Stock Market Analysis and Prediction

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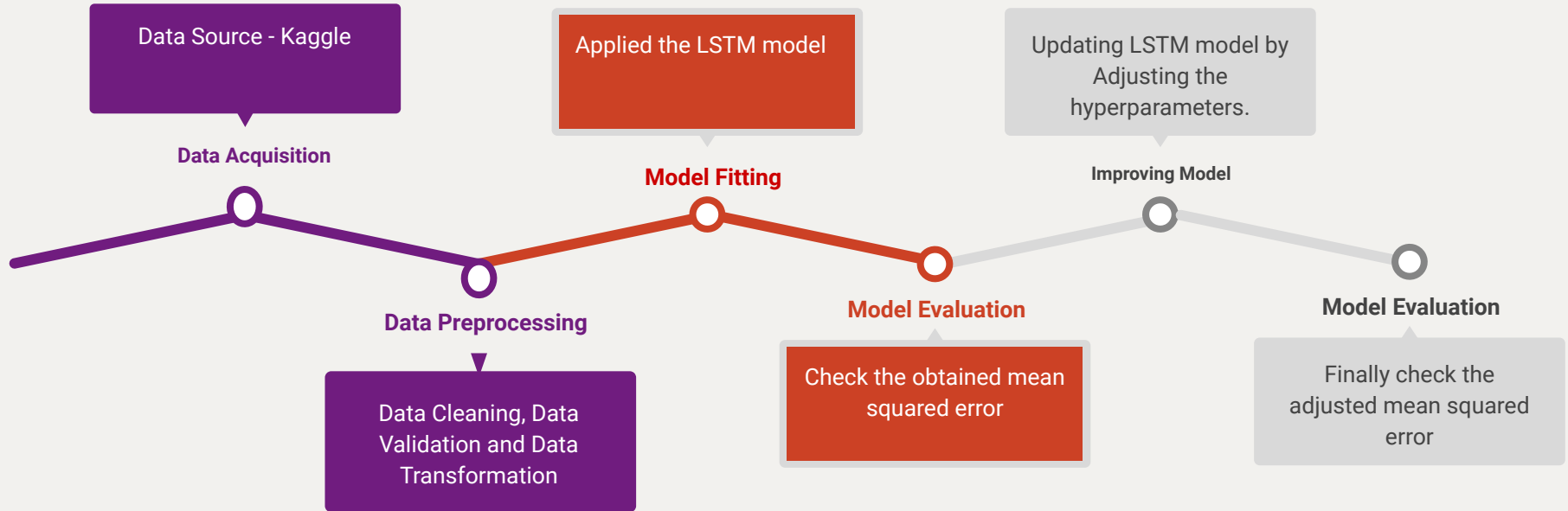*Under the Guidance of Prof. Amit Ganatra*

About Stock Market

- Stock market is very vast and difficult to understand.

- There are many factors affecting the stock prices such as

    * Supply and Demand Chain

    * Current company's reputation / Rumors

    * Technological advancements

    * Politics and much more..

And thus accurate predictions of the Stock Price is difficult job as many such factors result into High Volatility in Data.

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Problem Statement

- Investing in a good stock at the right time can bear profits but at a bad time can have disastrous result.
- Financial investors of today are facing this problem of trading as they do not properly understand as to which stocks to buy or which stocks to sell in order to get optimum result.
- The challenge of this project is to accurately predict the future closing value of a given stock across a given period of time in the future.

Overview of Project Tasks

Data Source - Kaggle

Data Acquisition

Applied the LSTM model

Model Fitting

Updating LSTM model by Adjusting the hyperparameters.

Improving Model

Data Preprocessing

Data Cleaning, Data Validation and Data Transformation

Model Evaluation

Check the obtained mean squared error

Model Evaluation

Finally check the adjusted mean squared error

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| Data Acquisition	Data Reduction	Data Cleaning	Data Transformation	Model Selection and Data Splitting
We obtained the data set from kaggle. This is the original stock market data which they sourced from original sources	For data reduction, we removed all unnecessary features from the dataset such as high, low, volume and date	Stock market data generally has no empty or missing values. However we did check if this was true. For data smoothing, we chose not to do it as it would improve the performance of LSTM	We used min-max scaling to reduce the values of data to 0-1 for LSTM model	We have used LSTM as it performs better in Time Series Data. Training size : 80% Testing size : 20%

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About Model Used (LSTM)

