Stock Price

In many real-life situations, it is important to predict future values using past data. Examples include forecasting sales, estimating future demand, and analyzing trends over time.

Accurate predictions help organizations and individuals make better decisions and plan ahead.

The main goal of this project is to build a predictive system that can learn patterns from historical data and use those patterns to forecast future outcomes.

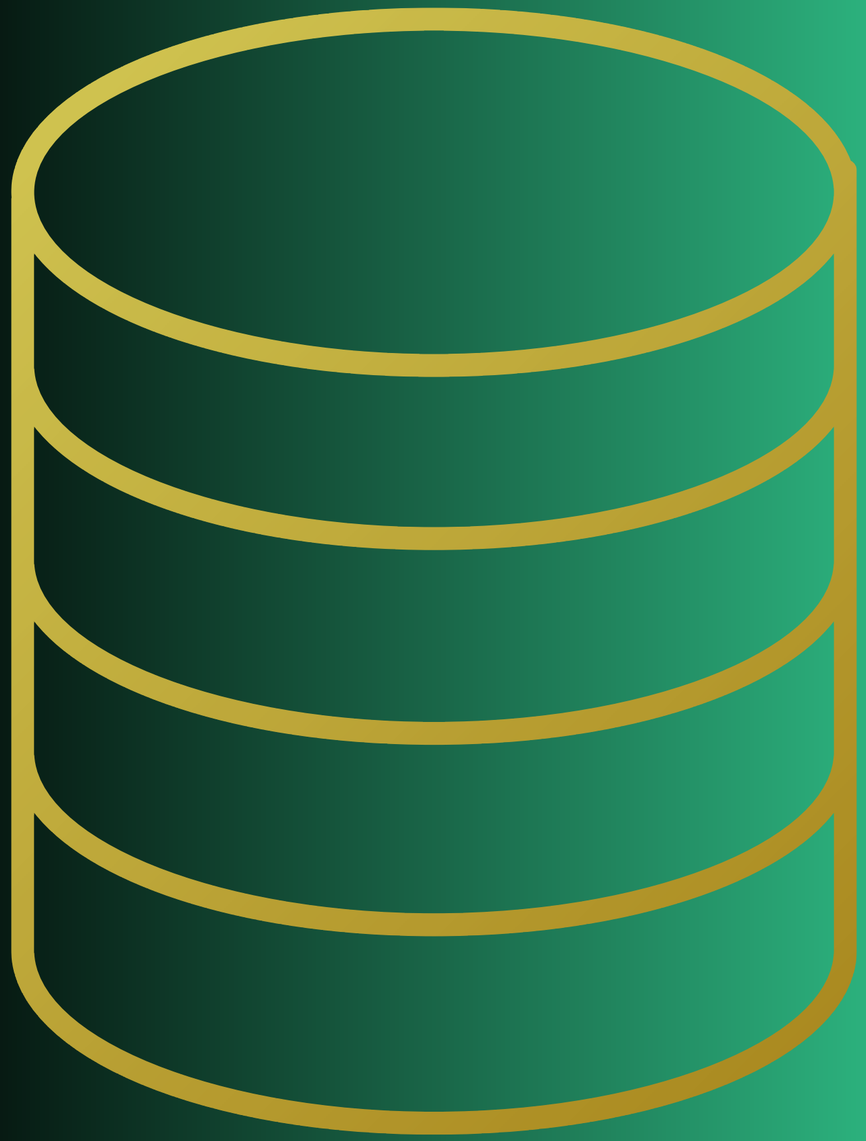
By understanding how the data behaves over time, the system can provide useful and reliable predictions.

To achieve this goal, different machine learning models are applied to a historical dataset.

These models are trained and evaluated to study the relationships between the input features and the target variable.

Finally, the performance of the models is compared in order to select the most accurate and reliable one for prediction.

