

Problem Definition: Consider incorporating time series forecasting techniques like ARIMA Or prophet to capture temporal patterns in demand data

Incorporating time series forecasting techniques like ARIMA or Prophet can be a valuable approach to capture temporal patterns in demand data. These techniques are particularly useful when you have historical data and want to make future predictions based on past trends. Here's how you can use each of them:

1. ARIMA (AutoRegressive Integrated Moving Average):

- ARIMA models are suitable for stationary time series data.
- You'll need to identify the order of differencing (d), autoregressive (p), and moving average (q) terms to build an ARIMA model.
- This method is effective for capturing linear trends and seasonality.

2. Prophet:

- Prophet is an open-source forecasting tool developed by Facebook.
- It is designed to handle time series data with multiple seasonalities, holidays, and special events.
- Prophet automatically detects changepoints and can handle missing data points.
- It's user-friendly and doesn't require extensive parameter tuning.

When incorporating these techniques, follow these general steps:

1. Data Preparation:

- Clean and preprocess your demand data, handling missing values and outliers.

2. Model Selection:

- Choose between ARIMA and Prophet based on the characteristics of your data and the complexity of the patterns you want to capture.

3. Model Training:

- Split your data into training and testing sets.
- Train the chosen model on the training data.

4. Parameter Tuning:

- For ARIMA, find the optimal values of d, p, and q using techniques like grid search or automated tools.
- Prophet often requires minimal parameter tuning but may benefit from specifying holidays and custom seasonalities.

5. Model Evaluation:

- Evaluate the model's performance using appropriate metrics (e.g., MAE, RMSE) on the testing data.

6. Forecasting:

- Use the trained model to make future demand predictions.

7. Visualization:

- Visualize the forecasts along with confidence intervals to communicate the uncertainty of predictions.

8. Monitoring and Updating:

- Continuously monitor the model's performance and retrain it as new data becomes available.

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