Parallel Stock Price Prediction Using Deep Learning

Group 4

Introduction

Quantitative investment

Program trading ➡ Deep learning

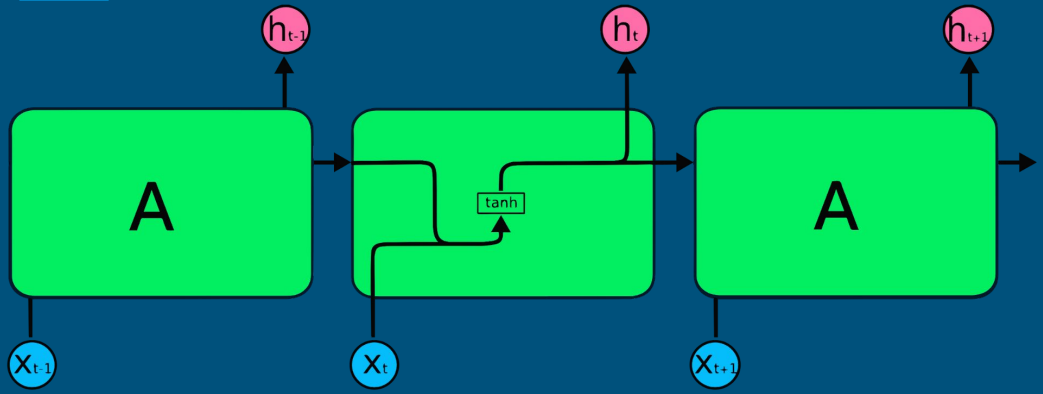
Dataset

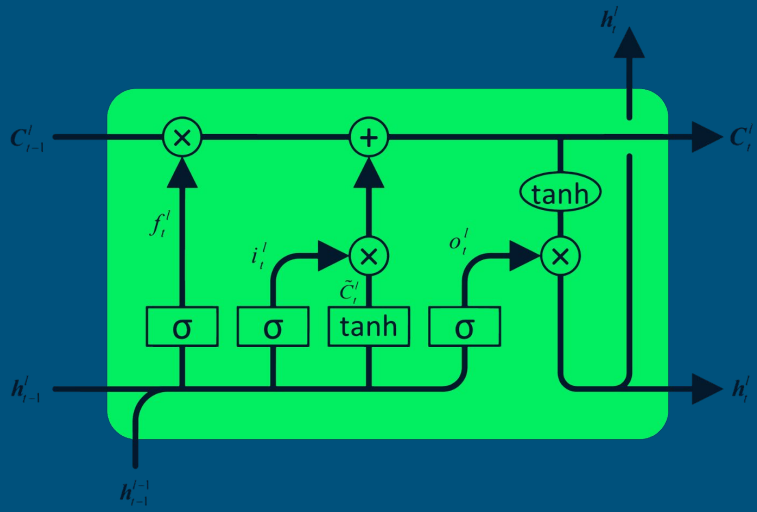
Stock pool: 89 stocks of Indian stock market（OLHCV）

Start time: 2015/02/02 14:30

End time: 2022/02/18 15:25

LSTM model - Basic Model





- 95% of data as training set
- 5% of data as testing set
- Each unit of sample is of length 60

LSTM model - Hyperparameter tuning

- Batch Size
  Testing batch size from 128, 64, 32, 16, 8

- Hidden layer Size
  Testing hidden layer Size from (128,128), (128,64), (64,64), (64,32)