Dataset description

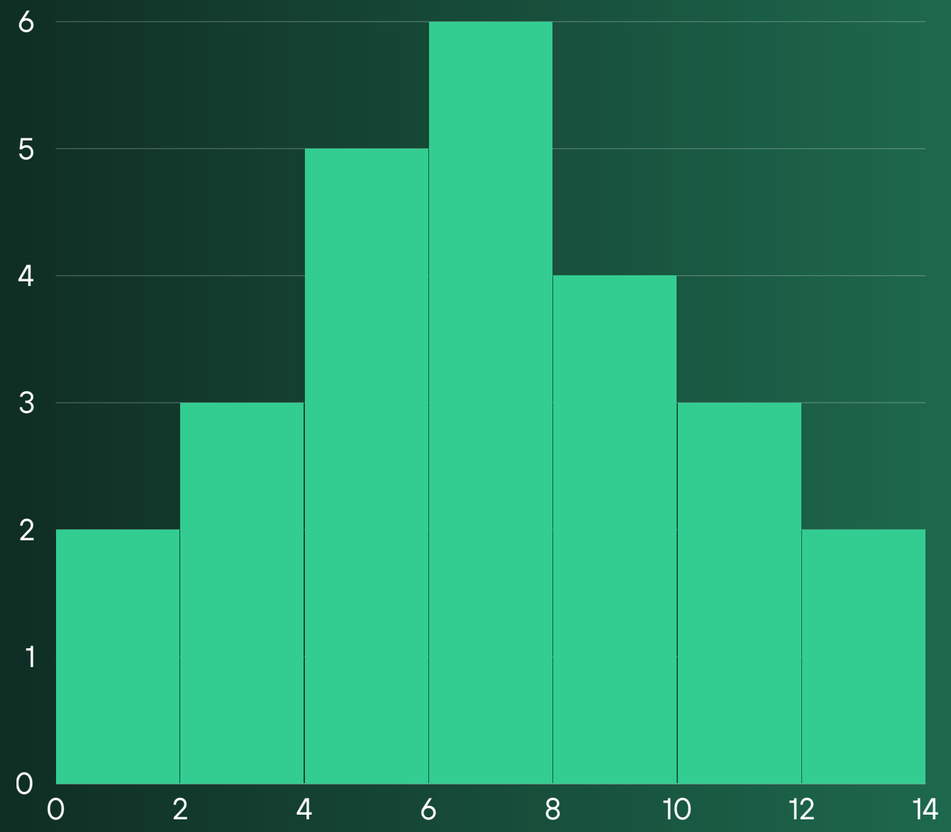


The dataset used in this project consists of historical stock market data for Tata Consultancy Services (TCS), retrieved from Yahoo Finance using the yfinance library. The data covers a time period starting from January 2010 up to the most recent available date, providing a long and reliable historical record for forecasting purposes.

