VNIndex Stock price prediction tool (Ho Chi Minh Securities Exchange)

Outline Detail

Section 1: Stock Price Forecasting with Analyst in the loop

1.1 Problem proposal

Stock price forecasting

Stock price forecasting is a intimidating job as the nature of the market is volatile and strongly dependent from many aspects of the economy such as financial reports, politics and even un-official news source. Therefore, predicting the stock market is more or less a motivating challenge that data analysts are trying to break the code.

In the scope of this project, we will use Facebook prophet to analyse the top 30 index from VNIndex. Prophet is a additive model enable analysts to produce faster, more flexible model using tunable paramaters. Although FBprophet has a better perfomance in modelling the forecast, it gives inferior accuracy comparing to Neural Network. However, with the votality of the stock market, FBProphet is more suitable choice for this project as it put Analyst in the loop, who can quickly create predictve time-series models and make preemptive action from such models.

The main goal of this project is not to out-play the professional broker whose day-by-day job is to use their technical skills to assess the stock market, but to help them better analyse the data and visualize the prediction.

Problems with Vietnam stock data collecting

Vietnam stock market is strongly dependent from developed countries' stock markets. Most of the time, a downfall or a hike in Vietnamese Stock Market comes from Wallstreet. Therefore, predicting Vietnam Stock Market can lead to false assumption with only local data.

In terms of data sources, there is a scarcity in getting a live feed of stock data as it is kept at bay at the big securities companies. Luckily, Cophieu68 provide a reliable source of past trading data that can be use for modelling purposes.

1.2 Applying simple time-series forecasting model to VIC (Vingroup Stock Index)

Nature of Time-series forecasting Holt and Winter Model Stock price forecasting using ARIMA (Autoregressive integrating moving average) Stock price forecasting using Neural Network Result Analysis

1.3 Time series prediction at scale with Facebook Prophet using Additive Model

Forecasting at scale with Facebook Prophet In organizations, forecasting made by data scientists is a common task to help with capactiy planning, goal setting and anomaly detection. However, producing reliable

forecasts involves serious challenges. With time series, the mentioned task exposed with many uncertainties and biases. To better tackle above challenges, we need a tool that helps analysts create model with interpretable paramters, of high performance, and quick evaluation. There are two main themes in the practice of creating a variety of business forecasts:

- Completely automatic forecasting techniques that too often inflexible to produce useful assumption or heuristics
- Analysts who can produce high quality forecasts are rare because it needs substaintial knowledge and experience.

These two results in a high demand for high quality forecasts often surpass the pace at which analysts can produce them.

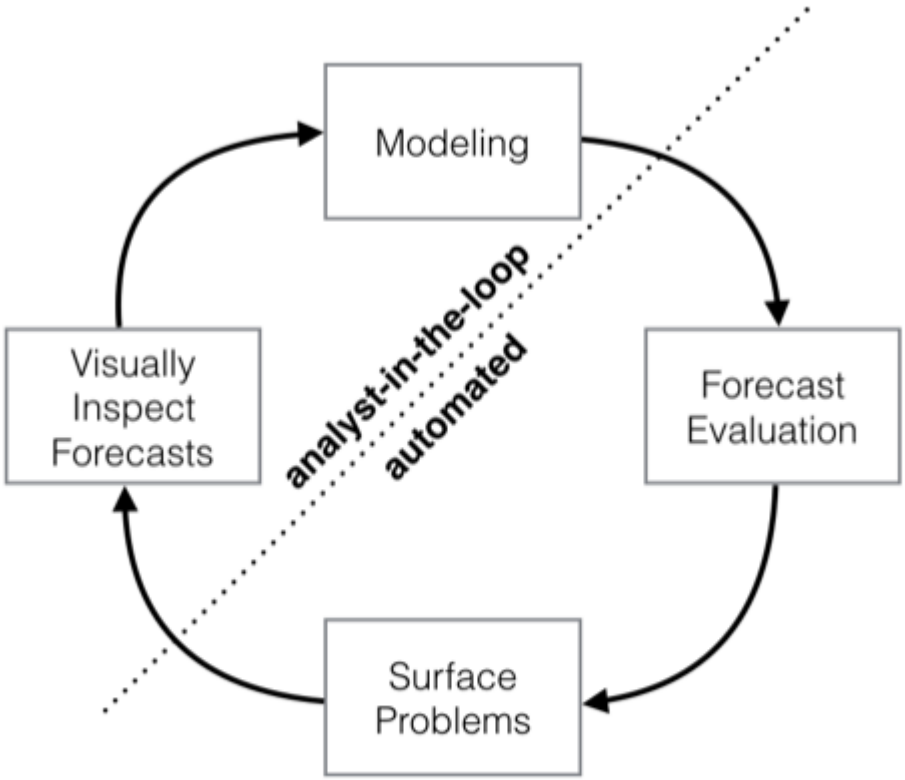
Facebook Prophet is a forecasting tool available in Python. Iit makes the job of forecasting easier for experts and non-experts to make high quality forecasts that keep up with demand.

