Title, author, abstract, keywords, introduction, methods, results, discussion, and references.

Title

Author

Abstract

Keywords

1. Introduction
2. Methods

2.a. Exploratory data analysis

For the purpose of EDA, we considered the records that described the highest price, lowest price, open time, close time, open price and close price for each day.

The preprocessing steps:

* Converting the columns consisting of dates from Unix timestamp to date time format.
* Creating customized columns based on data:-
* To analyze the close price and open price for each day.
* To analyze the open price and the highest price for each day.

1. Comparison using visualization:

Chart, line chart, histogram

Description automatically generated

Fig1. Prices at open time vs prices at close time at each day

Chart, histogram

Description automatically generated

Fig2. Prices at open time vs highest price each day

We observe the overlap in the graphs for both the open price and close graph each day Fig1. The prices are continuous, which means the closing rate from previous record is same as the opening rate for the next record.

There is visible difference in the open price and highest price of the day Fig2. We see that the highest price (orange line graph) has risen above the price

ii. Evaluation of gain at each day:

Using the customized columns, we use the below mentioned formula to calculate gain each day:

**Gain(at each day) = Close price(at each day) – Open price(at each day)**

**If Gain > 0, Gain\_Achieved = TRUE else,**

**Gain\_Achieved = FALSE**

So we could infer that about 53% of the records were found to have achieved gain.

iii. Analyzing the differences between the open and highest prices:

Using the customized columns, the correlation between Gain and difference between (open and highest prices) was inferred to have a value of 0.60.

This provided an insight that the Gain and increase in highest rate for the day greater than open rate in positively correlated, increase in one could possibly increase the probability of increase the other.

2.b. Predicting gain using classic algorithms:

Feature columns: open rate, highest rate and lowest rate of the day

Label column: Gain

i. Logistic regression

Using the logistic regression as a baseline classification algorithm, we fitted our data to the model to predict if there is a probability of achieving gain at the end of the day.

Accuracy: 87%

ii. KN neighbors classifier

Accuracy: 71%

2.c. Prophet by Facebook

Facebook Prophet is an open-source algorithm for generating time-series models that uses a few old ideas with some new twists. It is particularly good at modeling time series that have multiple seasonalities and doesn’t face some of the above drawbacks of other algorithms.[[1]](#footnote-1)

For trend analysis and prediction, records that described the highest price, lowest price, open time, close time, open price and close price for every hour were utilized.

The Fig3. Shows the general trend followed by our data.

Following the steps mentioned in the Prophet documentation[[2]](#footnote-2), we fit our data into the Prophet model. The resultant trend prediction is displayed in Fig5, the Prophet was able to catch the upward trend and predict the same.

Prophet.plot\_components method was used to see the trend, yearly seasonality, and weekly seasonality of the time series. Fig4 displays the output from Prophet.

Using the outputs, analysis on general trend was done.

* The Fig4 clearly displays a drop in trend during Fridays, which suggests approximately the best time to buy.
* Similarly, the trend suggests the best time to sell is Monday.

Chart, histogram

Description automatically generated

Fig3. Prices at close time at each hour of the day

Chart

Description automatically generatedChart, histogram

Description automatically generated

Fig4. Trend analysis and prediction for varied time components

Fig5. Trend prediction by Prophet

1. https://towardsdatascience.com/time-series-analysis-with-facebook-prophet-how-it-works-and-how-to-use-it-f15ecf2c0e3a [↑](#footnote-ref-1)
2. <https://facebook.github.io/prophet/docs/quick_start.html#python-api> [↑](#footnote-ref-2)