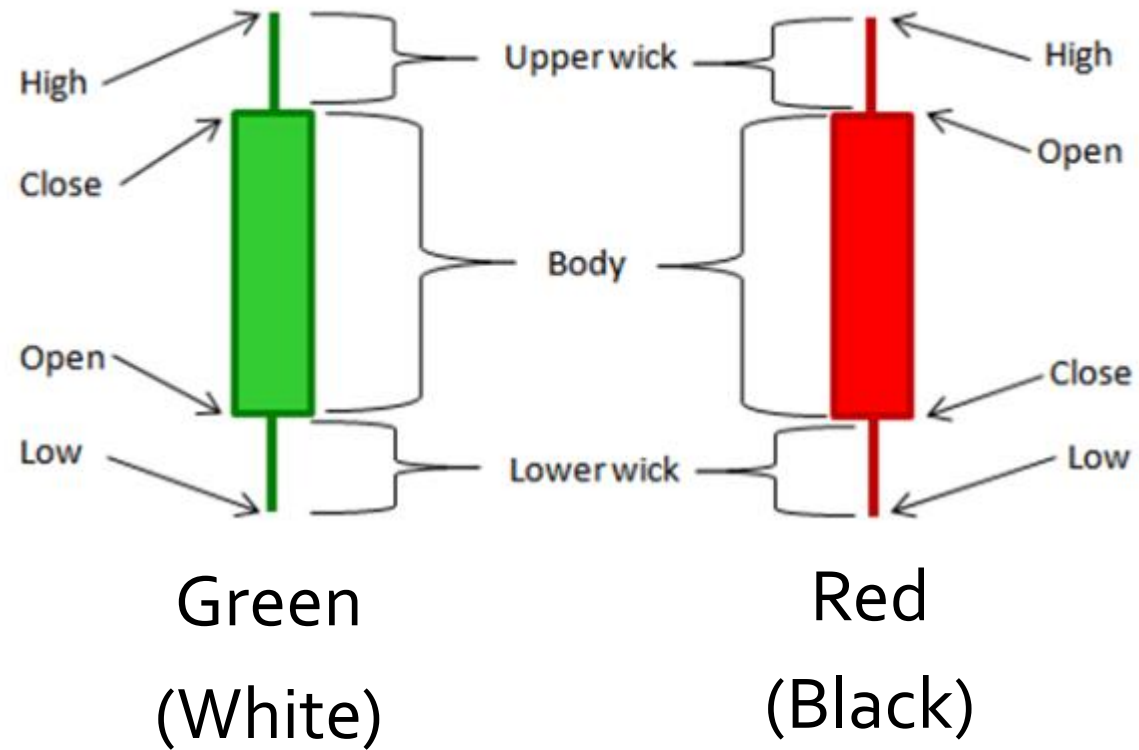


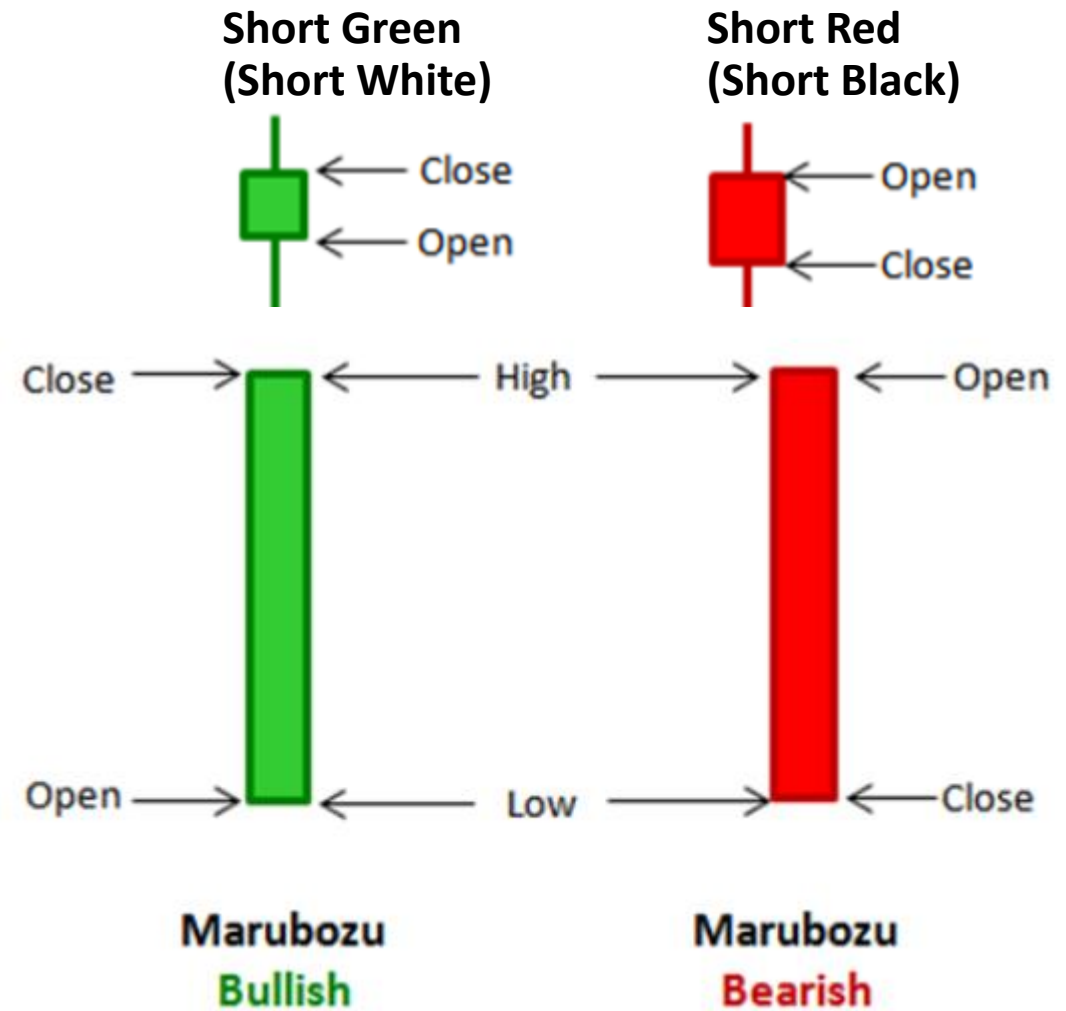
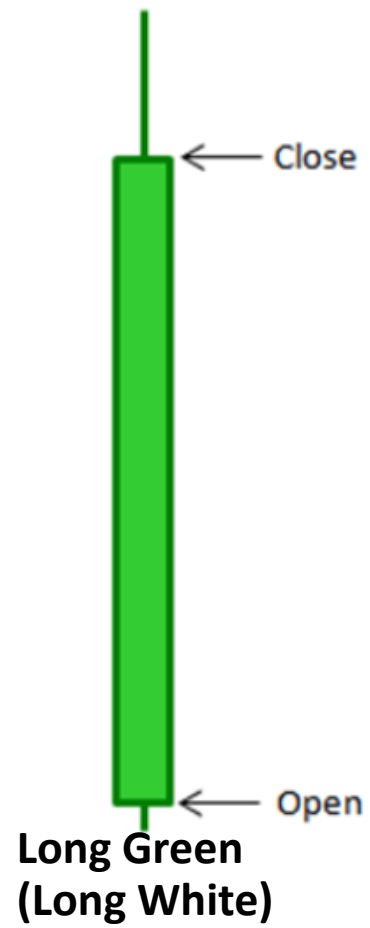
# Using Candle Stick Patterns for Day-Trade

The Data Incubator - Capstone Project

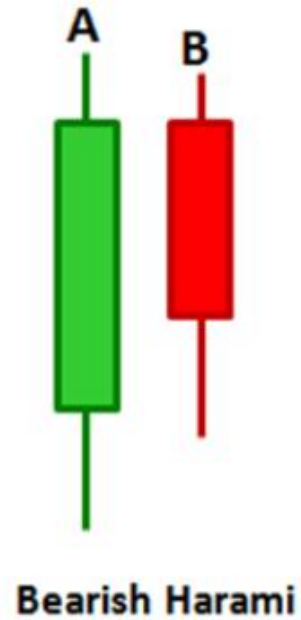
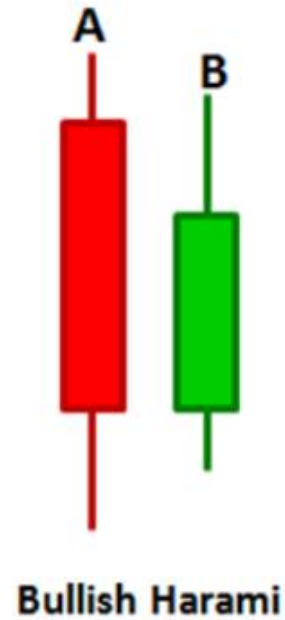
Suat Akbulut

# Candle Sticks





# Examples of Candle Stick Patterns



# What I do?

Statistical significance  
between Candlestick  
patterns and Mean  
Return of Day-Trade ?

