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Capstone Project 2

Comparing LSTM & Prophet on Predicting Stock Price Movement

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Introduction

- ❖ Predicting stock price movement
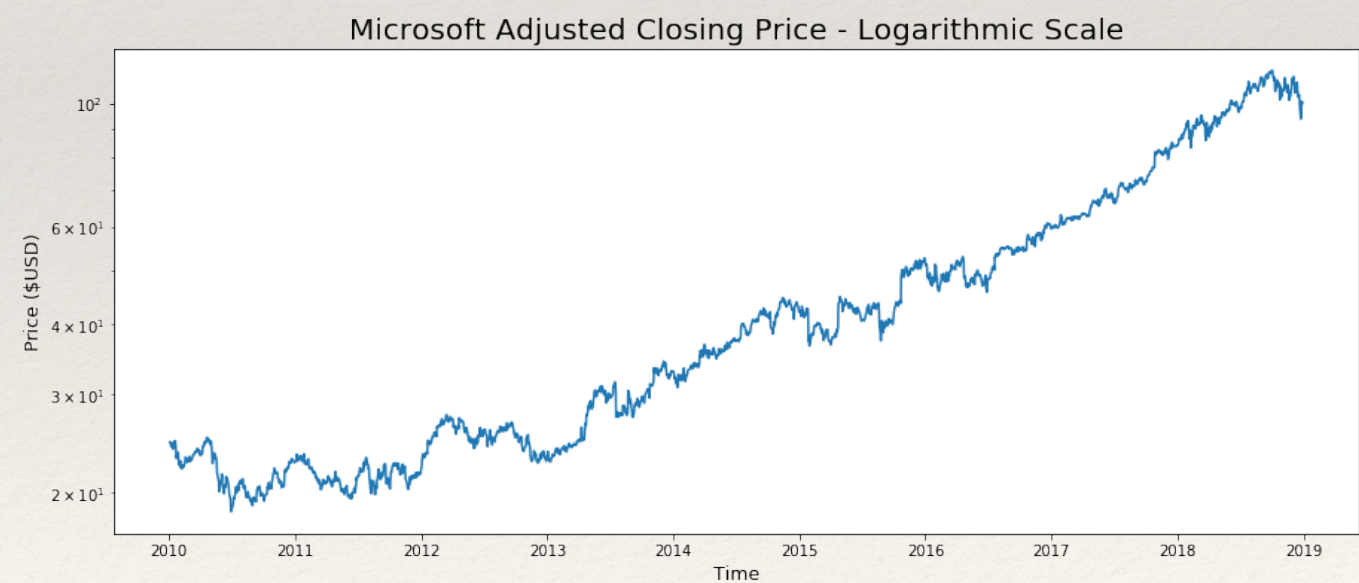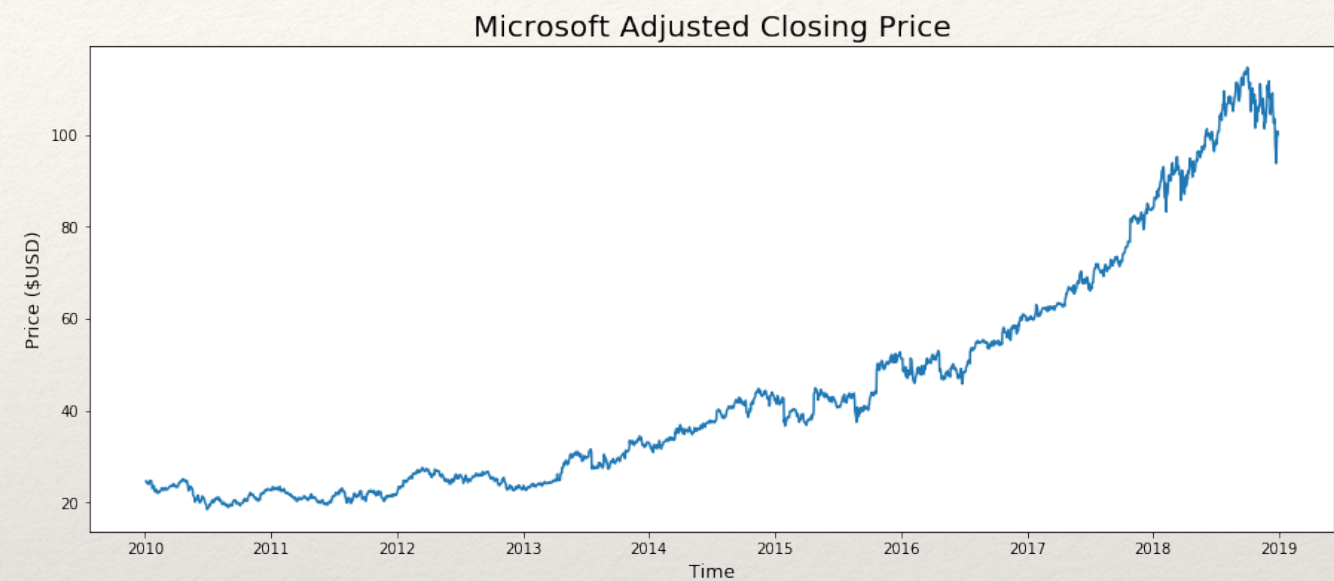
- ❖ LSTM

