Automobile Spare Parts Forecasting Report

1. Executive Summary

This report summarizes the AI/ML forecasting training for the Automobile Spare Parts project.
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Scope: 5 SKUs across 2 Locations.
Models Trained: SARIMA, Prophet, XGBoost, Weighted Ensemble.
Training Window: 4 Years of historical data (approx).

2. Training Methodology & Splits

To ensure robust model selection, we employed a Backtesting Strategy with multiple Training/Testing splits:
1. Split 3y/1y: Train on first 3 years, Test on last 1 year.
2. Split 3.5y/0.5y: Train on 3.5 years, Test on last 6 months.
3. Split 3.2y/0.8y: Train on 3.2 years, Test on last ~9 months.

Selection Logic: The 'Best Global Model' was selected based on a Composite Score (70% MAPE, 20% RMSE, 10% Bias) averaged across all splits.

3. Best Performing Models (Stats)

Part	Loc	Best Model	Test MAPE	Train MAPE	RMSE
PD457	A	SARIMA	14.4%	20.7%	126.9
PD457	B	SARIMA	7.8%	18.6%	66.1
PD2976	A	Weighted Ensemble	7.9%	18.0%	59.2
PD2976	B	SARIMA	5.8%	15.1%	45.5
PD1399	A	SARIMA	15.2%	16.7%	98.4
PD1399	B	Weighted Ensemble	10.4%	13.5%	76.7
PD3978	A	Weighted Ensemble	10.3%	14.4%	92.0
PD3978	B	Prophet	10.1%	7.0%	106.2
PD238	A	Prophet	10.1%	7.9%	0.8
PD238	B	SARIMA	5.9%	17.4%	0.6

**Train MAPE indicates in-sample fit. A very low Train MAPE vs High Test MAPE suggests Overfitting.*

4. 2025 Future Outlook

Part	Loc	Selected Model	Projected Total (2025)
PD457	A	SARIMA	8,398
PD457	B	SARIMA	8,658
PD2976	A	Weighted Ensemble	8,345
PD2976	B	SARIMA	8,761
PD1399	A	SARIMA	8,944
PD1399	B	Weighted Ensemble	7,802
PD3978	A	Weighted Ensemble	8,410

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PD3978	B	Prophet	8,084
PD238	A	Prophet	84
PD238	B	SARIMA	87