**FORECAST STOCK PRICE USING PROPHET**

What is Prophet:

Prophet is a time forecasting algorithm developed by the Facebook team. The model is designed to make time predictions based on data that has specific characteristics such as daily and annual seasonal trends, holiday effects, and the possible impact of certain events.

Time Series Analysis

1. Stock Price over year (Close price)
2. High Price/ Low Price/ Volumn over year
3. Daily Market Capitalization = Open Price \* Volumn
4. Daily Voltality (Return) = (Close Price 1 / Close price 0) -1
5. Cumulative Return using Close Price & Adjusted Close Price
6. The Average Monthly Returns
7. The Average Yearly Returns
8. The Average Day of Week Returns
9. Moving Average 50 days, 100 days, 200 days, 300 days of Stock Price (using close price)

Forecasting Stock Price with Prophet

1. How to create a forecast data in 365-day period

* Define Split Date: Which date will we split data into: train\_data and test\_data?
* Define train\_data & test\_data based on Split Date
* Define Forecast period: example 365 days
* Define which model you will use to make a forecast. In this case, we will use Prophet: model=Prophet()
* Fit model with historical stock data
* Using model.plot(), model.plot\_components(), plot\_plotly(model, ), plot\_components\_plotly(model, ) for visualization.

1. Evaluate the difference between the predicted values of the model and the true values of the data using mean\_absolute\_error (MAE) and Root\_mean\_squared\_error (MSE)

* MAE is the average absolute difference between the predicted values of the model and the true values of the data 🡺 to evaluate the performance of a regression model.
* Root Mean Square Error (RMSE) is the [standard deviation](https://www.statisticshowto.com/probability-and-statistics/standard-deviation/) of the [residuals](https://www.statisticshowto.com/probability-and-statistics/statistics-definitions/residual/) ([prediction errors](https://www.statisticshowto.com/prediction-error-definition/))

1. View the dates where the chagepoints occurred

* Changepoints are the datetime points where the time series have abrupt changes in the trajectory.
* By default, Prophet adds 25 changepoints to the initial 80% of the data-set.
* Let’s plot the vertical lines where the potential changepoints occurred

1. Modeling Holiday

* Add holiday in the forecast model, then using model.plot(), model.plot\_components(), plot\_plotly(model, ), plot\_components\_plotly(model, ) for visualization
* On what day stock price was the highest?
* What is the average Closing price?
* What is the maximum and minimum volume of stock traded
* For how many days the closing value was less than 60 dollars?
* What could be the maximum high value for each year?