

Stock Prediction Tool using Machine Learning

BY

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Abstract :

The Stock Prediction Tool is a pioneering solution that harnesses advanced machine learning techniques to address the enduring challenge of predicting stock prices in the dynamic and unpredictable world of financial markets. With a focus on enabling investors to make well-informed decisions and mitigate risk, this software provides real-time, actionable insights for both seasoned traders and newcomers. Through benchmarking against established market indices and a commitment to continuous improvement, the project seeks to revolutionize the way individuals and institutions approach stock trading and investment, creating substantial value for all users. In the era of data analytics and artificial intelligence, this software stands as a beacon of opportunity and innovation, poised to boost investor confidence and redefine participation in the stock market.

Problem Statement :

Stock price analysis has been a critical area of research and is one of the top applications of machine learning. There are many stocks in the market. But buyers do not know which stock can give them good profits.

What is stock market :

The stock market, also known as the equity market or securities market, is a financial marketplace where individuals and institutions can buy, sell, and trade ownership shares of publicly traded companies. It serves as a crucial component of the global financial system, enabling companies to raise capital and investors to buy and sell ownership stakes in these companies.

The stock market is a critical part of the financial system, providing a means for companies to raise capital and individuals to invest and potentially grow their wealth. However, it also carries risks, and investors should have a good understanding of the market and consider their financial goals and risk tolerance before participating.

Importance of Stock Market:

Stock markets help companies to raise capital.

It helps generate personal wealth.

Stock markets serve as an indicator of the state of the economy.

It is a widely used source for people to invest money in companies with high growth potential.

Market/Customer/Business Need Assessment :

Stock Price Prediction using machine learning helps us to discover the future value of company stock and other financial assets traded on an exchange. The entire idea of

predicting stock prices is to gain significant profits. Predicting how the stock market will perform is a hard task to do. There are other factors involved in the prediction, such as physical and psychological factors, rational and irrational behavior, and so on. All these factors combine to make share prices dynamic and volatile. This makes it very difficult to predict stock prices with high accuracy.

Target Specification and Characterization :

Develop Stock Prediction Software to help big companies predict customer revenue and enable easy investment for both companies and investors visiting their websites.

Utilize predictive analytics and machine learning.

Provide real-time data insights.

User-friendly interface for companies and investors.

Ensure data security and scalability.

Regular maintenance and support.

External Search (information sources/references) :

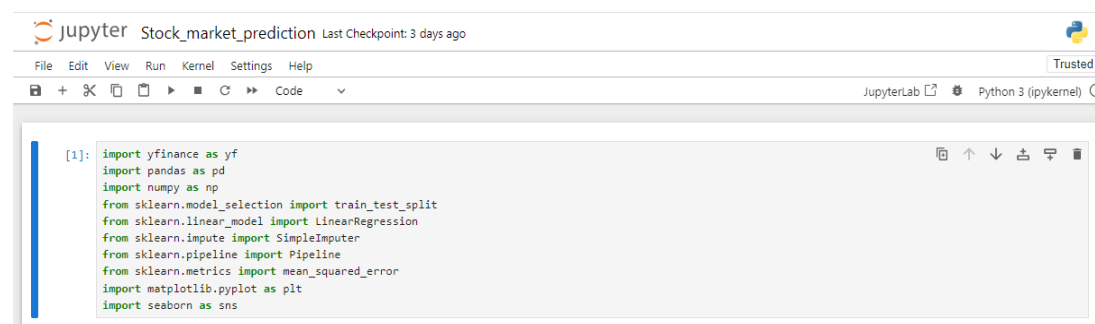
I use the Online shopper dataset for this project. Dataset can be found here:

(<https://finance.yahoo.com/quote/TATAMOTORS.NS/history?p=TATAMOTORS.NS>)

The Dataset found on the Yahoo finance. The dataset consists of feature vectors belonging to 250 sessions.