- Long Short-Term Memory (LSTM) is a recurrent neural network
- Recent researches have shown that LSTM, networks are the most popular and useful variants of RNNs.
- For data with time frames LSTM performs really well
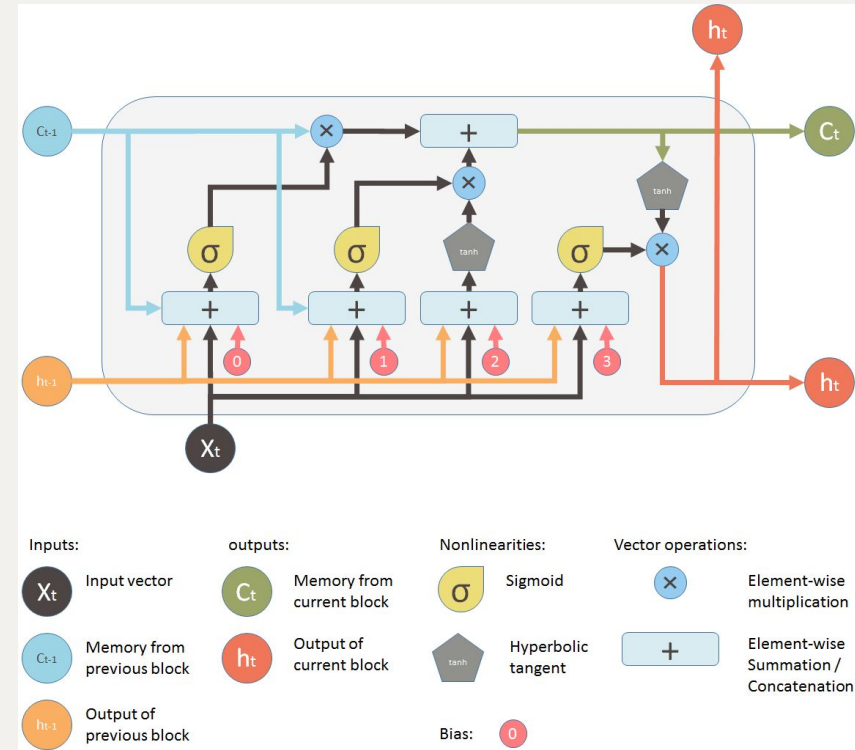
Results (LSTM)

- As you can see, we got a RMSE error of 0.0175 for training data and RMSE error of 0.0342 for testing data.


Google Trading vs Prediction

About Model Used (Improved LSTM)

- The improvement was observed by testing and optimising each parameter and then selecting the final value for each of them.

  - Increased the number of hidden node from 100 to 128.
  - Added Dropout of 0.2 at each layer of LSTM
  - Increased batch size to 512
  - Increased epochs to 20
  - Made prediction with the batch size

Results (Improved LSTM)

- As you can see, we got a RMSE error of 0.014 for training data and RMSE error of 0.0312 for testing data.

Google Trading vs Prediction

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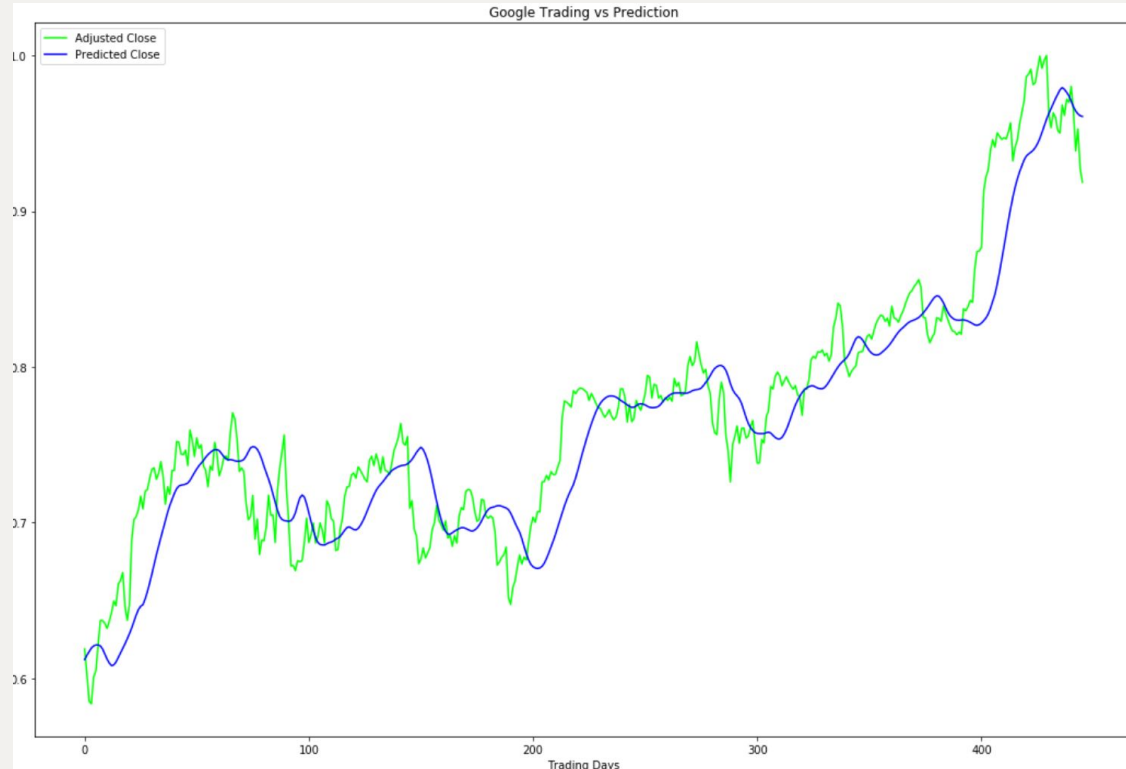
Conclusion

- After tuning some of the Hyper-Parameters, we were able to minimize the RMSE from 0.017 to 0.014 for training, while for testing, from 0.0342 to 0.0312.

THANK YOU! 🙏

Any Questions or Suggestions?

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Project Link : *https://github.com/caped-crusader16/Stock-Market-Analysis-and-Prediction*