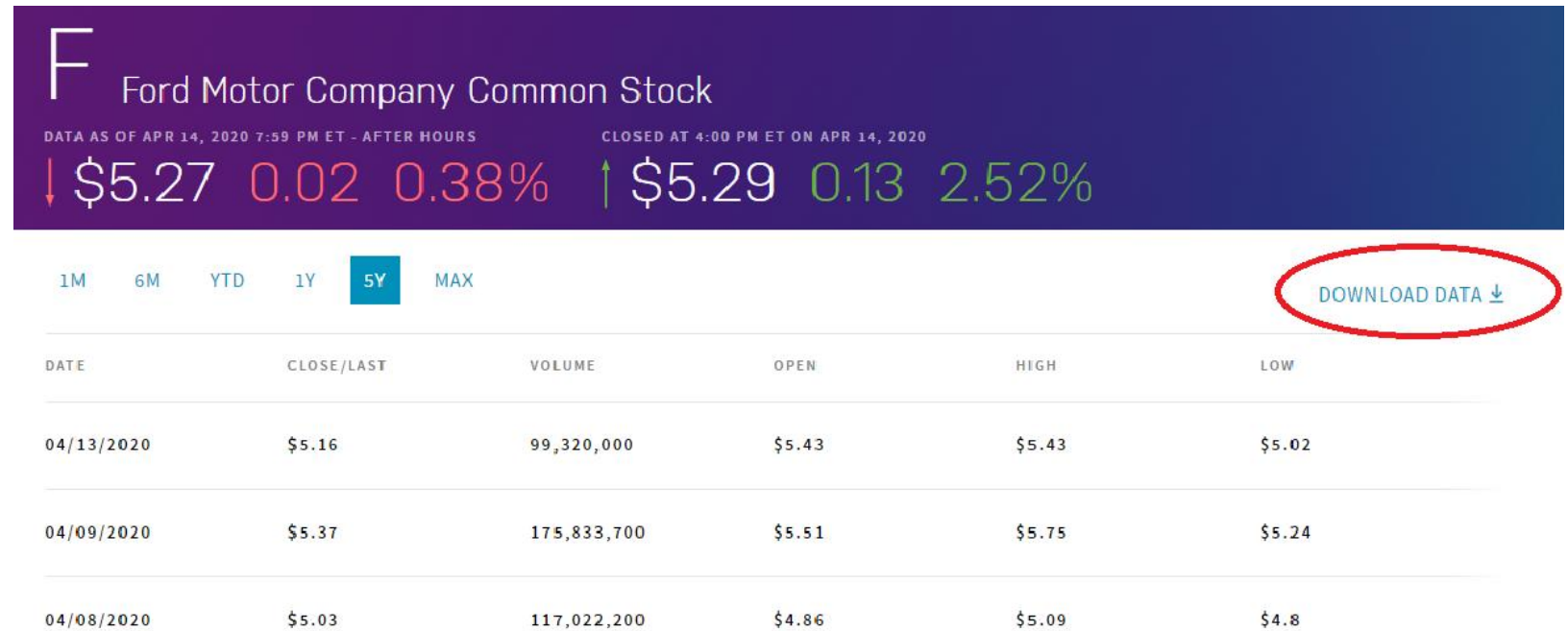
- Scrape 300,000 daily price data about the top 250 S&P500 stocks
- Create candlesticks, day-trade return
- Predict whether a day-trade is likely to be profitable with acceptable **precision**.

| <u>Model</u>            | <u>Accuracy</u> | <u>Presicion</u> | <u>Recall</u> |
|-------------------------|-----------------|------------------|---------------|
| Logit (Non-Opt)         | 0.521           | 0.528            | 0.756         |
| Random Forest (Non-Opt) | 0.513           | 0.526            | 0.764         |
| NN                      | 0.516           | 0.530            | 0.674         |