Prototype :

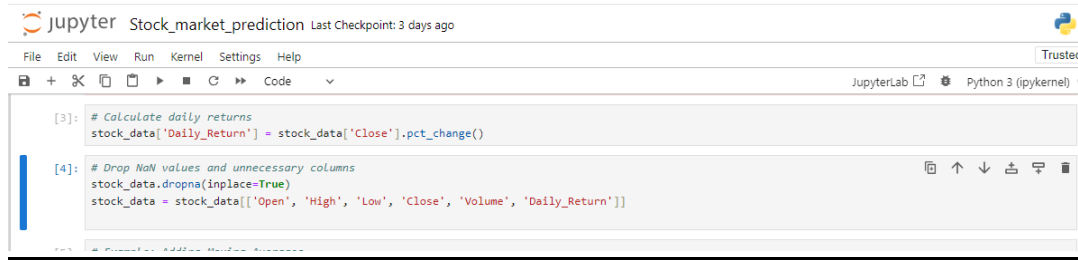
First import the basic libraries for data Preprocessing :



The screenshot shows a JupyterLab window titled 'Stock_market_prediction'. The interface includes a menu bar (File, Edit, View, Run, Kernel, Settings, Help) and a toolbar with icons for file operations and execution. A code cell is active, displaying the following Python code for importing necessary libraries:

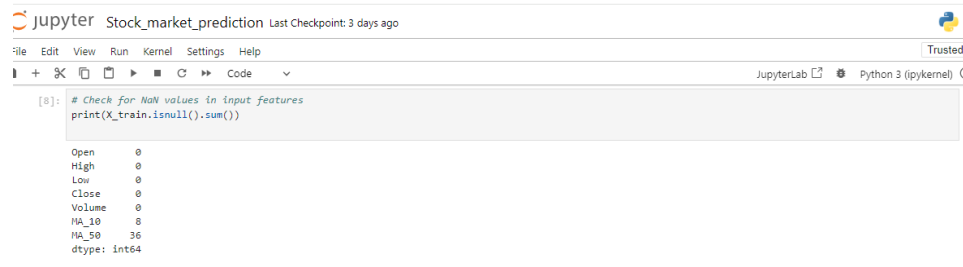
```
[1]: import yfinance as yf
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.impute import SimpleImputer
from sklearn.pipeline import Pipeline
from sklearn.metrics import mean_squared_error
import matplotlib.pyplot as plt
import seaborn as sns
```

Drop NaN values and unnecessary columns :



```
[3]: # Calculate daily returns
stock_data['Daily_Return'] = stock_data['Close'].pct_change()

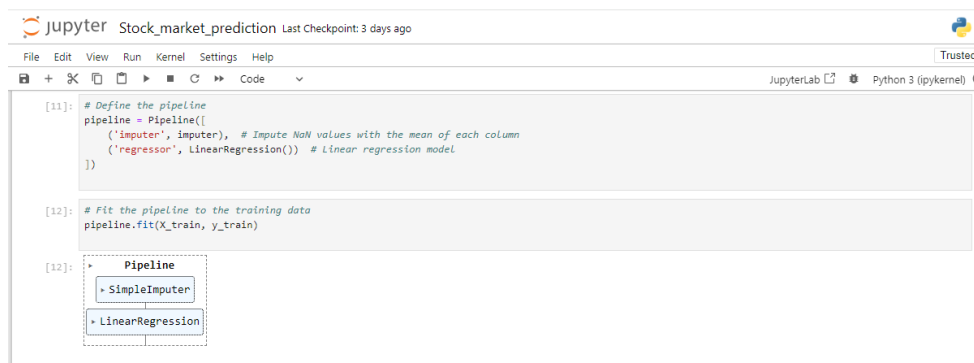
[4]: # Drop NaN values and unnecessary columns
stock_data.dropna(inplace=True)
stock_data = stock_data[['Open', 'High', 'Low', 'Close', 'Volume', 'Daily_Return']]
```



```
[8]: # Check for NaN values in input features
print(X_train.isnull().sum())
```

Open	0
High	0
Low	0
Close	0
Volume	0
MA_10	8
MA_50	36
dtype:	int64

Define the pipeline:



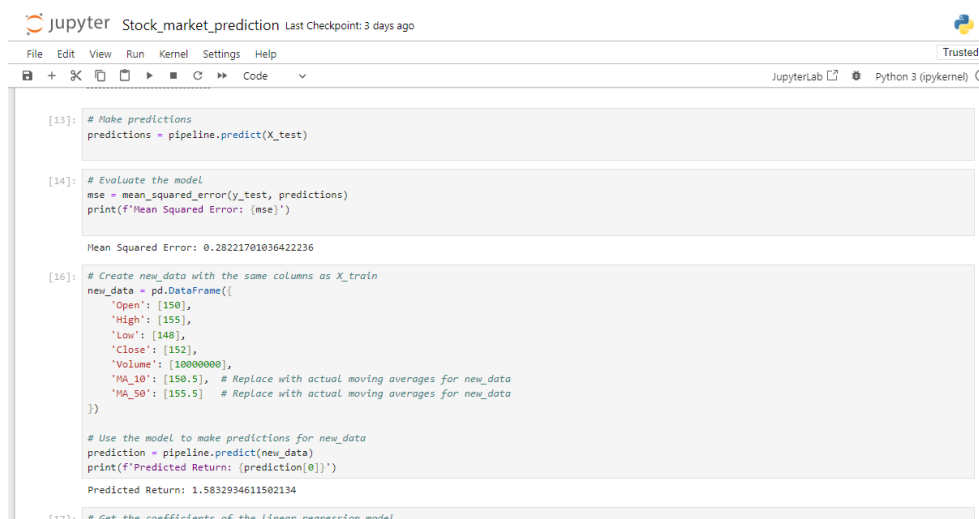
```
[11]: # Define the pipeline
pipeline = Pipeline([
    ('imputer', Imputer), # Impute NaN values with the mean of each column
    ('regressor', LinearRegression()) # Linear regression model
])

[12]: # Fit the pipeline to the training data
pipeline.fit(X_train, y_train)
```

[12]: Pipeline

- SimpleImputer
- LinearRegression

Prediction :



```
[13]: # Make predictions
predictions = pipeline.predict(X_test)

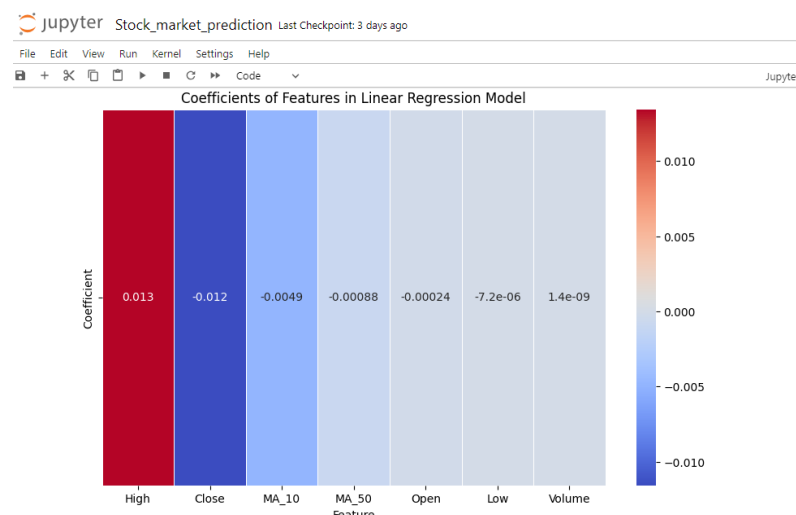
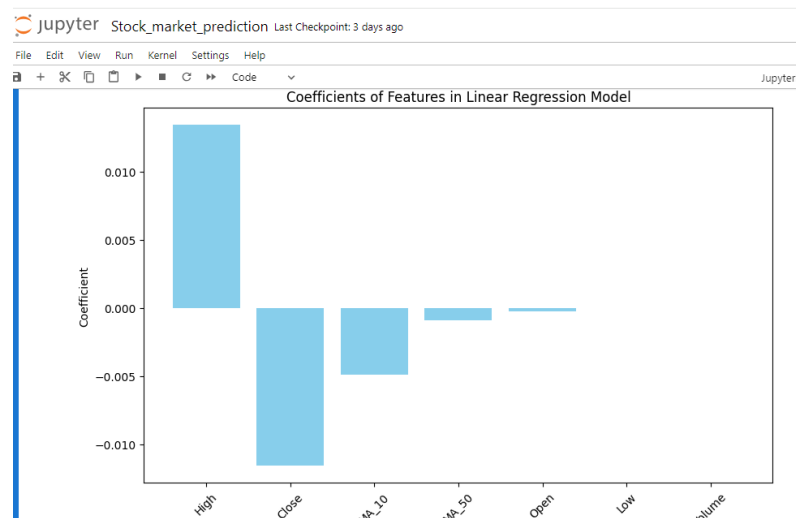
[14]: # Evaluate the model
mse = mean_squared_error(y_test, predictions)
print(f'Mean Squared Error: {mse}')

Mean Squared Error: 0.28221701836422236

[16]: # Create new_data with the same columns as X_train
new_data = pd.DataFrame({
    'Open': [150],
    'High': [155],
    'Low': [148],
    'Close': [152],
    'Volume': [10000000],
    'MA_10': [150.5], # Replace with actual moving averages for new_data
    'MA_50': [155.5] # Replace with actual moving averages for new_data
})

# Use the model to make predictions for new_data
prediction = pipeline.predict(new_data)
print(f'Predicted Return: {prediction[0]}')

Predicted Return: 1.5832934611502134
```