- ❖ Facebook Prophet

Data Set

- ❖ Alphavantage API

- ❖ Microsoft Stock

  - ❖ 1/2010 - 12/2018

Data Wrangling

❖ Custom function to pull data from API

    ❖ Symbol, start date, end date

    ❖ Returns pandas data frame
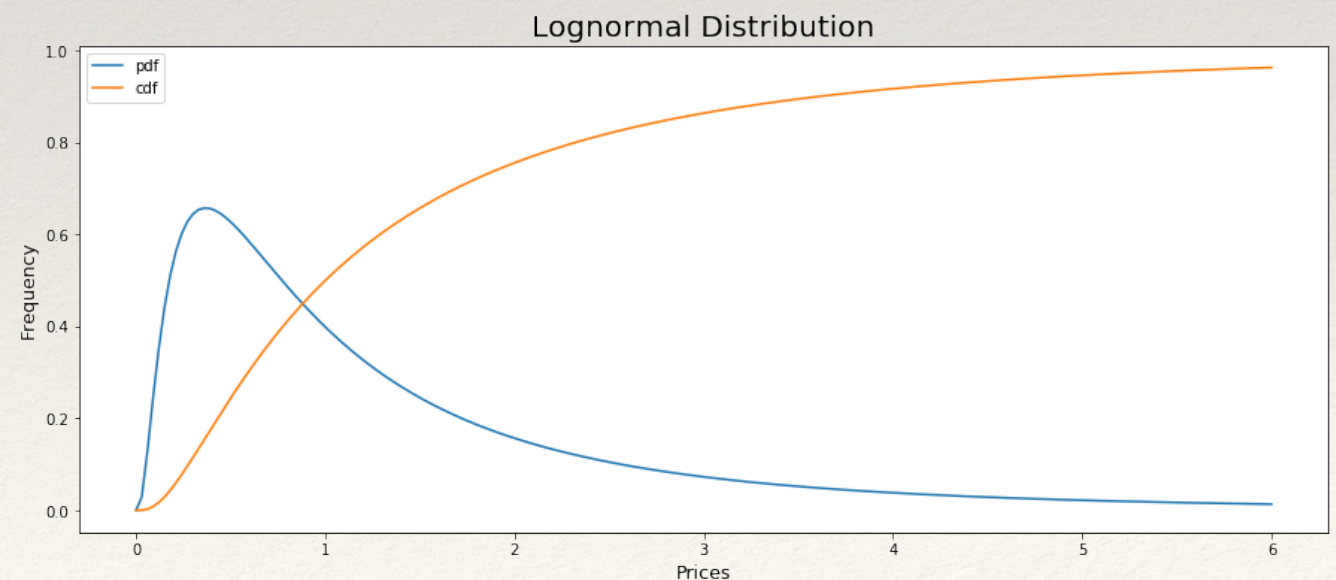
❖ Save data frame as CSV file for further analysis
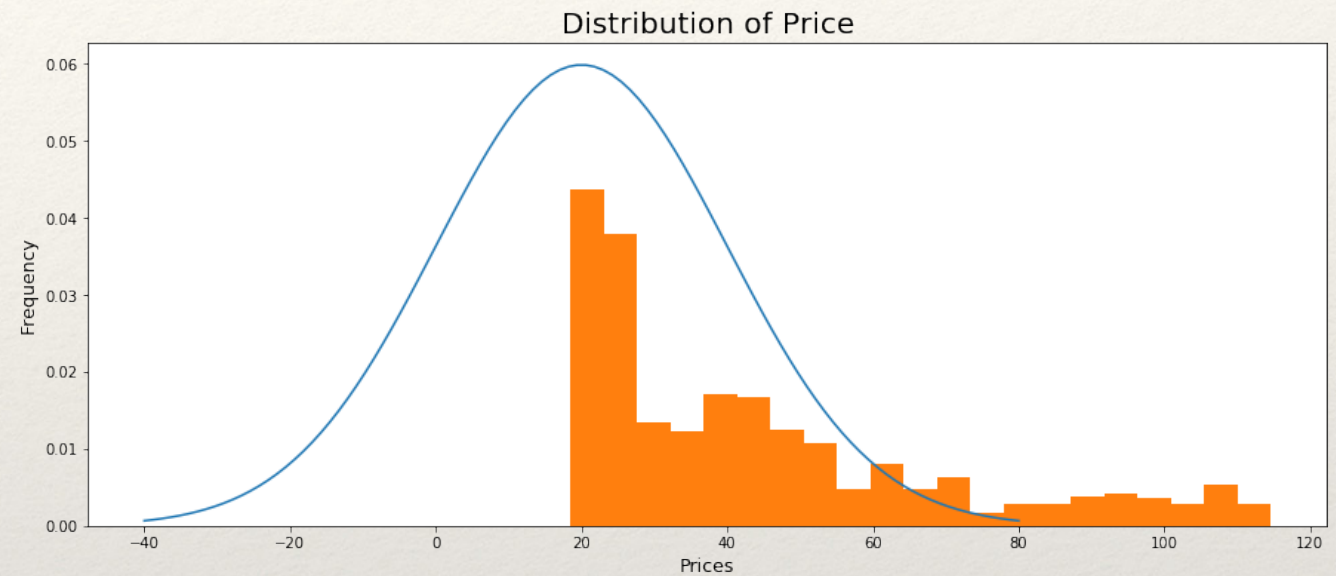
Data Analysis