# Part 1: Scrape Data

[www.nasdaq.com](http://www.nasdaq.com),  
Top 250 S&P500 Stocks Last 5 year's daily  
Open, High, Low, Close, Volume

Used requests  
Saved as .csv files  
ticks and Label the Patterns



The screenshot shows the NASDAQ website for Ford Motor Company Common Stock. The header is dark blue with white text. Below the header, there are two rows of stock data: one for the current price (\$5.27) and one for the previous close (\$5.29). The '5Y' tab is selected in the time period menu. A red circle highlights the 'DOWNLOAD DATA' button. Below the menu is a table with columns: DATE, CLOSE/LAST, VOLUME, OPEN, HIGH, and LOW. The table contains three rows of data for the dates 04/13/2020, 04/09/2020, and 04/08/2020.

| F Ford Motor Company Common Stock                |            |             |                                      |        |        |
|--|------------|-------------|--------------------------------------|--------|--------|
| DATA AS OF APR 14, 2020 7:59 PM ET - AFTER HOURS |            |             | CLOSED AT 4:00 PM ET ON APR 14, 2020 |        |        |
| ↓ \$5.27 0.02 0.38%                              |            |             | ↑ \$5.29 0.13 2.52%                  |        |        |
| 1M   | 6M         | YTD         | 1Y                                   | 5Y     | MAX    |
| DOWNLOAD DATA ↓                                  |            |             |                                      |        |        |
| DATE   | CLOSE/LAST | VOLUME      | OPEN                                 | HIGH   | LOW    |
| 04/13/2020                                       | \$5.16     | 99,320,000  | \$5.43                               | \$5.43 | \$5.02 |
| 04/09/2020                                       | \$5.37     | 175,833,700 | \$5.51                               | \$5.75 | \$5.24 |
| 04/08/2020                                       | \$5.03     | 117,022,200 | \$4.86                               | \$5.09 | \$4.8  |

## Part 2: Create Candlesticks and Label the Patterns

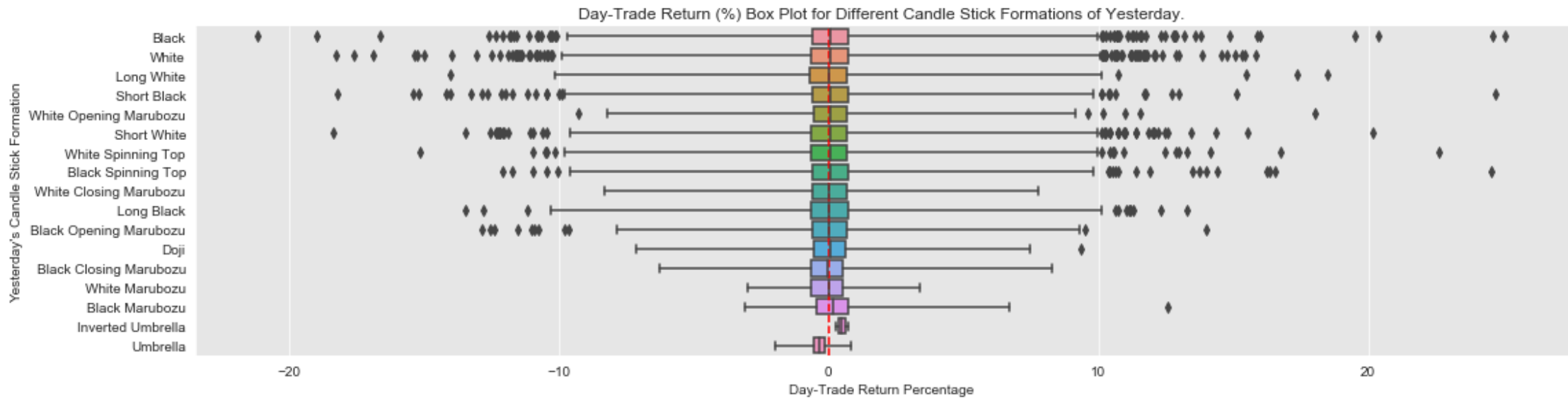
First 18 different candle sticks for the last 4 days

Volumes for the last 4 days

Day Trade Profit (%)

Day Trade Profit (Binary)

