AI / ML Based Forecasting Models To Predict Product Demand for a Global Solar Power Consumer Products Distributor

15%
Reduction in inventory carrying cost

10%
Reduction in incidents of stock-out

WMAPE 12%
Accurate forecasting models

CLIENT

The client is focused on providing affordable consumer products which work on solar power. They work on a social cause to provide consumer power solutions globally.

PROJECT BRIEF

Given the dealer based distribution model and dynamic nature of supply chain, the customer wanted to develop AI / ML based forecasting models to predict the demand for each of it's products at dealer level. This will help them to optimize their inventory at dealer / warehouse level and also to make their procurement process better.

TECHNOLOGY STACK

PROBLEM STATEMENT

The customer has the below problems to optimize their inventory:

- Provide accurate daily forecasts to avoid stock-out and over-stocking situation.
- Models should provide forecast at dealer and product level. Some dealers / products can have very low / zero demand for days together.
- Reduce the inventory carrying cost and release free cash flow
- Model should adopt to the frequent product retirement and new product introduction.
- They have a bundle of products which are supposed to be forecasted together. Replacement of these products with new products should be dynamic in the model development and consumption process

SOLUTION DELIVERY

- Squareshift team developed a fully GCP native forecasting models
- Automated Model refitting Mechanism with guard rails for model performance
- Vertex AI pipelines used for Model development, Forecasting, Refitting and Model tracking and multiple algorithms tried out to find the best one (LGBM, SVR, ARIMA, Auto ML)
- Auto ML and Custom ML pipelines used based on the product and dealer segment level sales distribution
- AI agents used to solve the below problems:
1. Identify new products every month and create a pipeline to build models for them
2. Segment the dealers by their sales volume and build segment wise models every month
3. Route the dealers by volume to the right model for daily forecasting
4. Dynamically evaluate the re-fitted models every month among a set of algorithms and choose the best one for forecasting