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Time Series Forecasting using PROPHET

BRI Data Hackathon 2021 Workshop

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- Pythonist since 2017

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Objectives

01 Understanding the **workflow** of time series forecasting in general

02 Getting to know frequently used features of **Prophet**

03 Run through the code examples of Prophet implementation in **Python**

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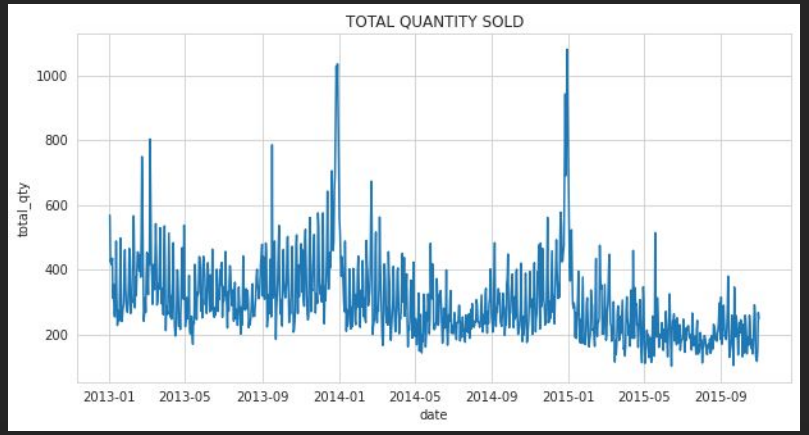

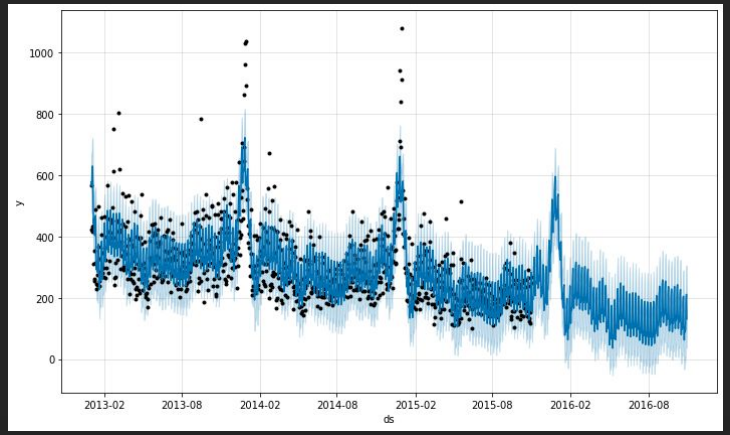

Time Series

A series of data points collected at **equally spaced** time intervals and indexed in **time order**. Thus, a sequence of discrete-time data.

Forecasting

Learn any inherent structures or patterns within the **historical** data, with the objective of generating **future** values for the series.