- Bias associated with price

- Logarithmic scale

- Long term trend

Microsoft Adjusted Closing Price

Microsoft Adjusted Closing Price - Logarithmic Scale

Data Analysis

- ❖ Lognormal returns

- ❖ Lognormal distribution

- ❖ Instantaneous rate of change of return

Distribution of Price

Lognormal Distribution

Preprocessing

LSTM

- Supervised learning
  - ±60 days
- Train test split
  - Avoid times series bias
- LSTM format
  - data, steps, features
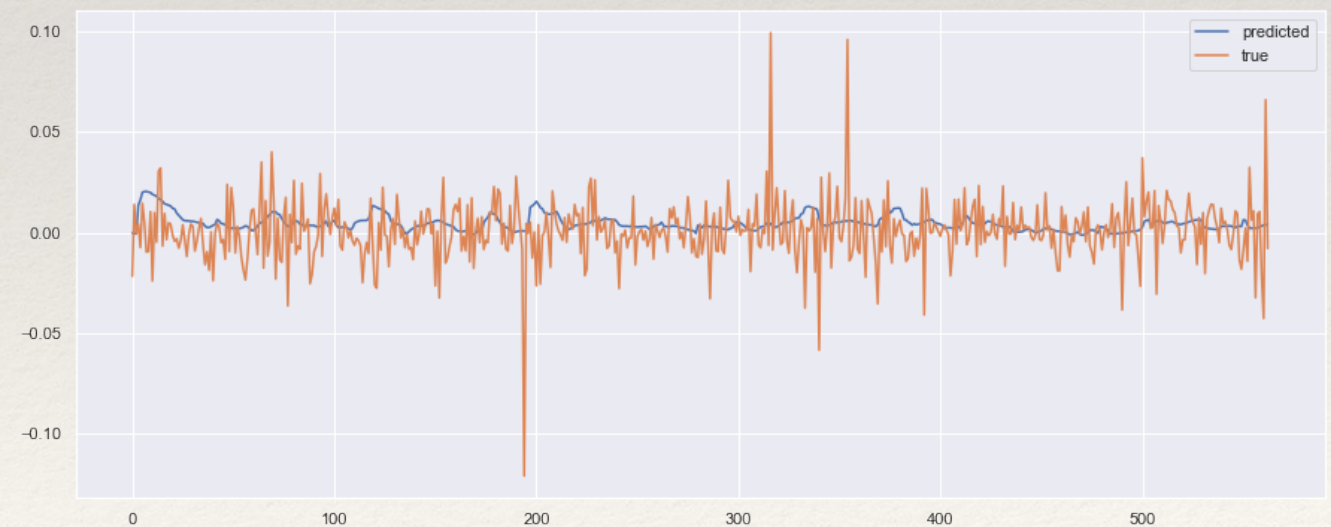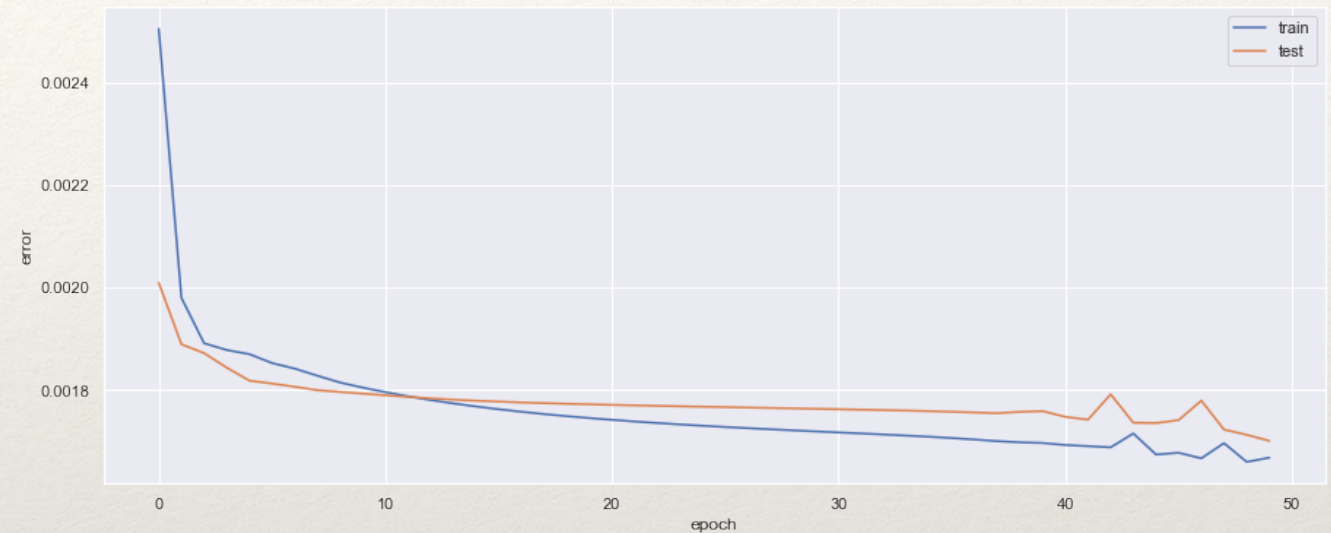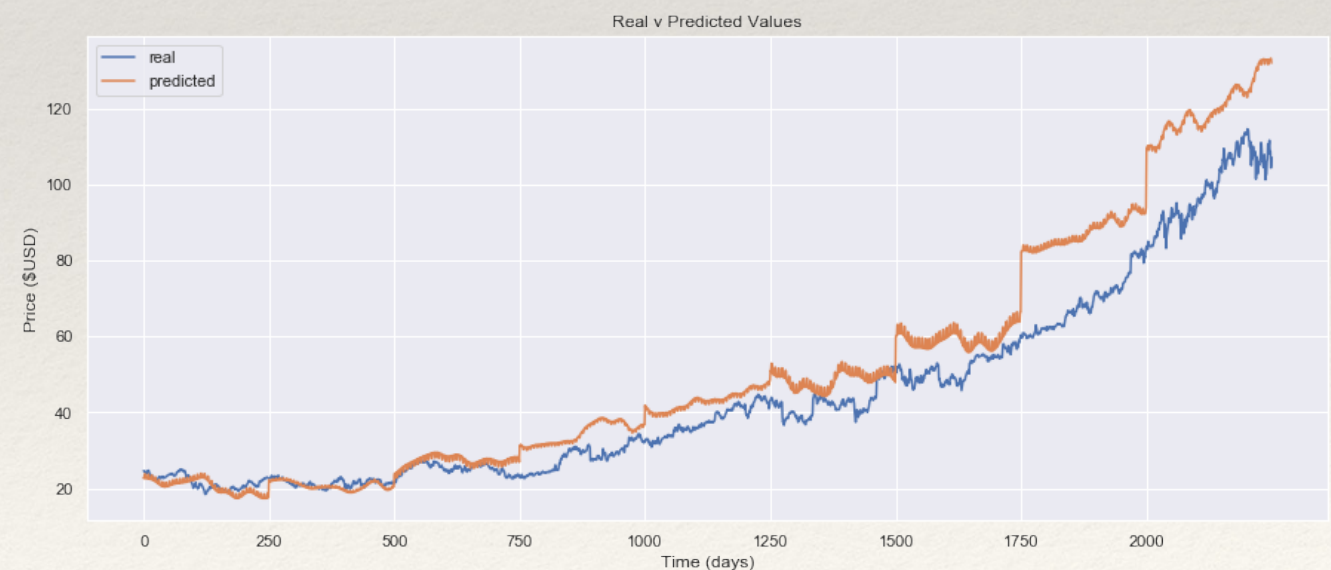
Prophet