Benchmark :

In the context of our Stock Market Prediction Tool Using Machine Learning , benchmarking is a critical practice to assess the performance and effectiveness of our predictive models. We will utilize benchmark indices and relevant measures to gauge the accuracy and reliability of our stock price predictions. The chosen benchmarks are indicative of broader market movements and represent the yardstick against which our predictions will be evaluated.

Selected Benchmarks:

Tata Motors Ltd

Business Opportunity :

the development of our Stock Prediction Tool is poised to seize the growing business opportunities in the financial technology sector. By effectively addressing market needs, offering unique advantages, and continuously improving our software, we aim to revolutionize the way individuals and institutions approach stock trading and investment, creating substantial value for both investors and our business.

Conclusion :

The journey of developing and implementing our Stock Prediction Software has been a remarkable endeavor, driven by the vision of transforming the way investors approach the dynamic and often unpredictable world of stock markets. In the realm of financial technology, this project has not only addressed the pressing need for reliable stock market predictions but has also unearthed significant business opportunities and growth potential.

Our tool, powered by advanced machine learning and predictive analytics, stands as a testament to our commitment to providing accurate, real-time, and actionable insights for investors of all types – from novices seeking guidance to seasoned traders and institutional players managing vast portfolios. The core mission of this software has been to empower users with the knowledge required to make well-informed decisions, mitigate risk, and optimize investment strategies.

The project has identified the paramount role of benchmarking, enabling us to gauge our software's performance against established market indices, ensuring transparency and accountability. Continuous refinement and adaptation to the evolving financial landscape are at the forefront of our commitment to user satisfaction and business success. As we step into a future defined by data analytics and artificial intelligence, our Stock Prediction Software represents not just a business opportunity but a pioneering solution that merges technology with the intricacies of financial markets.

The potential to boost investor confidence, foster a more informed and active participation in the stock market, and provide a competitive edge to our users is a vision we will relentlessly pursue.

In conclusion, our Stock Prediction Software opens doors to a more secure and prosperous financial future. The project's journey has been marked by dedication, innovation, and a relentless pursuit of excellence. We look forward to the impact it will create in the world of investments and the substantial value it will bring to both our users and our business.

Github link :

(<https://github.com/BoradeAarti/Stock-Prediction-using-Machine-Learning->)

