CSE343: Machine Learning Project Proposal
Finance Forecaster: Using Machine Learning to predict stock prices

Aryan Dhull	Deepanshu	Pranav Aggarwal	Prerak Gupta
2021520	2021524	2021551	2021552

1. Motivation

Precise stock price prediction remains a challenging yet highly valuable venture in today's fast-paced financial markets. As traders and investors seek to make knowledgeable decisions, the ability to forecast the ups and downs of the market plays an important role. Eventually, successful price prediction could certify market participants with magnified insights, likely reducing risks and optimizing investments in an ever-evolving economic landscape.

This project aims to grasp algorithms and data analysis techniques to unlock patterns hidden within historical stock data. Machine learning techniques, such as time series forecasting and regression can be applied to historical stock market data to predict future price movements. Developing accurate predictive models can be precious for traders, investors, and financial institutions looking to make informed decisions.

2. Related Work

Recent work shows that stock market prediction can be enhanced using machine learning.

Mehar et al in *Stock Closing Price Prediction using Machine Learning Techniques* used ANN for predicting the next day closing price of the stock and RF for comparative analysis. [1] Michel et al in *Evaluating Multiple Classifiers for Stock Price Direction Prediction* bench marked ensemble methods (Random Forest, ADA boost) against single classifier models (NNs, Logistic Regression, SVMs, kNN). [2] Adebiyi et al in *Stock Price Prediction Using the ARIMA Model* showed that ARIMA (Autoregressive Integrated Moving Average) model has a strong potential for short-term predictions in time-series analysis.[3]

3. Final Outcome

This project aims to leverage machine learning algorithms and data computation techniques to manage and analyze vast and complex data to identify patterns and trends in massive amounts of data. Developing accurate predictive models, which can make use of historical stock market data to make predictions about future price movements. Identifying market conditions can aid in assessing risk and volatility, potentially reducing investment risk. Machine learning models can be improved and adapted easily in the future in the dynamically changing financial landscape.

4. Timeline

WEEK	TASK
Week 1-2	Data Collection
Week 3	Data Preprocessing and Visualization
Week 4	Feature Extraction and Analysis
Week 5	Feature Selection and Correlation
Week 6	Linear Regression, SVMs
Week 7	K-Means, Naïve Bayes
Week 8	Random Forest, Decision Tree and NNs
Week 9	ARIMA and SARIMAX
Week 10	Hyperparameter Tuning and Outcome Analysis
Week 11-12	Writing Report

5. Individual Tasks

TASK	TEAM MEMBER(S)
Data Collection	Deepanshu, Prerak
Data Preprocessing and Visualization	Aryan, Pranav
Feature Extraction and Analysis	Aryan, Prerak
Feature Selection and Correlation	Deepanshu, Pranav
Linear Regression, SVMs	Aryan, Prerak
K-Means, Naïve Bayes	Aryan, Pranav
Random Forest, Decision Tree and NNs	All
ARIMA and SARIMAX	All
Hyperparameter Tuning and Outcome Analysis	Pranav, Deepanshu
Writing Report	All