Forecasting at scale implies the complexity in variety of forecasting problems, in this case, the stock market. At scale doesn't directly concern about computational power and storage as this is a straightforward problem. Building a large number of models that **scales out** to many problems made possible with Prophet. And it has been proved to be trust-worthy for decision making at Facebook.

Useful application of Facebook Prophets:

- hourly, daily, or weekly observations with at least a few months (preferably a year) of history
- strong multiple “human-scale” seasonalities: day of week and time of year
- important holidays that occur at irregular intervals that are known in advance (e.g. the Super Bowl)
- a reasonable number of missing observations or large outliers
- historical trend changes, for instance due to product launches or logging changes
- trends that are non-linear growth curves, where a trend hits a natural limit or saturates

Prophet shines the accurate forecasts are produced by skilled forecasters, with much less effort. Due to the additive model, the results will not be produced under a blackbox from a completely automatic precedures. Prophet, on the other hand, enable Analyst with no training in time series method can improve and tweak forecasts using a variety of easily-interpretable paramters. In that case, we put the analysts in the loop.



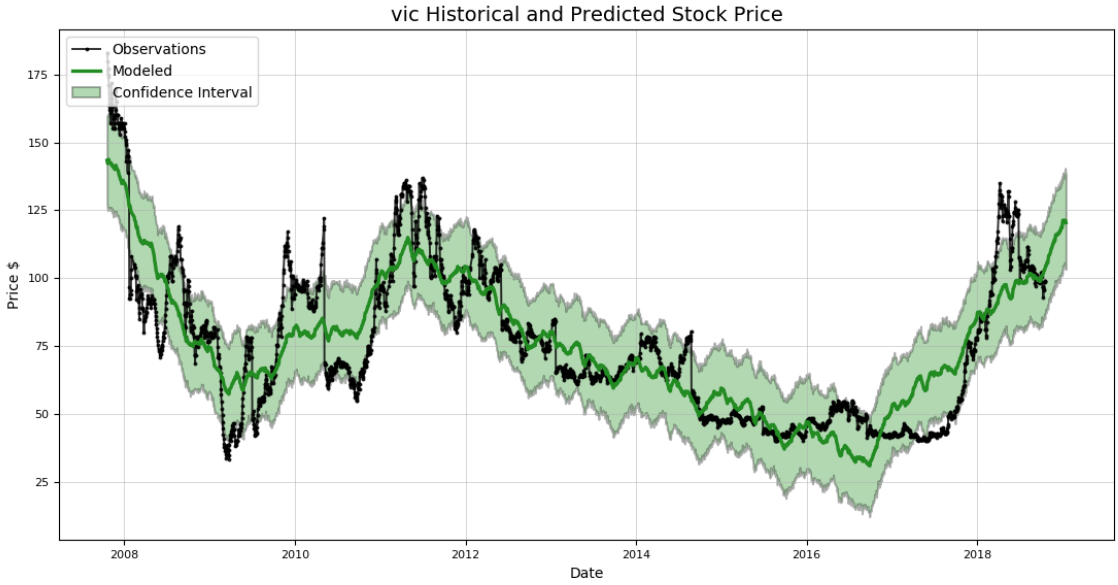
Additive model in time-series forecasting Analyst in the loop with semi-automatic forecasting model.

1.4 Apply Stocker, a FBProphet stock analysis, to VNIndex dataset

Stocker, an open source stock analysis tool using Facebook Prophet Stocker is a Facebook Prophet implementation by William Koehrsen as an Stock Analysis tool for S&P300 Stocks using Quandl Financial Library.
Stocker for VNIndex With the idea of stocker, we will apply the VNIndex stock history to produce a high quality analysis and therefore, give better forecasting decision-making assists. **Apply Stocker To VIC (Vincom - A Vingroup Company)** Migrating from S&P300 to VNIndex consists of standardizing the dataset to match those of the US data. For the piloting process of the forecast, we will use VIC, a Vincom stock ticker to forecast its future price.

Using the 90 days period, we have the model as follow. Prophet are made using an additive model which consider a time series as a combination of an overall trend along with seasonalities on different time scales such as daily, weekly, and monthly. Create a model and making a prediction can be done with Stocker in one line:

```
model, model_data = vic_stock.create_prophet_model(days=90)
```



In the above prediction, the green line contains a confidence interval representing the uncertainty in the forecast. In this case, the confidence interval is set at 80%, meaning we expect that this range will contain the actual value 80% of the time. Notice that at the end of the black dotted lines, the confidence interval widens as it grows further away from the history data.

Evaluate Predction

1.5 Using modified Stocker to build models for VN30 (Top 30 VNIndex stocks)

VN30, top 30 VNIndex, analysis Building additive models using Stocker For VNIndex

Section 2: Deploy Stocker For VNIndex

2.1 Stock Forecast Application built with Analyst in the loop

Feasibility The Technology stack Design Layout Target Audiences Functionality

2.2 System Specification

Data Use cases Sequential Chart

2.2 Apply ReactJS Framework to boost development process

2.3 Deploy VNStocker to the backend stack

2.4 Feedbacks from a Stock Broker