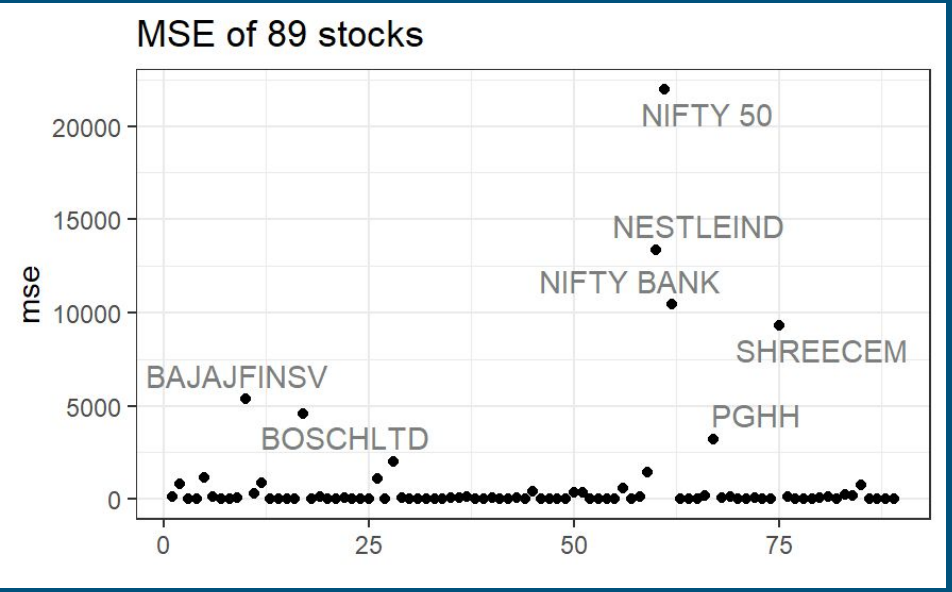
Computational Steps

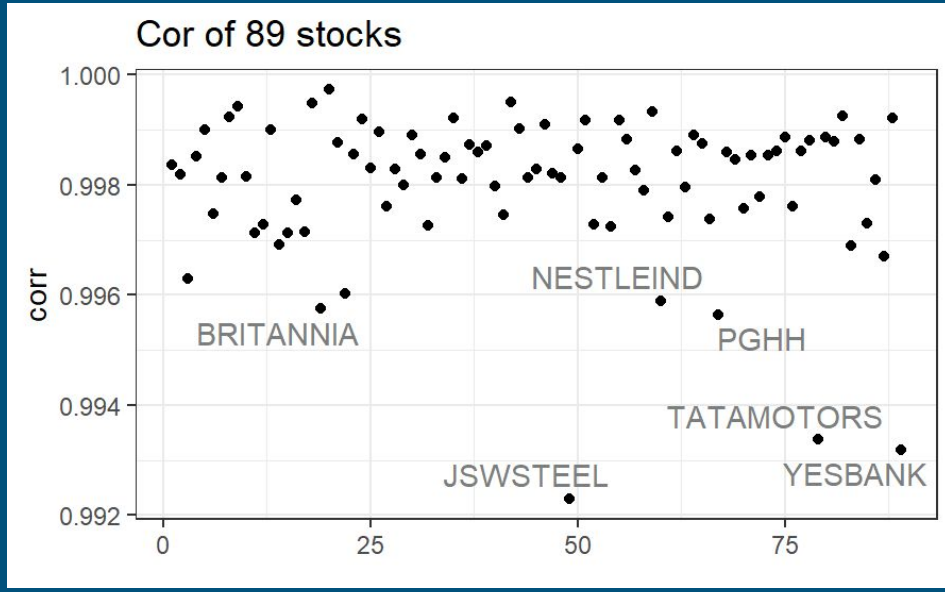
- Upload a list containing the names of each stock
- Use queue to read from the list iteratively
- Build the LSTM models and get the prediction for each stock
- Process them outside the CHTC for downstream analysis afterward
- Time cost : 20 min each

Result Evaluation

- We use MSE and Correlation coefficient between the prediction and actual data to evaluate the result of the prediction.
- Most MSEs are very small and there are only a few extremely large numbers. It indicates that most predictions are pretty accurate.
- Surprisingly, we found the lowest correlation is 0.992, which shows a high correlation between our predicted data and real data, even if those stocks with large MSE.