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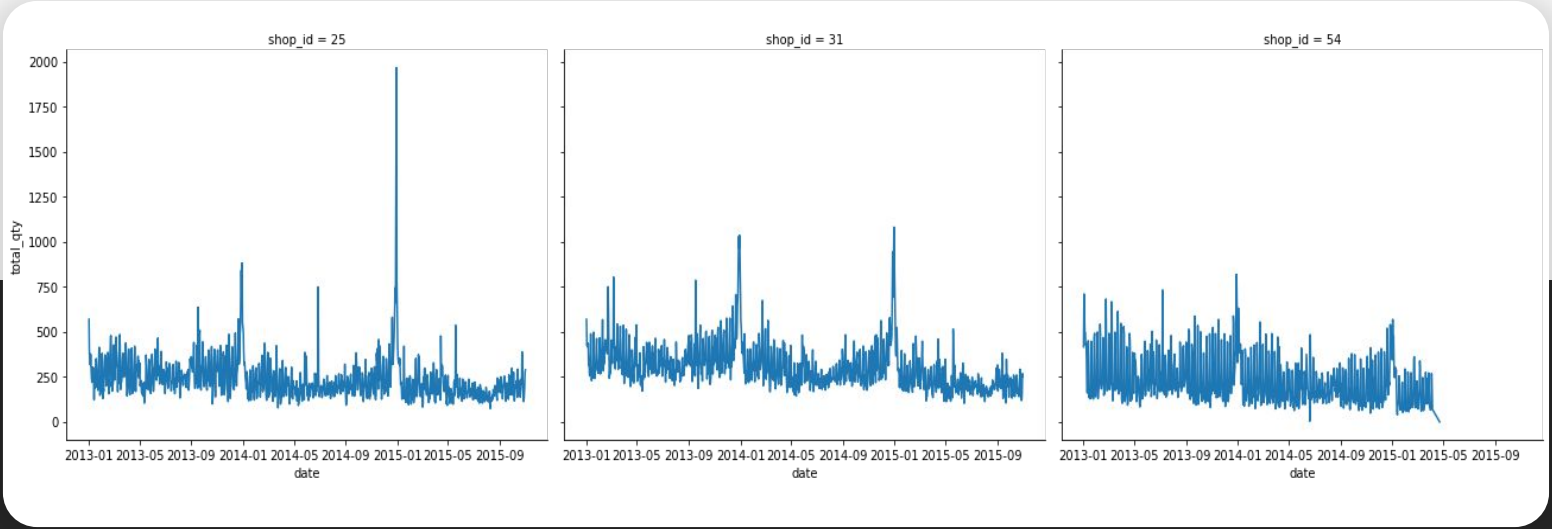
Multiple Time Series



There is **one variable** from **multiple objects** being observed from time to time.

Example: We observed the fluctuation of total_qty over time, from the three different stores.

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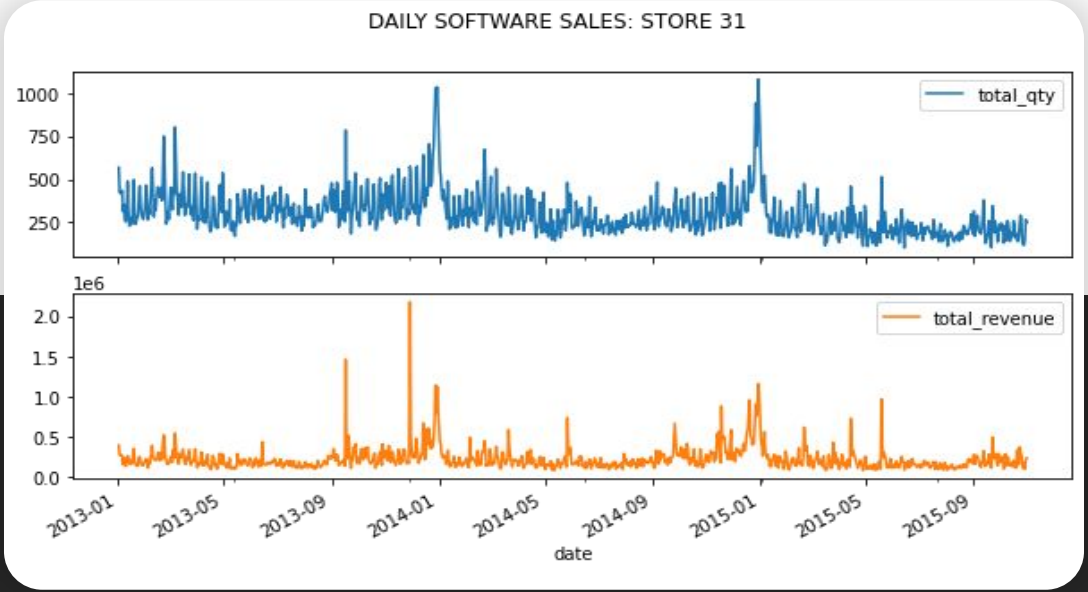
Multivariate Time Series



There are **multiple variables** from only **one object** being observed from time to time.

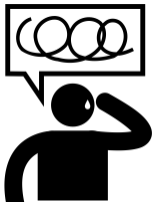
Typically for such series, the variables are closely interrelated.

