



Prof

Codefest

Xenber Track 1

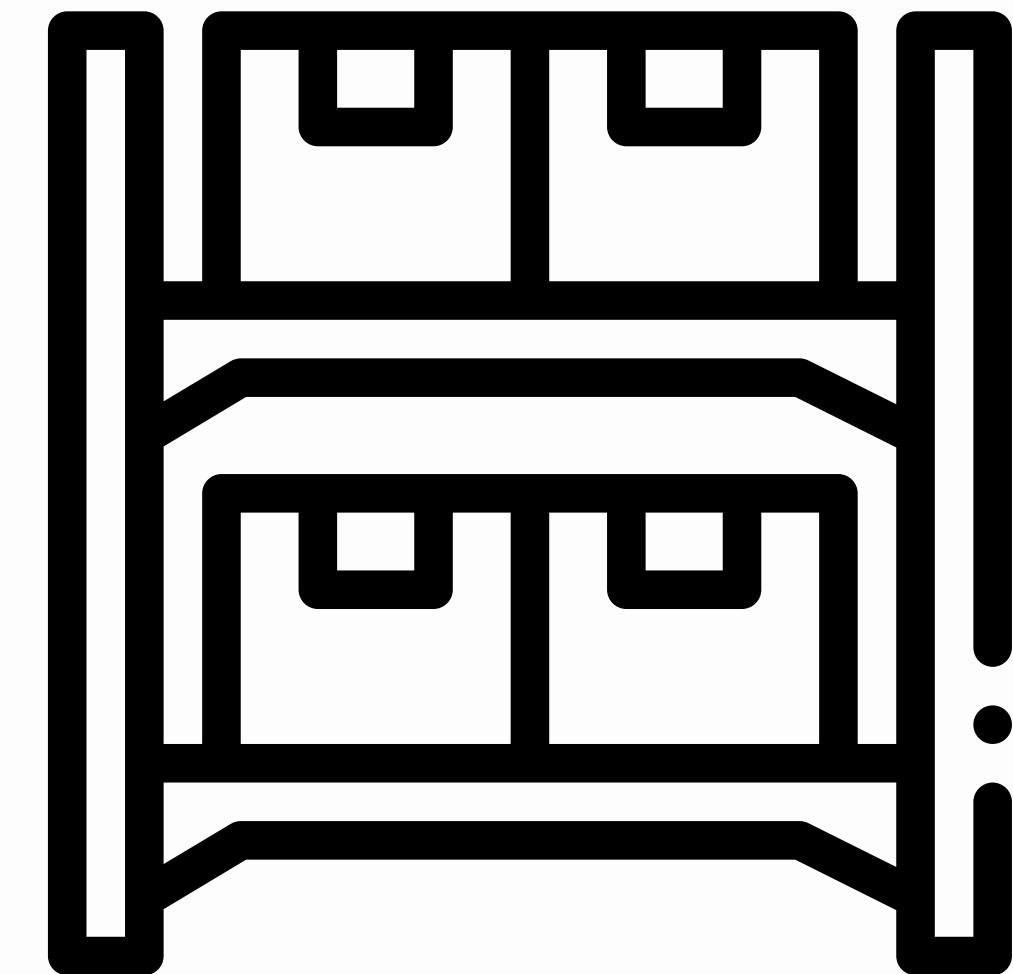