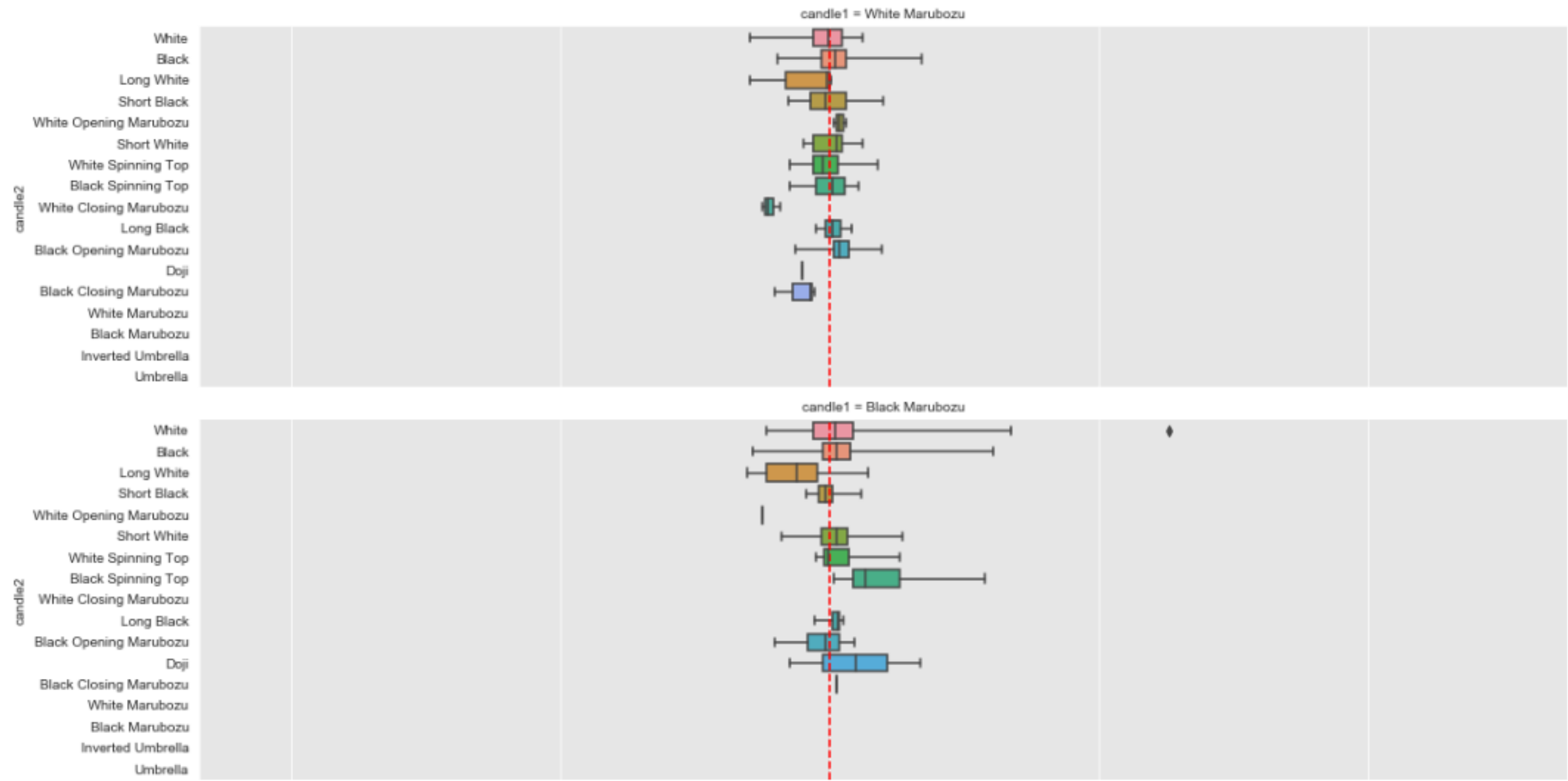
Labelling the patterns (NEXT)



