Stock Market Prediction

Milestone 3

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DSC 680 -Project3 Milestone 3
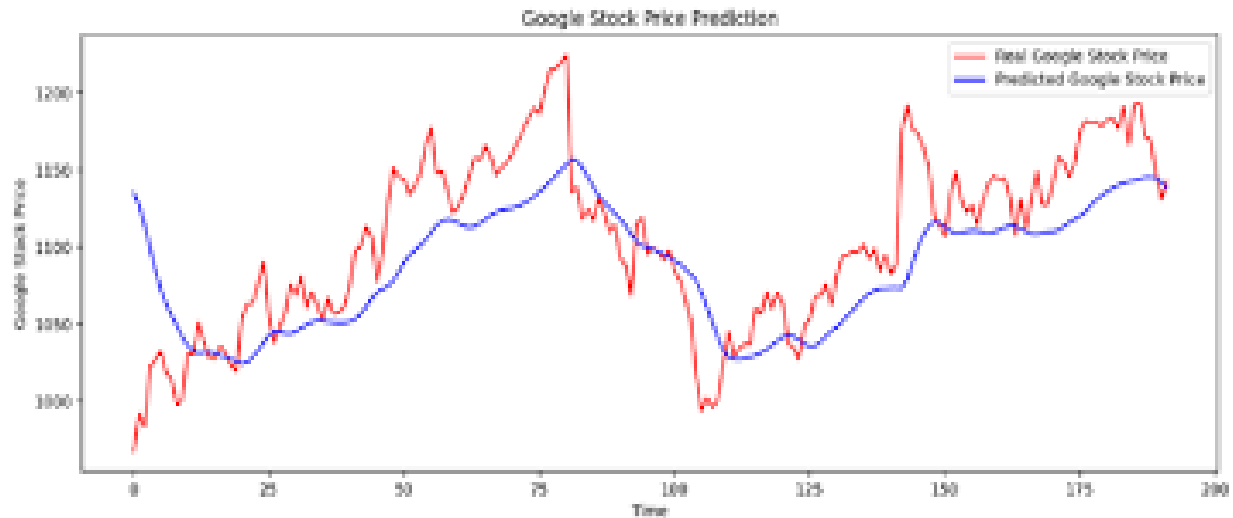
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TOPIC:

Creating a machine learning model aimed at forecasting stock prices to support trading and investment decisions.

BUSINESS PROBLEM:

Investors and traders in the stock market frequently seek precise forecasts of stock prices to guide their decisions on when to buy, sell, or hold stocks. Predictive models offer valuable assistance by enabling investors to anticipate price shifts and refine their investment strategies accordingly.

The Goal of this project is to analyze Google Stock Price Data retrieved from Kaggle and apply LSTM model to predict results and compare with actual data to analyze the performance of the model.

Google Stock Price Prediction

DATA SETS:

Historical Data Sets: Google Stock Prices is retrieved from Kaggle Source with the information required perform training and analyzing the data from Data Set.

Different Data field in the Data Set:

https://github.com/avinashalapati09/portfolio/blob/main/StockMarket/Google_Stock_Price_Train.csv

Date: Date of Trading.

Open: Open price of stock

High: Highest price of stock

Low: Lowest price of stock

Close: Closing price of stock

Volume: Total volume of stocks traded

METHODS:

1. Time-Series Analysis: Apply time-series analysis methodologies to construct models and predict fluctuations in stock prices using historical price data.

2. Feature Engineering: Create pertinent features derived from historical stock data, market indices, and fundamental indicators to identify and interpret patterns and trends.
3. Machine Learning Models: Utilize machine learning algorithms like Linear Regression, Random Forest, or Long Short-Term Memory (LSTM) networks to forecast stock prices.

RESULTS:

By Applying LSTM Model on training data and testing it we could derive the model worked accurately in predicting the Real Stock Price.