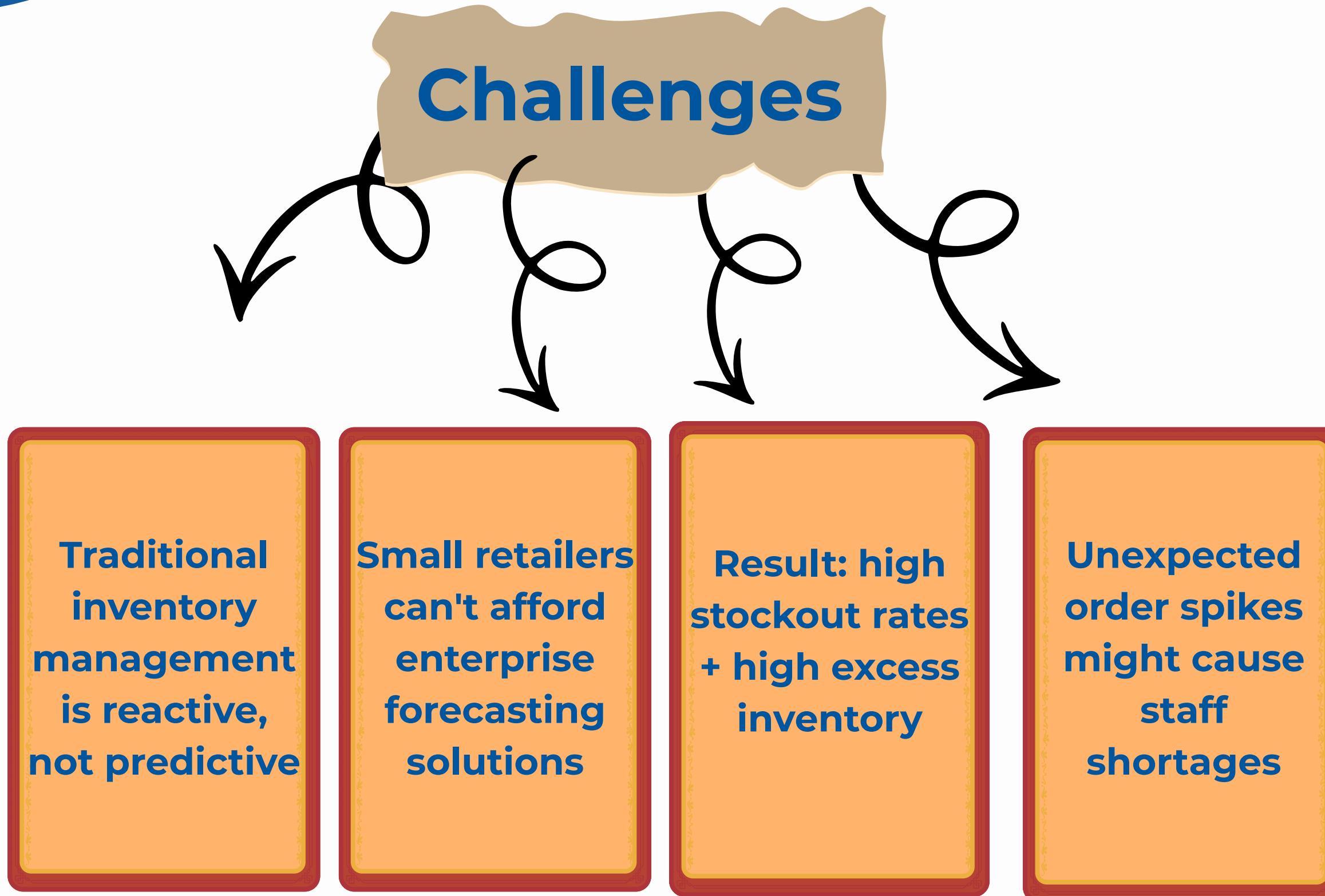
By:

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Problem Statement

Inventory mismanagement costs retailers **BILLIONS** annually.



Our Solution

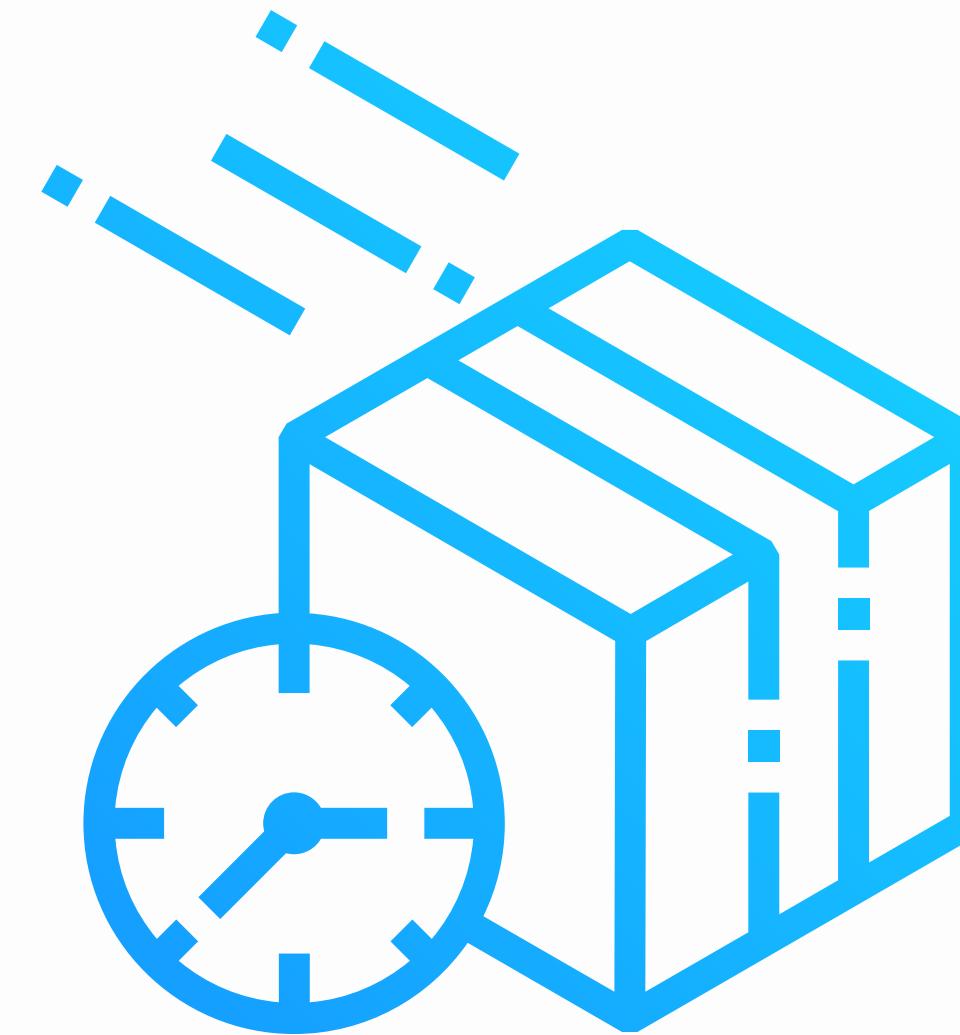
The Gap:

Affordable, AI-powered demand forecasting is inaccessible to 90% of retailers, forcing them to choose between:

- Stockouts & lost revenue
- Overstocking & wasted capital

AdventureWorks AI:

Intelligent Inventory Forecasting AI-powered demand prediction that transforms reactive inventory management into proactive optimization (eg; automated staff scheduling and stock reordering)



Target User



Primary Target:

Small-to-medium retail businesses

(10-500 products)

Physical stores + e-commerce

Annual revenue: \$500K - \$10M



User Persona:

Store managers

Inventory coordinators

Small business owners

Operations managers



Industry Focus:

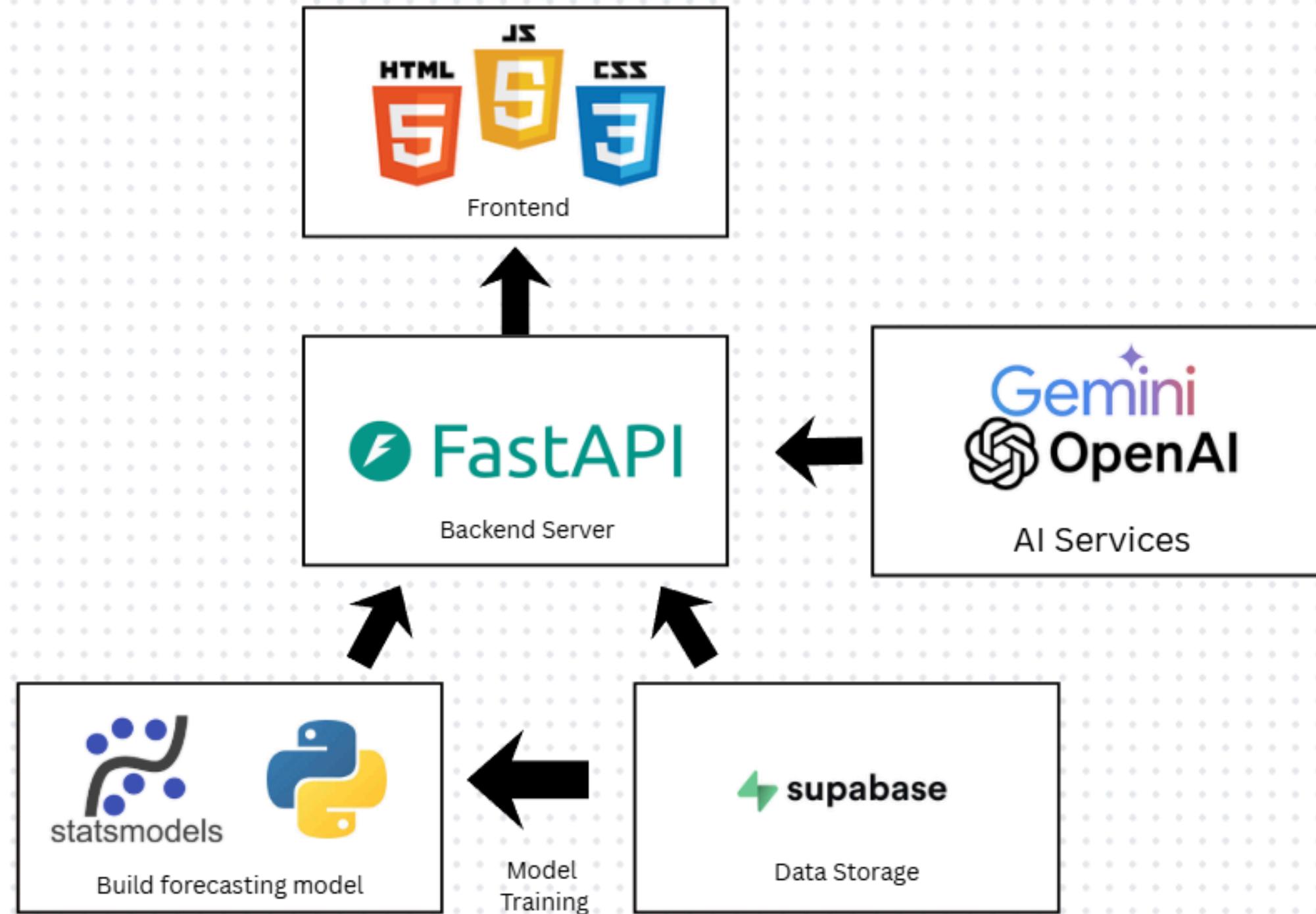
Bike shops, sporting goods

Consumer electronics

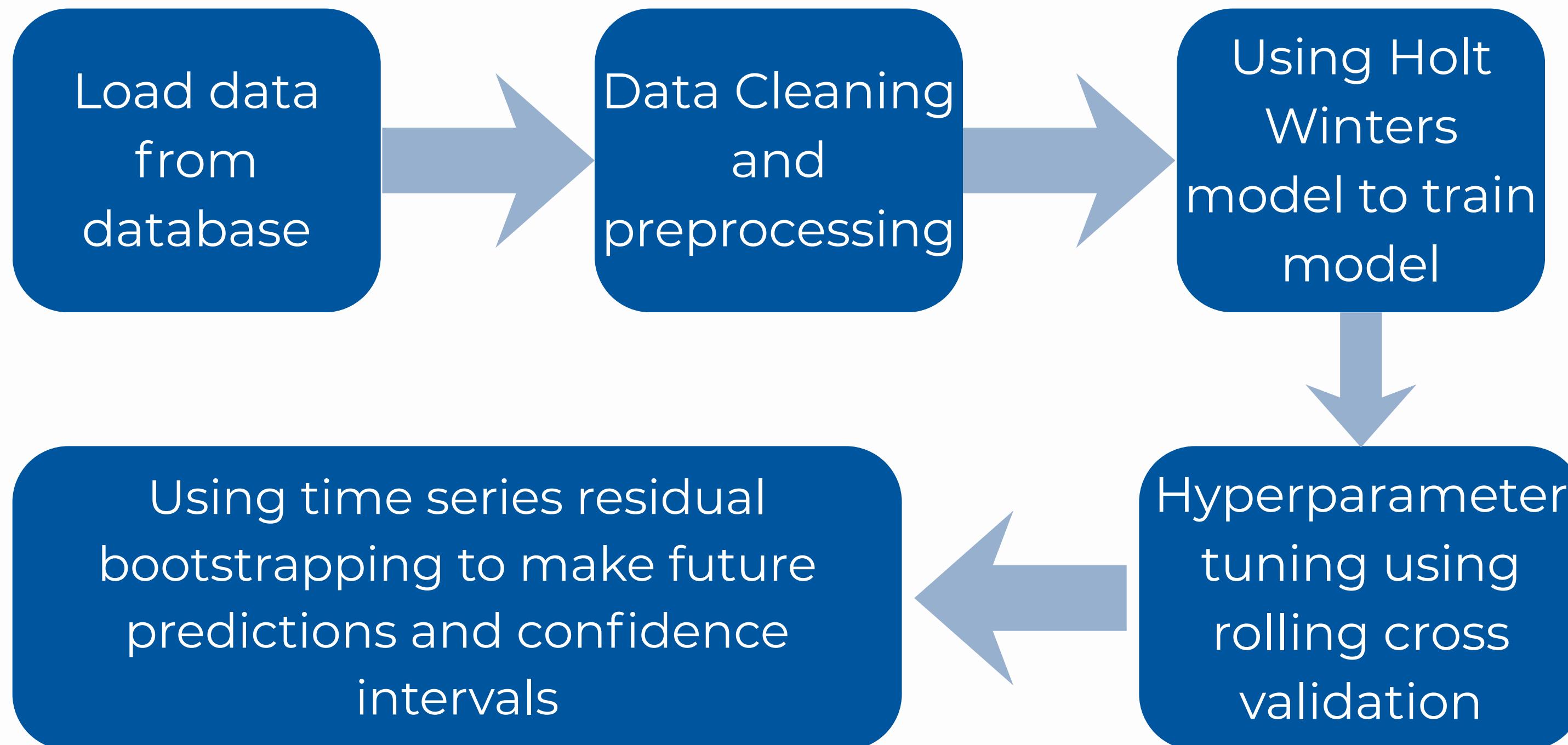
Fashion & apparel

Home goods

System Architecture



Model Building



Model Performance

These are the performance of our Holt Winters Forecasting Model after hyperparameter tuning using rolling cross validation

===== SUMMARY OF BEST MODELS =====

	Product	MAPE (%)	Trend	Seasonal
0	AWC Logo Cap	14.40	add	mul
1	Fender Set - Mountain	13.07	None	add
2	ML Mountain Tire	16.27	mul	add
3	Mountain Bottle Cage	8.20	mul	mul
4	Mountain Tire Tube	13.75	mul	mul
5	Patch Kit/8 Patches	8.92	None	add
6	Road Bottle Cage	10.15	None	mul
7	Road Tire Tube	9.10	add	mul
8	Touring Tire Tube	10.94	None	mul
9	Water Bottle - 30 oz.	6.66	None	mul



**Some key features of this
platform includes:**

AI Data Assistant

AdventureWorks Analytics | Inventory Analysis | Bell icon

Data Assistant Online | Just now

Compare trends of Sales for Road Bikes and Helmets for last month

The sales trends for Road Bikes and Helmets during May 2022 show distinct patterns. Helmets generally maintained a higher daily sales volume compared to Road Bikes throughout the month. Both categories