
Stock Price
Prediction

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Introduction

Problem Statement:

- Market sentiment and public perception plays a crucial role in shaping stock prices.
- Investors invest in stock market using multiple ways: one is mathematical data and second one is financial report of the stocks.
- But this does not provide an insight why stock behaved the way it behaved, what are the real world triggers that causing movements into the stock

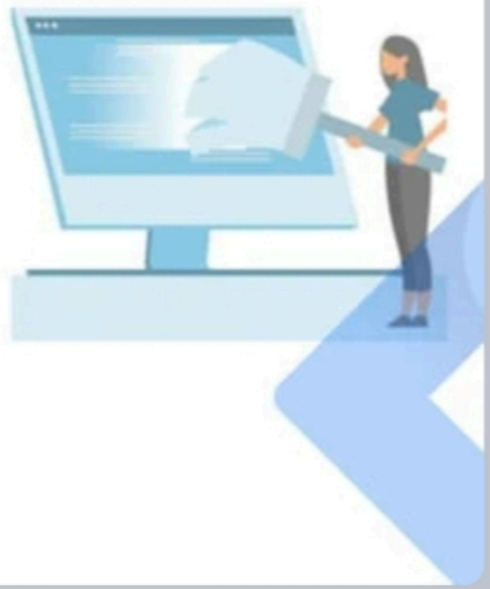
Approach

1. Data Preparation and Cleaning:

- Load 20 years of historical stock prices from multiple stocks into a pandas dataframe.
- Clean the data by removing irrelevant columns and addressing missing values, outliers, and inconsistencies.
- Select relevant columns (open, high, low, close, volume) for further analysis.
- Generate indicator columns (price change, price change percentage, RSI, BB, SO) by applying calculations on the selected columns.
- Create the target column by assigning the next day's closing price as the prediction label for supervised learning.

2. Data Preprocessing:

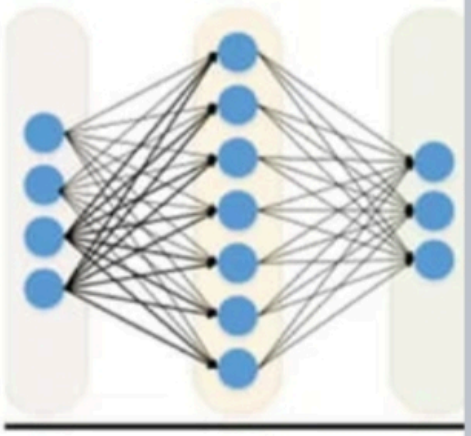
- Clean the data by addressing missing values, outliers, and inconsistencies.
- Normalize or scale the data for improved model convergence and performance.
- Split the data into training and validation sets, preserving chronological order..



Model Development and Evaluation

3. LSTM Model Development:

- Convert non-indicator columns into time series inputs to capture temporal patterns.
- Split the data into training and validation sets, preserving the temporal order.
- Preprocess and normalize the data for LSTM network input.
- Design the LSTM model with appropriate architecture, including hidden layers, LSTM units, dropout rates, and activation functions.
- Define the loss function and optimizer for model training and parameter optimization.



4. Prediction and Evaluation:

- Train the LSTM model on the training data, optimizing weights and biases.
- Monitor model performance on the validation set using metrics like MSE or RMSE.
- Analyze learning curves and adjust hyperparameters as needed.
- Validate the model's generalization using unseen data.
- Assess model performance with metrics such as R-squared, MAE, or directional accuracy to evaluate its effectiveness in stock price prediction.

Implications and Future Directions

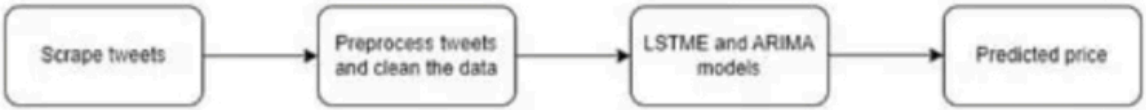
5. **Monitoring and Updating:**
   - Continuously monitor model performance and effectiveness.
   - Update models with new data to ensure reliability.
   - Assess model performance against real-time stock price data.

6. **Reporting and Visualization:**
   - Present results and insights in a clear and understandable manner.
   - Visualize predicted and actual stock prices for comparison.
   - Enhance understanding of the model's performance.

7. **Conclusion and Future Scope:**
   - Summarize the project, highlighting the significance of using indicators and historical data for stock market prediction.
   - Discuss the potential applications and benefits of accurate stock price predictions, such as portfolio management, risk assessment, and trading strategies.
   - Mention possible avenues for future enhancements, such as incorporating additional indicators, exploring alternative machine learning algorithms, or leveraging natural language processing (NLP) techniques for sentiment analysis.

Technical steps

There are main four steps in the process of stock price prediction:



1.) Scrapping of tweets:

- in this step tweets are scraped from twitter using the symbol names of the stocks.

2.) Preprocessing of tweets:

- in this step tweets are preprocessed using different methods to obtain the clean and proper data on which we can train model to get the high accuracy.

LSTM: Capturing Stock Price Trends

- Long Short-Term Memory (LSTM) is a type of recurrent neural network (RNN) that has become popular for predicting stock prices. LSTMs are designed to process and predict sequences of data, making them well-suited for time series analysis, such as stock price prediction.
- In stock price prediction using LSTM, the historical stock prices are used as input data, and the output is the predicted stock price for a future time period. LSTMs can process sequences of historical stock prices and capture the complex relationships between them to predict future prices.
- LSTMs work by using memory cells and gates to process and store information. The memory cells can remember information for a long time, allowing the network to capture long-term dependencies in the data. The gates control the flow of information into and out of the memory cells, allowing the network to selectively remember or forget information.
- In LSTM-based stock price prediction, the input data is first preprocessed and transformed into a format that can be fed into the LSTM model. The input data is typically normalized to a standard range, such as between 0 and 1, to improve the performance of the model. The LSTM model is then trained on the historical stock price data, and the model weights are adjusted to minimize the prediction error.
- Once the LSTM model is trained, it can be used to make predictions about future stock prices. The model takes the most recent historical prices as input and generates a prediction for the future price. The prediction is then compared to the actual price to evaluate the accuracy of the model.
- LSTM-based stock price prediction can be a powerful tool for investors and traders, allowing them to make informed decisions about buying and selling stocks. However, it is important to note that stock prices are influenced by many factors, and LSTM-based predictions should be used in conjunction with other analysis techniques to make informed investment decisions.

Performance Evaluation: Analyzing Output

- FINALLY WE GET THE PREDICTED PRICES OF THE STOCKS FOR THE NEXT DAY.