

Shri Ramswaroop Memorial University



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Course :- B.Tech.

Branch :- CS (DS + AI)

Subject :- I.T. Workshop

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SCILAB MINI PROJECT

Amazon Stock Price Analysis and Prediction using Scilab

Objective of the Project :-

The main objective of this project is to analyze **Amazon stock market data** using **Scilab** and apply **Machine Learning techniques** to predict stock prices. The project focuses on:

1. **Data Preprocessing** – Reading and structuring stock market data from a CSV file.
2. **Machine Learning Model** – Implementing **Linear Regression** to predict future stock prices.
3. **Visualization** – Plotting various graphs to analyze trends, such as:
 - Actual vs. Predicted Closing Prices.
 - Trading Volume Over Time.
 - Open vs. Close Prices.
 - High vs. Low Prices.
4. **Stock Market Trend Analysis** – Observing stock price fluctuations over time and drawing insights from historical trends.

This project provides insights into **financial data analysis** and helps in understanding how machine learning can be applied to real-world stock prediction scenarios.

Tools and Technologies Used

1. **Scilab** – Open-source numerical computation software used for data analysis, plotting, and machine learning.
2. **CSV Dataset** – Amazon stock data from 2000 to 2025, containing fields like:
 - Date
 - Open price
 - High price
 - Low price
 - Close price
 - Adjusted close price
 - Trading volume
3. **Machine Learning Algorithm – Linear Regression**, a fundamental ML model used to predict stock prices based on historical trends.
4. **Graphical Representation** – Various plots are used to visualize stock market trends, making it easier to interpret financial data.

Project Workflow

1. **Loading Data**
 - The dataset is loaded from a CSV file using `csvRead()`.
 - Relevant stock price data fields are extracted.
2. **Preprocessing Data**
 - The **date column** is converted into numerical indices to be used in model training.
 - The **closing prices** are used as the dependent variable for prediction.
3. **Applying Machine Learning (Linear Regression)**
 - A **Linear Regression Model** is trained using $\text{theta} = \text{inv}(X' * X) * X' * y$, where:
 - x represents the input data (days as indices).
 - y represents the actual closing prices.
 - The model finds the best-fit line to predict stock prices.

4. Making Predictions

- The trained model is used to **predict closing prices** for the dataset.
- These predictions are compared with actual values.

5. Visualizing Data using Graphs

- **Stock Price Prediction** – A graph showing actual vs. predicted prices.
 - **Trading Volume Trend** – A graph displaying how stock trading volume fluctuates over time.
 - **Open vs. Close Prices** – A comparison between stock opening and closing prices.
 - **High vs. Low Prices** – A graph showing the variation in stock price highs and lows.
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Significance of the Project

- Helps in understanding **financial trends** through **machine learning techniques**.
- Provides a **visual representation** of stock market trends for easy analysis.
- Demonstrates how **Scilab** can be used for **data analytics and forecasting**.
- Serves as a foundation for **advanced stock market predictions** using **more complex ML models** in the future.

Code :-

Scilab Practical.scil (C:\Users\Deepak\Desktop\Scilab Practical.scil) - SciNotes

Scilab Practical.scil

```
1 // Load the dataset
2 clc;
3 clear;
4
5 // Read CSV file
6 dataset = csvRead('C:\Users\Deepak\Desktop\New folder (2)\Scilab\amazon.csv', ',', '');
7
8 // Extract relevant columns
9 dates = dataset(2:$,1); // Skipping header
10 open_prices = dataset(2:$,2);
11 high_prices = dataset(2:$,3);
12 low_prices = dataset(2:$,4);
13 close_prices = dataset(2:$,5);
14 volume = dataset(2:$,7);
15
16 // Convert dates to numerical indices for training
17 x = (1:length(dates))';
18 y = close_prices;
19
20 // Train a linear regression model
21 X = [ones(length(x),1) x]; // Adding bias term
22 theta = inv(X'*X) * X' * y;
23
24 // Make predictions
25 y_pred = X * theta;
26
27 // Plot actual vs predicted prices
28 scf(0);
29 plot(x, y, 'b', 'LineWidth', 2);
30
31 plot(x, y_pred, 'r', 'LineWidth', 2);
32
33 legend(['Actual Close Price', 'Predicted Close Price']);
34 xlabel('Days');
35 ylabel('Stock Price');
36 title('Amazon Stock Price Prediction using Linear Regression');
37
38 // Plot stock volume trends
39 scf(1);
40 plot(x, volume, 'g', 'LineWidth', 2);
41 xlabel('Days');
42 ylabel('Volume');
43 title('Amazon Stock Trading Volume Over Time');
44
45 // Plot Open vs Close Prices
46 scf(2);
47 plot(x, open_prices, 'm', 'LineWidth', 2);
48 plot(x, close_prices, 'c', 'LineWidth', 2);
49 legend(['Open Price', 'Close Price']);
50 xlabel('Days');
51 ylabel('Price');
52 title('Amazon Open vs Close Prices');
53
54 // Plot High vs Low Prices
55 scf(3);
56 plot(x, high_prices, 'r', 'LineWidth', 2);
57
58 plot(x, low_prices, 'b', 'LineWidth', 2);
59 legend(['High Price', 'Low Price']);
60 xlabel('Days');
61 ylabel('Price');
62 title('Amazon High vs Low Prices');
63
```

Output :-