experienced daily fluctuations, with some notable peaks indicating increased sales on specific days. For instance, both Road Bikes and Helmets saw significant spikes around mid-month (e.g., May 15th), suggesting possible promotional activities or

Ask about sales, trends... Chat icon

Performance Overview

TOTAL ORDERS **2,225**

UNITS SOLD **8,543**

ACTIVE CUSTOMERS **2,162**

Avg ORDER SIZE **3.8**

Deep Dive Metrics

Sales Trend Analysis
Legend: Units (Blue line), Orders (Green line)

Category Distribution
Legend: Accessories (Blue), Clothing (Green), Negeri Sem (Orange), Perak (Red), Pulau Pinan (Purple)

Sales by Country
Legend: Kuala Lumpur (Blue), Selangor (Green), Negeri Sem (Orange), Perak (Red), Pulau Pinan (Purple)

Forecasting Based Warning System

Road Tire Tube

Historical performance & future demand projection.

⚠ ACTION REQUIRED

Sales Forecast Analysis

● Historical ● Median Forecast ● 80% CI



Restock Recommended

Inventory levels are critically low relative to predicted demand.

Analysis:

The model predicted that the total **Road Tire Tube** sold for the next 4 weeks will be between **395.94 - 533.55** units.

CURRENT INVENTORY

452

Do you want to restock?

