Technical Report: Forecasting with Prophet Model

Prophet is a time-series forecasting tool developed by Facebook, designed to handle data with strong seasonal effects, missing values, and outliers. It is particularly useful for predicting daily time-series data with known seasonal patterns and is robust against irregularities. Prophet decomposes the time series into three main components: trend, seasonality, and holidays.

Key Parameters for Prophet:

- `changepoint_prior_scale`: Controls the flexibility of the trend component. A larger value (e.g., 0.1) allows the trend to change more rapidly, while a smaller value (e.g., 0.001) enforces a smoother, more stable trend.

- `seasonality_prior_scale`: Regulates the strength of seasonal effects. A higher value increases the model's sensitivity to seasonal variations, while a lower value leads to smoother seasonal cycles.

- `holidays`: Enables the inclusion of external events or holidays that could impact the time series. This is important for datasets influenced by specific dates, such as school holidays or public events.

- `seasonality_mode`: Defines whether the seasonal effect is modeled additively or multiplicatively. Additive is useful for small seasonal variations, while multiplicative is better for large fluctuations.

- `daily_seasonality`, `weekly_seasonality`, `yearly_seasonality`: These parameters control whether and how seasonal effects are modeled at different time scales.

Conclusion

Prophet is an intuitive and highly flexible tool for time-series forecasting, especially for data with clear seasonality and external events. Its user-friendly parameters allow for quick adaptation to various forecasting needs.