# Part 3: Exploratory Data Analysis



# Last Two Day's Candle Stick Formation vs Percentage Return

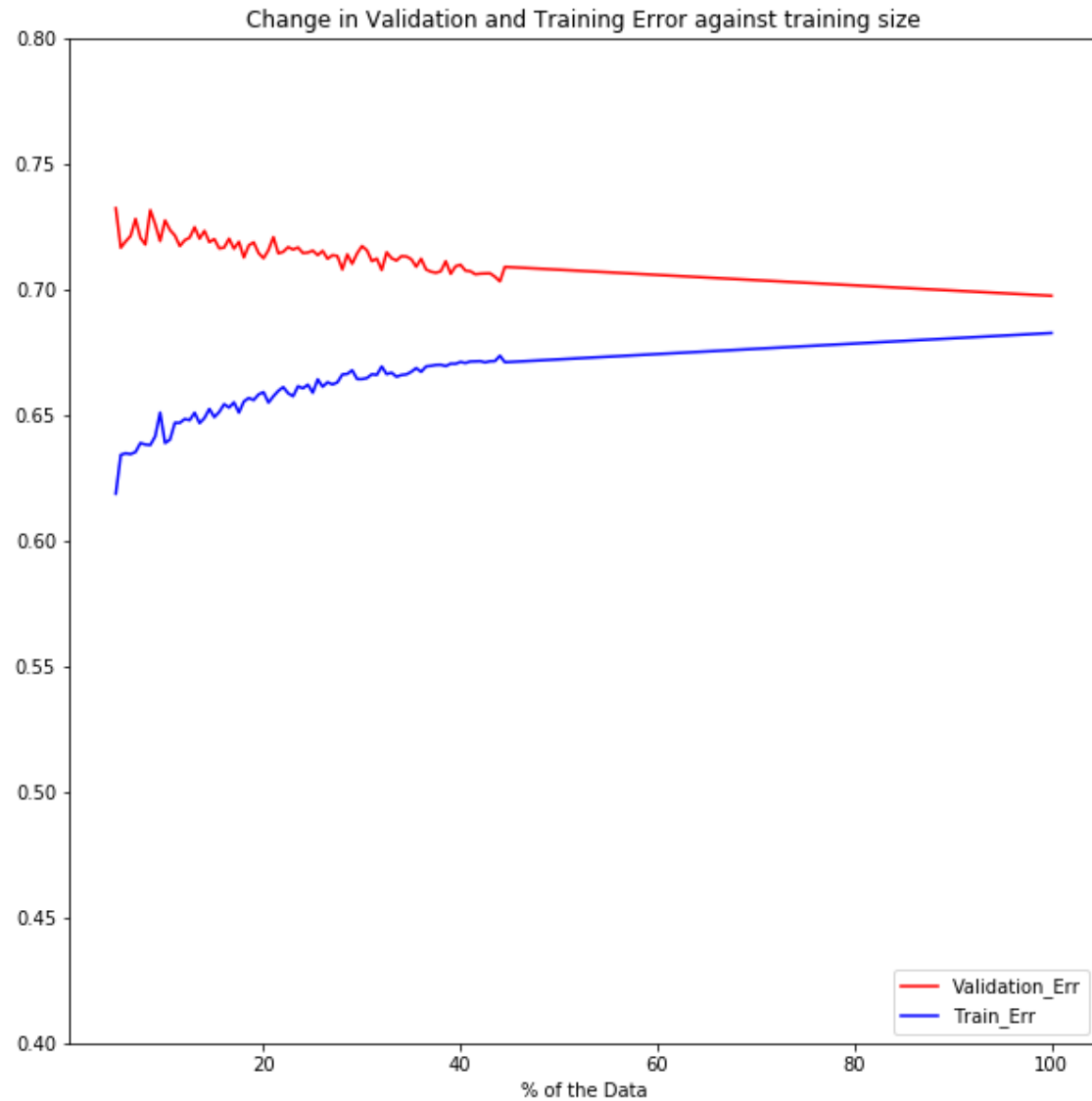


## Part 4: Preprocess and ML:

- Logistic Regression, Random Forest Classifier, and Neural Network

| <u>Model</u>            | <u>Accuracy</u> | <u>Presicion</u> | <u>Recall</u> |
|-------------------------|-----------------|------------------|---------------|
| Logit (Non-Opt)         | 0.521           | 0.528            | 0.756         |
| Random Forest (Non-Opt) | 0.513           | 0.526            | 0.764         |
| NN                      | 0.516           | 0.53             | 0.674         |

## Part 5: More data or More Complication?



Next:

More  
Complexity

- First 18 different candle sticks for the last 4 days
- Volumes for the last 4 days (std)
- Day Trade Profit (%)
- Day Trade Profit (Binary)
- (NEXT) Labelling the patterns, e.g. Bearish Harami, Bullish Engulfing, Bearish Evening Star, etc.
- Maybe candlestick pattern is more effective for smaller capitalized stocks