LSTMs (Long Short Term Memory RNNs) Model accurately predicted the results
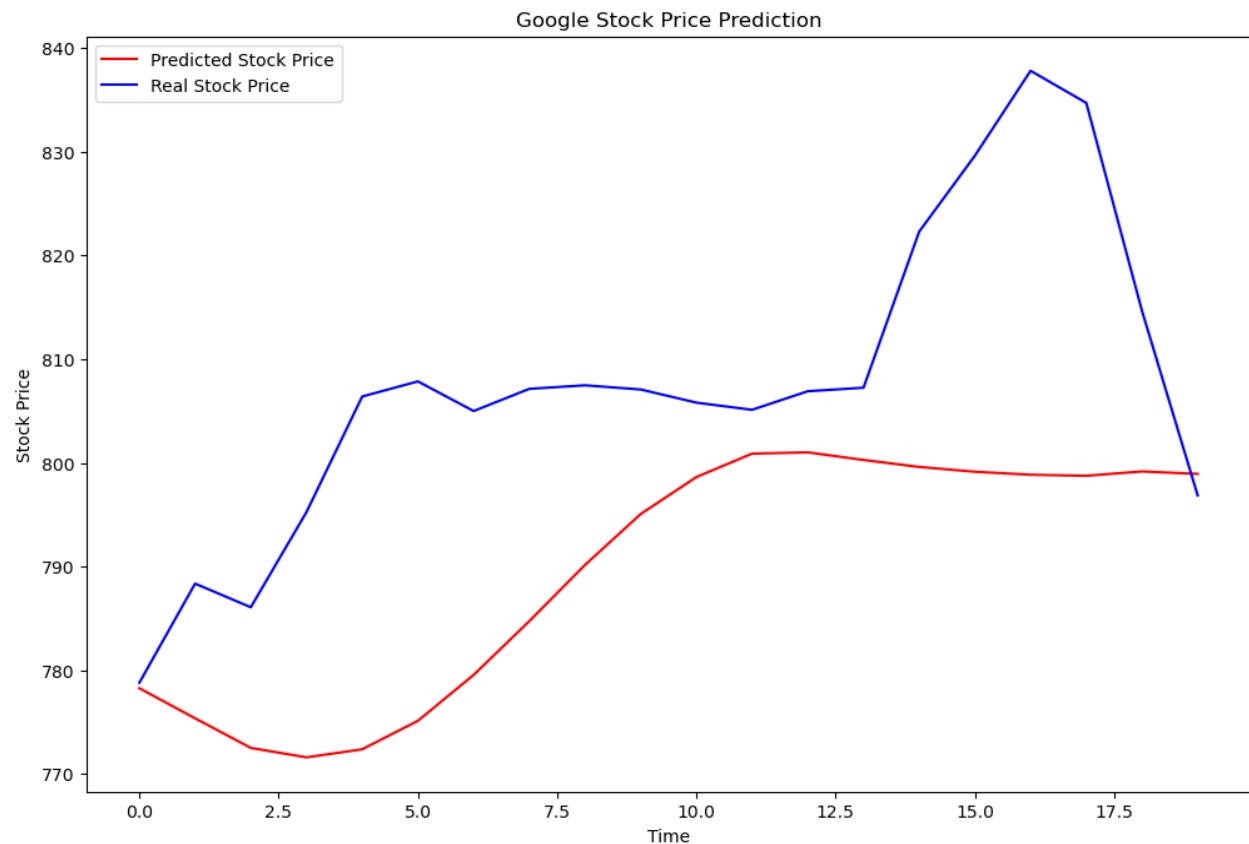
Ethical Considerations:

1. Fairness: Guarantee equity in model predictions and prevent biases that could unfairly affect specific investor groups.
2. Transparency: Uphold transparency throughout the model creation process and communicate any uncertainties linked with stock price forecasts.
3. Privacy: Safeguard sensitive data within the dataset, particularly personal information from news articles or social media postings.

Challenges:

1. Market Volatility: Stock prices are susceptible to multiple factors, such as market volatility, economic indicators, and geopolitical events, which pose challenges to precise predictions.
2. Data Quality: Tackle challenges like missing data, outliers, and discrepancies within the collected datasets to ensure reliability and accuracy.
3. Overfitting: Guard against overfitting of predictive models to historical data, ensuring adaptability to changing market conditions.
4. Model Interpretability: Offer insights into the key drivers behind stock price forecasts to aid investors in comprehending the reasoning behind the model's suggestions.

Conclusion:

The Recurrent Neural Networks gave rise to the popularity of LSTMs (Long Short Term Memory RNNs) predicted Stock Price Data accurately.

RNN (LSTM) is implemented alongside with Keras Framework which produced Good results.

Questions:

1. What is stock price prediction?
2. Why is stock price prediction important?
3. What are the key factors influencing stock prices?
4. What are some common techniques used for stock price prediction?
5. How do machine learning algorithms help in stock price prediction?
6. What are the challenges in stock price prediction?
7. How accurate are stock price predictions?
8. What are the ethical considerations in stock price prediction?
9. What are some limitations of stock price prediction models?
10. How can investors use stock price predictions in their investment strategies?

References:

1. J. Brownlee, "Introduction to Time Series Forecasting with Python," Machine Learning Mastery, 2018.
2. Y. LeCun et al., "Deep Learning," Nature, 2015.
3. A. K. Malik et al., "Sentiment Analysis and Prediction of Stock Market Indicators Using Machine Learning Techniques," IEEE Access, 2021.