No

Yes, Restock

Automatic AI Staff Scheduling

Total Orders Forecast

Weekly order volume analysis and workforce planning.

Predicted Order Volume



Actual Orders Forecast Confidence Interval

↗ HIGH DEMAND

Busy Month Ahead

PAST 4 WKS AVG
385

NEXT 4 WKS AVG
447

Forecast models predict a **+16.1%** increase in order volume compared to the previous month.

Next month is predicted to be busier. Would you like to rearrange staff schedules?

No

Yes, Rearrange

New Optimized Schedule

Generated based on predicted demand.

DAY	SHIFT A (10-4)	SHIFT B (2-8)
Monday	Alicia Tan, Jason Koh, Bryan Lim	Chloe Wong, Farah Aziz, Daniel Lee
Tuesday	Natalie Cheng, Amir Hakim, Stephanie Ong	Kelvin Yap, Alicia Tan, Jason Koh
Wednesday	Bryan Lim, Chloe Wong, Farah Aziz	Daniel Lee, Natalie Cheng, Amir Hakim
Thursday	Stephanie Ong, Kelvin Yap, Alicia Tan	Jason Koh, Bryan Lim, Chloe Wong
Friday	Farah Aziz, Daniel Lee, Natalie Cheng	Amir Hakim, Stephanie Ong, Kelvin Yap
Saturday	Alicia Tan, Jason Koh, Bryan Lim	Chloe Wong, Farah Aziz, Daniel Lee
Sunday	Natalie Cheng, Amir Hakim, Stephanie Ong	Kelvin Yap, Alicia Tan, Jason Koh

Do you want to download this schedule?

Cancel

Download CSV

Sales Spike Anomaly Detection

Demo Controls

Select Product: Road Tire Tube

Demand Spike (x normal): 2x

Test Anomaly Status

Trigger Demand Spike

Clear Anomaly

Demo Mode: Simulates demand spike for presentation

DEMAND SPIKE +22% **Road Tire Tube** **RESTOCK**

INCREASE

PAST 4 WKS: **392** sold | IN STOCK: **452** units

PREDICTED SALES FOR THE NEXT 4 WEEKS: **396** MIN | **534** MAX

Order Stock

Demand Spike Detected AI Anomaly Detection Alert

Road Tire Tube | Demo Mode Active

Risk Level: NORMAL

ACTUAL SALES: **162** units/week | EXPECTED MAX: **133** units/week

SPIKE PERCENTAGE: +21.5% above forecast

Inventory Status: Current Stock: **452** units | **Sufficient stock**

AI Recommendation: INCREASE ORDER: Prepare 28 extra units

BUSINESS METRICS

The screenshot shows the 'Business Impact Dashboard' interface. At the top, there are navigation links for 'AdventureWorks Impact', 'Analytics', and 'Inventory'. A purple header bar features the text 'Powered by AI Forecasting' and the title 'Business Impact Dashboard' in large white font, with a subtitle 'Quantifying the value of intelligent predictive analytics & inventory optimization' below it. Below the header, there are two buttons: 'Enterprise Projection: Metrics scaled to 30-store retail chain deployment (300 products tracked)' and 'Pilot (10 SKUs) Enterprise Scale'. On the left, under 'Financial Impact', there are four cards: 'TOTAL SAVINGS RM139,710 per month' (Monthly), 'ANNUAL IMPACT RM1,676,610 projected annually' (Yearly), 'STOCKOUTS PREVENTED 240 products saved' (Protected), and 'PRODUCTS TRACKED 300 under management' (Active). On the right, a timestamp indicates 'Last updated: 11/27/2025, 11:01:37 PM'.