Result Evaluation





Stocks Selection Strategy

By now we have gotten a dataset with four columns:

- Stock Name
- Date
- Real Close Prices
- Predicted Prices

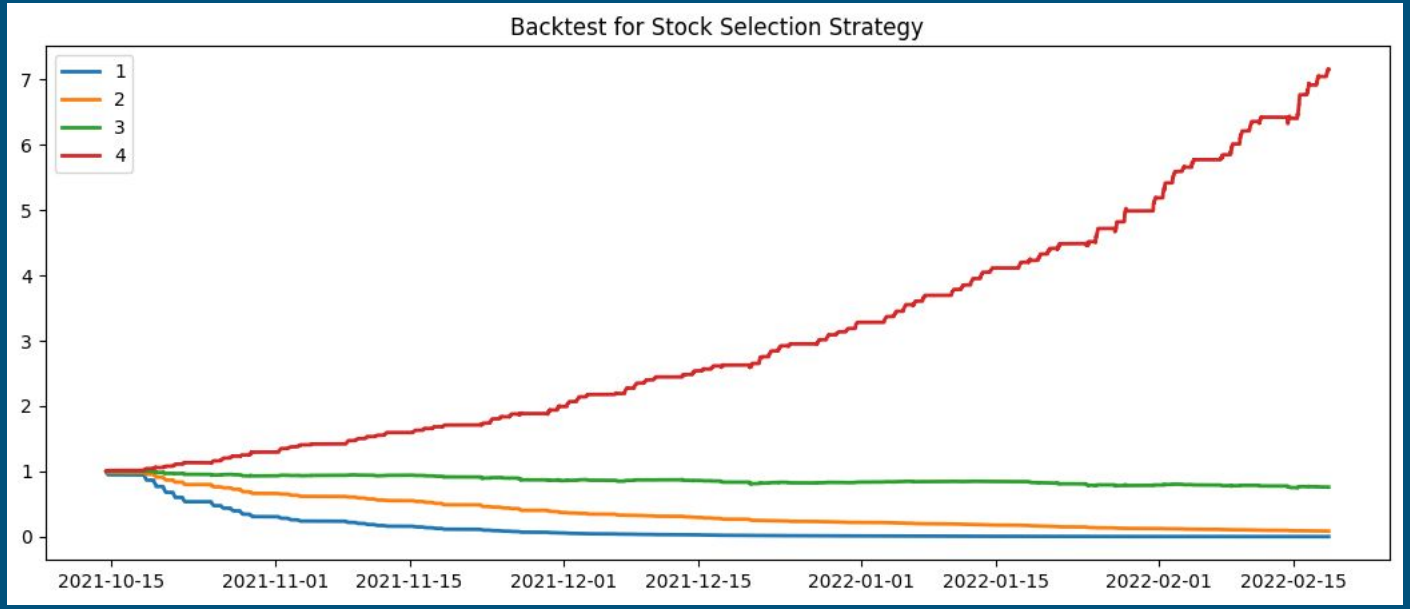
	close	prediction	date	stock
0	2333.7	2323.379639	2021-10-14 10:55:00+05:30	ACC
1	2335.2	2323.864502	2021-10-14 11:00:00+05:30	ACC
2	2333.4	2324.245117	2021-10-14 11:05:00+05:30	ACC
3	2329.9	2323.904053	2021-10-14 11:10:00+05:30	ACC
4	2335.2	2322.36377	2021-10-14 11:15:00+05:30	ACC

Real return and predicted return for each stock and time period can be calculated easily from these four variables.

Stocks Selection Strategy

- At each time point, sort the stocks by the factor value from lowest to highest and divide them into 4 groups.
- That is, set the first quarter of the stocks to be the first group, the second quarter to be the second group …
- In each group, the stocks are equally weighted.

Stratified Backtest Result



Thank you!