022, 9:36:47 PM	9/14/2018
002	Loaded	Store Ord Partial	35.32	9/28/2022, 9:15:47 PM	6/10/2019

AI/ML Predictive Slotting

- Analyze your inventory using Market ulletBasket Analysis, generating a report that displays items in your warehouse that are commonly ordered together
- Leverage Market Basket Analysis for • Putaway, evaluating candidate Locations based on the Primary Item's Location
- Gradual centering of clusters ightarrow
- Incorporate into current operations •
- Perform re-slotting over time without • the time consuming and disruptive traditional process

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Conversational AI

Provide real-time information through conversational interaction:

- Easy mobile access to order, shipment & product information
- Send requests using text or speech, supports
 MS Teams, WhatsApp, SMS, Slack, Messenger, etc.
- Latest status and location based on IoT, sensors, etc.
- Extensible and adaptable via the Oracle Digital Assistant Platform:
 - Use REST APIs to access relevant business objects: orders, shipments, invoices, etc.
 - Integration with heterogenous IT landscape

C

Western Digital - Logistics Assistant Bot

https://community.oracle.com/customerconnect/events/603659-scm-western-digital-presentsextending-logistics-with-digital-assistant-and-machine-learning

- Western Digital's first Logistics Assistant Bot, can make an impact in the operation with efficiency, scalability and strong R.O.I
- **Major function** include shipment tracking, document retrieve, Product Packaging info, Invoice status, Claim tracking and Subscription etc. It can further be expanded to Planning, Procurement, Manufacturing.
- User feedback for **learned behaviors** and predict and provide personalize service

Western Digital

Turn-around time reduction

	••••••••••••••••	•
	WD-LogiBot 8:28 AM	
	Please enter the DN/PT Number	
		8:2
		2075055
	DNPT 2075055 (Incoterm CPT) was DELIVERED Carrier - CEVA LOGISTICS , Mode - AIR , Shipment ID - 2023	30630-0216
	Tracking Number - <u>C1754087</u>	
	2023-07-04 07:00:00 🗹 Order Delivered	
	2023-06-30 12:50:19 ✓ Order On the Way	
	2023-06-30 12:50:19 √ Order Shipped	
	2023-06-30 06:02:02 ✓ Order Preparing to Ship	
	2023-06-30 03:55:30 √ Order Placed	
		8:31 /
	Get Documents (POD/Packing	List/Cl etc.)
	WD-LogiBot 8:31 AM	
	Link to OR_EXT_COMMERCIAL_INVOICE_4B for DN/PT Nun	nber 20750
_	OR EXT COMMERCIAL INVOICE 4B	

Continued AI/ML Expansion

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Order Routing and Order Consolidation

- Determines the desirability of orders consolidating in \bullet same shipment; ensures orders follow user-preferred route
- Data Anomaly/Outlier Detection
- Analyze data as received or entered by a user: screen for • anomalies & potential errors in real time

Document Extraction and Anomaly Detection

- Convert documents into data for ingestion and avoid • effort & errors from manual entry.
- **Product Classification**
 - Reduce user effort & errors in identifying the correct \bullet classification codes (e.g., HS codes)

Introducing Cohere

The Oracle + Cohere strategy is simple:

Deliver the most impactful and intelligent generative solutions for your business. Oracle has partnered with leading generative AI company Cohere to create the industry's best generative AI solutions for the enterprise.

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ORACLE + Scohere

Generative AI and Supply Chain

According to analysis undertaken by Ernst & Young in 2024, supply chains can benefit from Generative AI through its ability to:

- Classify and categorize information based on visual or textual data
- data
- Automatically generate content in various forms that enables faster response times
- Summarize large volumes of data, extracting key insights and trends
- text

Source: Ernst & Young, 2024, https://www.ey.com/en_us/coo/how-generative-ai-in-supply-chain-can-drive-value

• Quickly analyze and modify strategies, plans and resource allocations based on real-time

• Assist in retrieving relevant information quickly and providing instant responses by voice or

Generative AI and Logistics

Example areas of value for Generative AI in Logistics include:

- Logistics network design \bullet
 - \bullet lower costs and improved service levels.
- Last-mile dynamic route optimisation •
 - \bullet customer satisfaction.
- Global trade optimisation
 - \bullet complex international trade networks, helping ensure compliance while minimizing costs.

Source: Ernst & Young, 2024, https://www.ey.com/en_us/coo/how-generative-ai-in-supply-chain-can-drive-value

Optimize the design of logistics networks considering factors such as warehouse locations, transport links and demand patterns to generate the most efficient configuration. This leads to reduced delivery times,

For logistics operations, one of the major challenges is routing in real time. Generative AI can continually update and optimize delivery or pickup routes based on changing factors like traffic conditions, weather and the priority of deliveries. This leads to increased efficiency, reduced fuel consumption and improved

Analyze the myriad variables, including tariffs, customs regulations, trade agreements and shipping costs, to suggest the most efficient and cost-effective trade routes and strategies. This aids companies in navigating

What-if Tactical Planning Define ontimize analyze & compare logistics	CRACLE LOGISTICS Modeling Project	
scenarios	Actors = Vev = + ± >)	0
 Network Design What-If Analysis 	Image: Construction of the second of the	OF
Simulate network performance using real-world, operational data		
 Carriers, rates, capacities, locations, 	Rows Selected: 1	
equipment, items, order history, etc.	Actions ▼ View ▼ Q	
	 ☑ ☆ D. DELIVERY WINDO 	
Intrinsic part of TMS for seamless execution Use operational data in scenarios 	□ ☆ D. DELIVERY WINDO	
 Implement decisions and changes for immediate effect 	>> Rows Selected: 1	

Digital Twins What-if Tactical Planning

Define, optimize, analyze & compare logistics scenarios

- Network Design
- What-If Analysis

Simulate network performance using real-world, operational data

• Carriers, rates, capacities, locations, equipment, items, order history, etc.

Intrinsic part of TMS for seamless execution

- Use operational data in scenarios
- Implement decisions and changes for immediate effect

DOW'S LNM PROJECTS FOR 2021

1H 2021

NAA Logistics:

NAA Logistics:

General Business

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