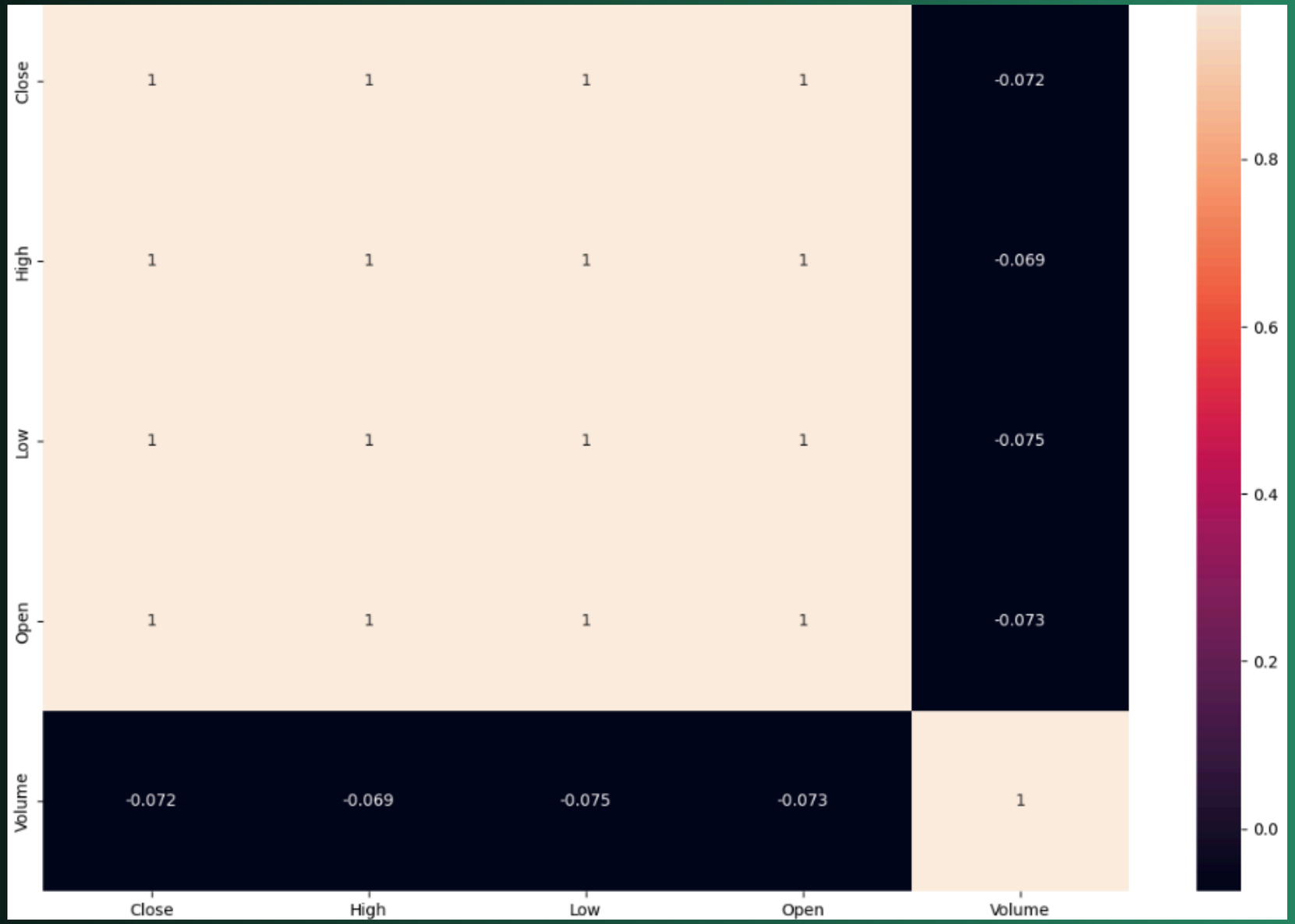
Features:

- Date: The trading date
- Open: The opening price of the stock
- High: The highest price reached during the trading day
- Low: The lowest price reached during the trading day
- Close: The closing price of the stock
- Volume: The total number of shares traded