AdventureWorks Impact | Analytics | Inventory

Powered by AI Forecasting

Business Impact Dashboard

Quantifying the value of intelligent predictive analytics & inventory optimization

Enterprise Projection: Metrics scaled to 30-store retail chain deployment (300 products tracked)

Pilot (10 SKUs) Enterprise Scale

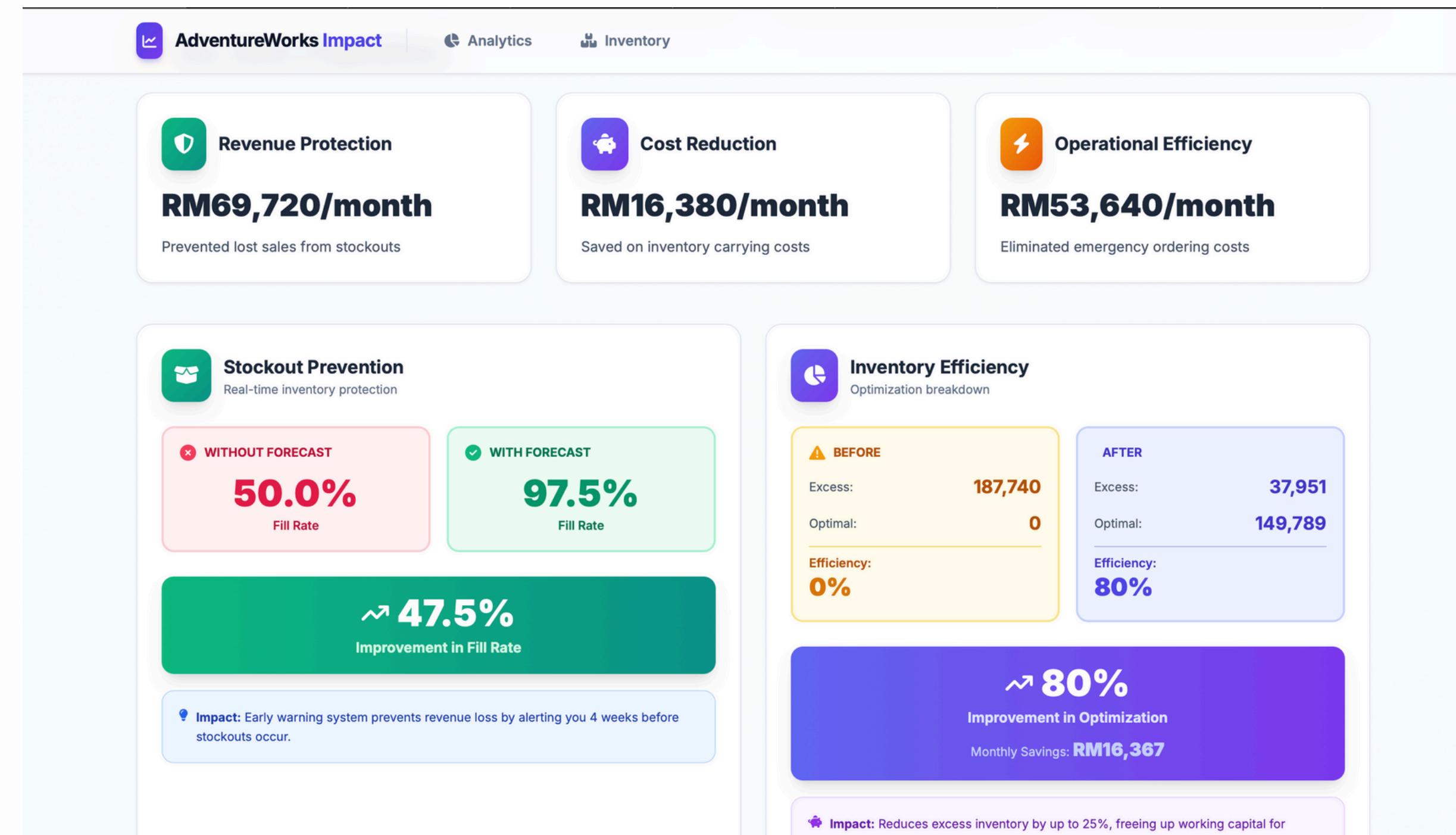
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Financial Impact

- TOTAL SAVINGS **RM139,710** per month (Monthly)
- ANNUAL IMPACT **RM1,676,610** projected annually (Yearly)
- STOCKOUTS PREVENTED **240** products saved (Protected)
- PRODUCTS TRACKED **300** under management (Active)

Key Value Propositions

BUSINESS METRICS



Impacts

Stockouts drop because forecast-driven restock alerts and anomaly scans catch demand surges before inventory runs dry.

Excess inventory shrinks thanks to confidence-interval guidance on optimal stock levels and costing metrics tied to actual product prices.

Staffing stays ahead of spikes as the scheduling copilot reallocates people automatically when predicted orders jump.