- 'ds' & 'y'

Model Analysis

LSTM
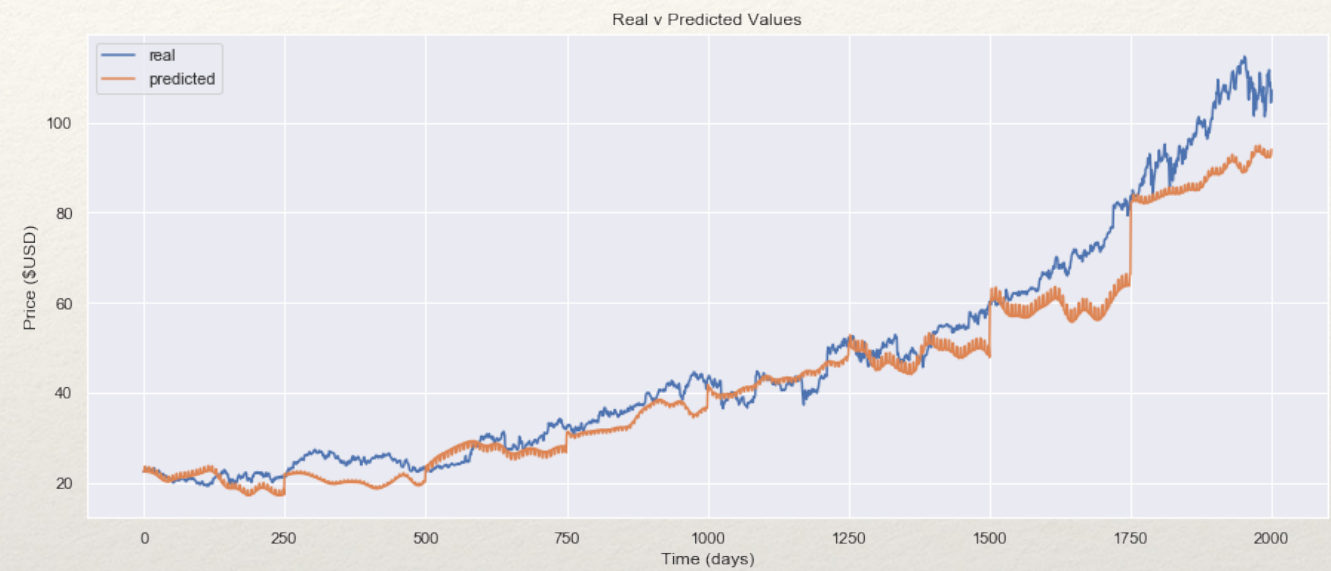
- 3 layers
  - 50 nodes
  - Loss: MSE
  - Optimizer: ADAM
- Training/testing loss
- Daily return predictions
  - Direction vs. Value

Model Analysis

Prophet

❖ Yearly seasonality

❖ For loop vs manual

Model Comparison

LSTM

❖ Short vs long term predictions

  ❖ 53% daily return direction

  ❖ 74% quarterly return direction

❖ Averse to time series bias

Prophet

❖ 100% correct predictions

  ❖ Small sample size

  ❖ Stock market assumptions

Next Steps

- Other stock prices

- Shorter predictions with prophet

  - Takes a long time to train and predict

  - May not be able to properly predict using a loop

- Other deep learning models

  - CNN, GRU