Example: We observed the fluctuation of total_qty and total_revenue over time, from only store 31

Problems

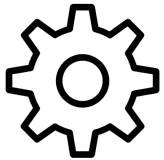
Manual effort of handling missing values

Cannot handle irregular patterns, such as outliers



Difficult in handling multiple seasonalities

Limited hyperparameter tuning



Forecasting
Traditional Approach

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PROPHET

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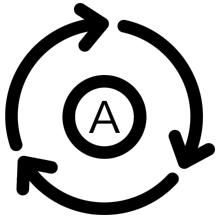
Open source library released by **Facebook**'s Data Science team

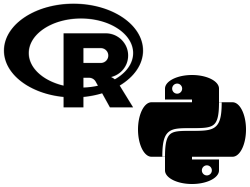
An **additive** model: Trend + Seasonality + Holiday

Accurate and Fast

Tunable Forecasts



Fully Automatic

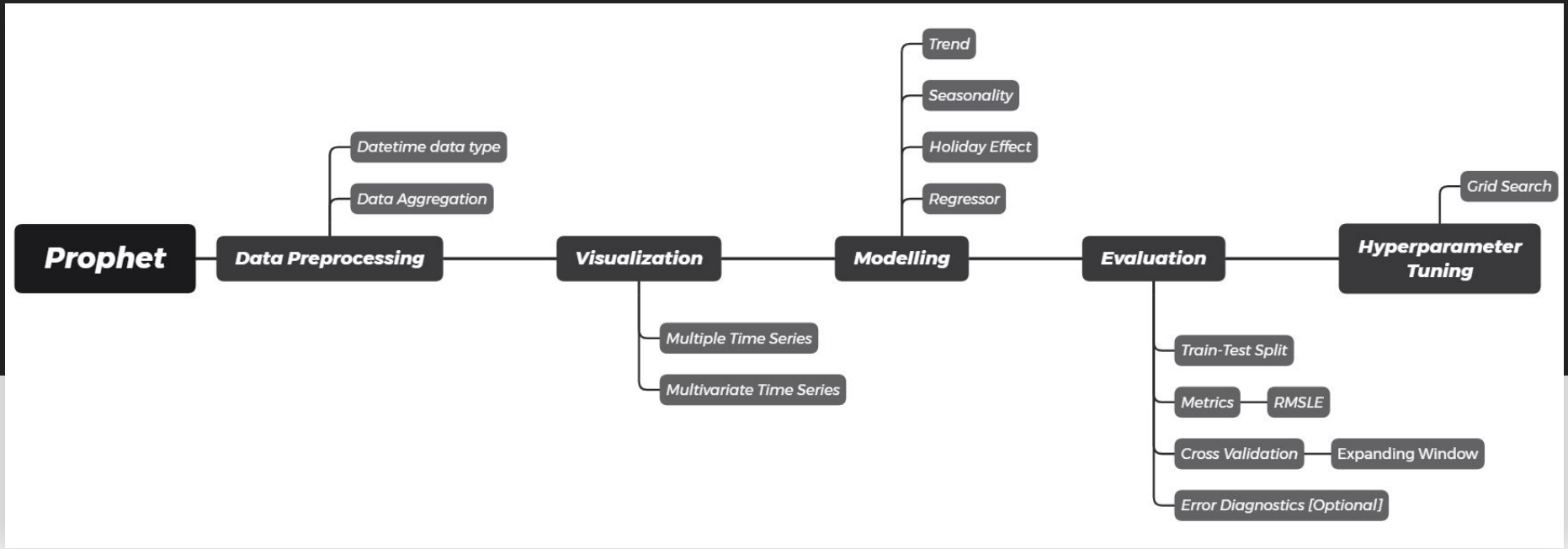


Available in R and Python

Detail:

https://facebook.github.io/prophet/

Workflow


Prophet
Data Preprocessing
Datetime data type
Data Aggregation
Visualization
Multiple Time Series
Multivariate Time Series
Modelling
Trend
Seasonality
Holiday Effect
Regressor
Evaluation
Train-Test Split
Metrics
RMSLE
Cross Validation
Expanding Window
Error Diagnostics [Optional]
Hyperparameter Tuning
Grid Search

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Google Colab Notebook

bit.ly/algo-webinar-material

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Best of Luck

Happy Forecasting!