Graphs and Visualization



HeatMap


Close
High
Low
Open
Volume
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1
1
1
-0.072
1
1
1
1
-0.069
1
1
1
1
-0.075
1
1
1
1
-0.073
-0.072
-0.069
-0.075
-0.073
1
Close
High
Low
Open
Volume
0.8
0.6
0.4
0.2
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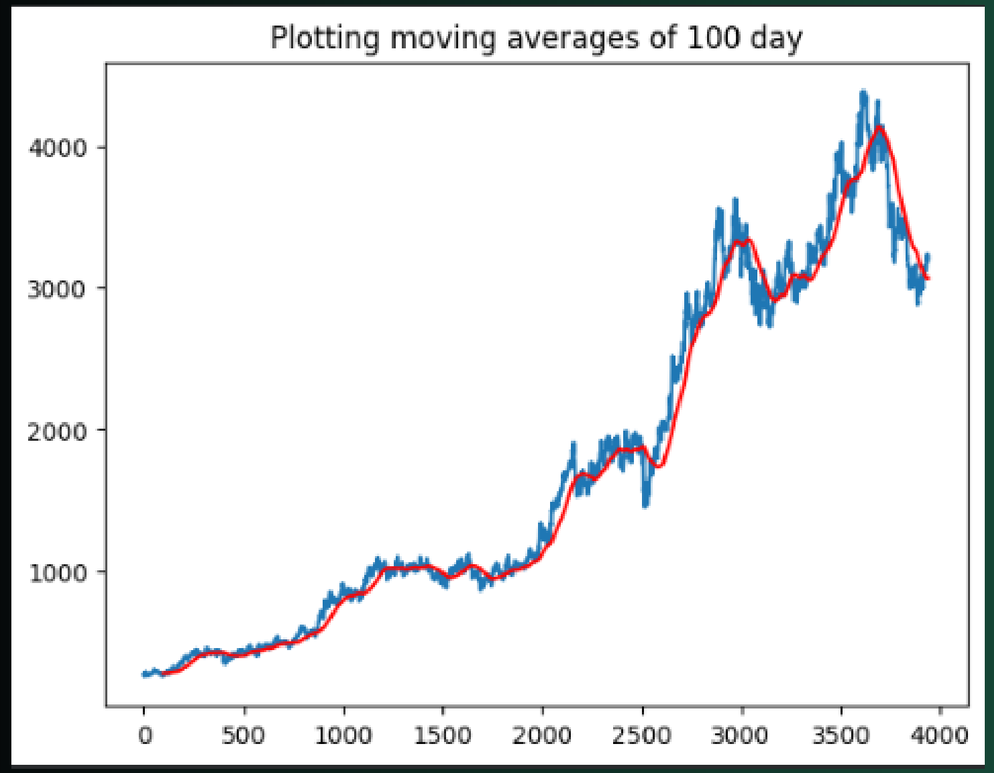
Plotting moving averages of 100 day
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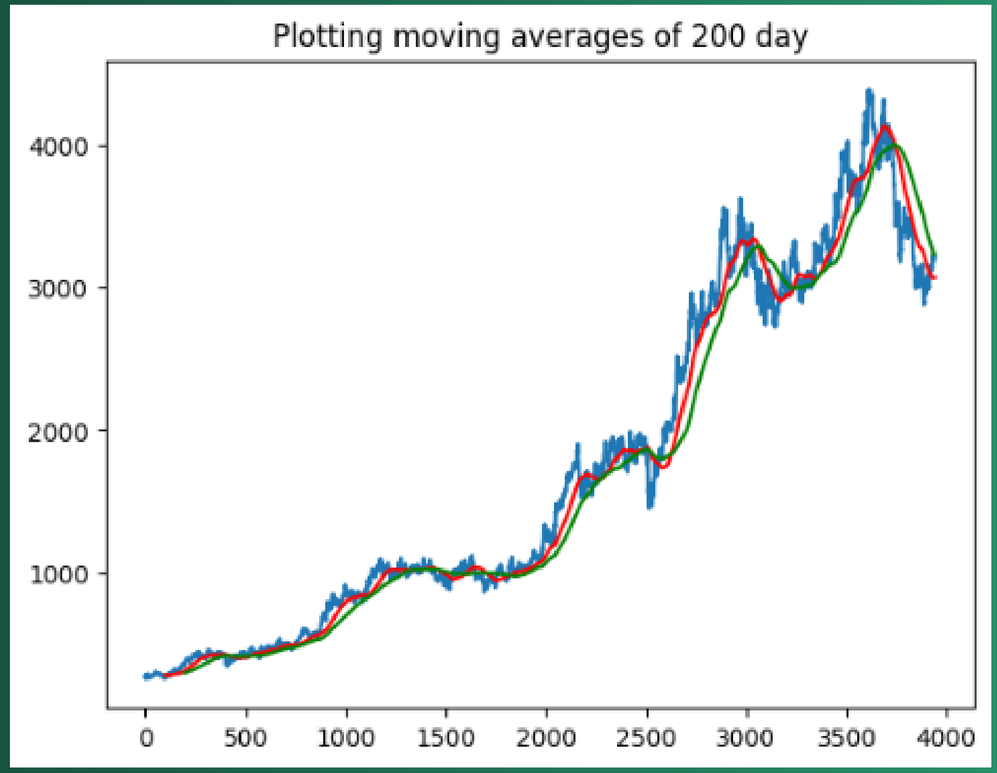
Plotting moving averages of 200 day
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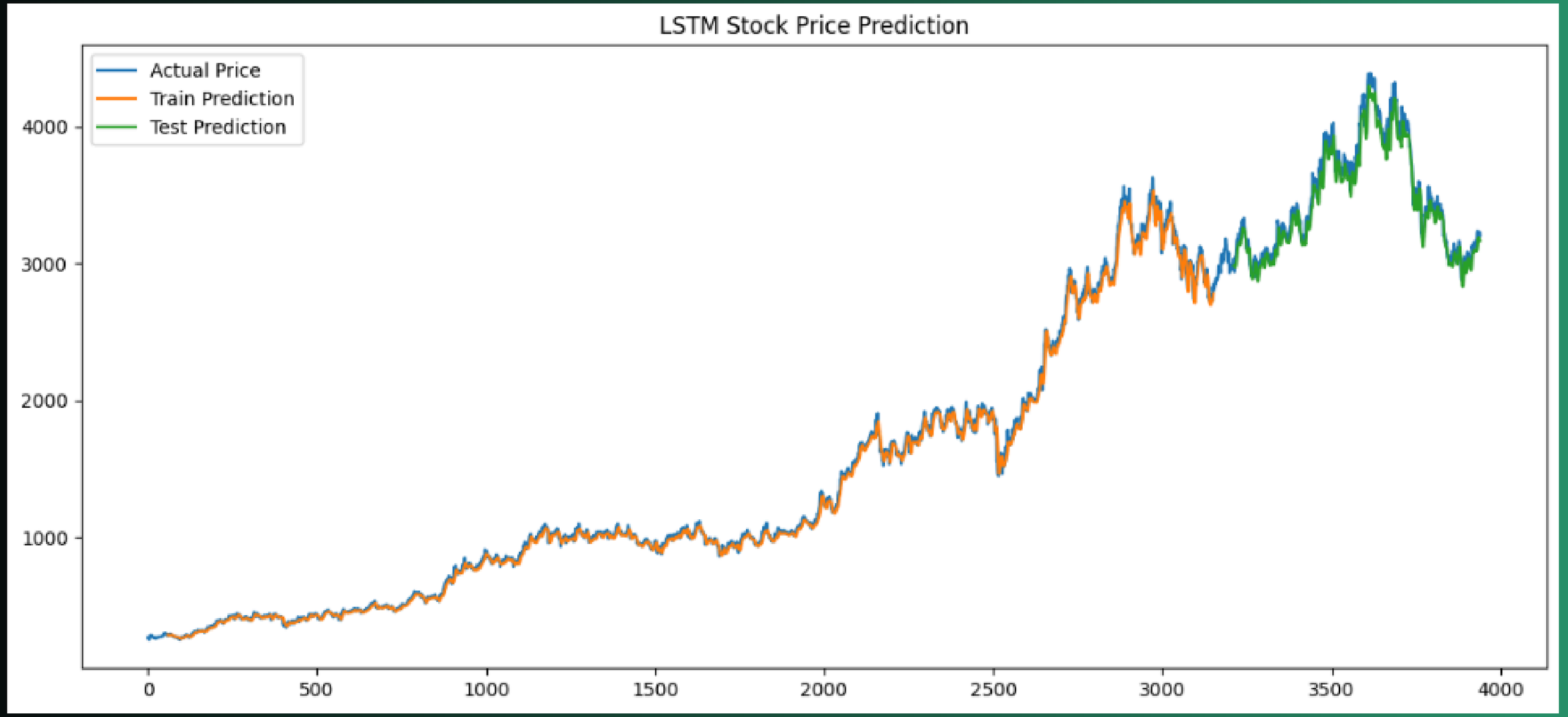
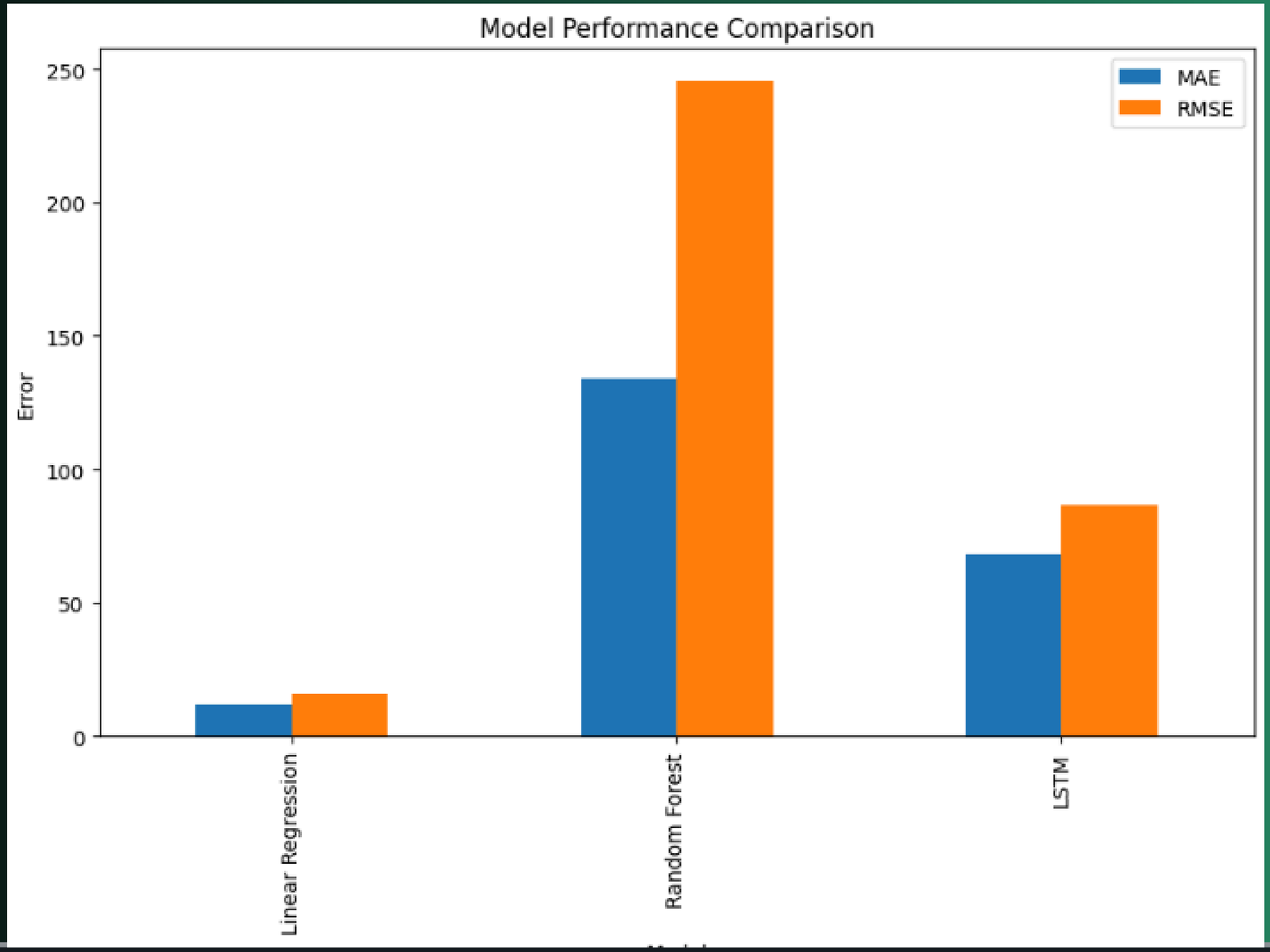
Linear Regression VS Random Forest Regressor

LSTM Prediction



Performance Comparison



Results of the predictive models

Model	MAE	RMSE	R2
Linear Regression	11.902840	15.618866	0.998560
Random Forest	134.305138	245.391109	0.644525
LSTM	67.956414	86.652577	0.954014

Conclusion

We built a solid system to track TCS stock prices over the last 15 years. The results show it works, but the accuracy changes a lot because the market is so unpredictable.

Our next step is to make the model more consistent so it doesn't get confused by big price jumps.