

Forecasting The Future: Analyzing Netflix Stock Prices

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ABSTRACT- This project aims to predict Netflix stock prices using machine learning algorithms such as Supervised Learning, Linear Regression, K-Nearest Neighbors (KNN), Support Vector Machine (SVM), and Decision Trees. The data set used for this analysis comprises historical Netflix stock prices along with relevant financial indicators. To ensure robustness and accuracy, k-fold cross validation is employed as the validation method. This methodology involves Preprocessing and Cleaning the data set, Feature Engineering to enhance Model Performance, Data Standardization to standardize the data with a fixed range to ensure the machine learning models are trained well and accurately, Cross Validation is used to detect problems like over fitting and selection bias since it tests the ability of the machine learning model on predicting new data and the implementation of linear regression algorithm. In supervised learning, the model is trained on a labelled data set, where the algorithm learns the relationship between input features and corresponding output labels. By training the model on historical data and validating its accuracy, it aims to provide aiding in decision-making process related to stock investments, stocks buying or selling strategies and risk assessment. This research contributes to the field of financial forecasting by providing insights into the effectiveness of various machine learning techniques in predicting stock prices.

Index Terms- Supervised Learning Algorithm are Linear Regression, Support Vector Machine (SVM), K-Nearest Neighbors (KNN), Decision Trees, Stock Market, Predictions, Forecasting.

I. INTRODUCTION

The project involves analyzing historical data and current market trends related to Netflix's stock price to forecast its future movements. The aim is to provide investors with actionable insights to make informed decisions about buying, selling, or holding Netflix stock. The project seeks to enhance investors' understanding of Netflix's stock and its potential trajectory in the market. The project is to utilize machine learning techniques, specifically Linear Regression, KNN, Decision Trees, and SVM, along with k-fold cross-validation, to predict Netflix stock prices accurately. By leveraging historical stock data and financial indicators, the goal is to

provide investors with reliable forecasts to facilitate informed decision-making regarding stock investments.

The purpose of forecasting the future and analyzing Netflix's stock price is to provide investors with insights into potential future movements of the stock. By understanding the underlying factors driving Netflix's performance and market dynamics, investors can make more educated investment decisions, manage risk, and allocate capital effectively. Ultimately, the goal is to help investors navigate the stock market and maximize returns on their investments in Netflix.

The scope of forecasting the future and analyzing Netflix's stock price is to Implement ensemble methods to combine predictions for improved accuracy and to Explore deep learning architectures to capture complex patterns in stock price data and to Integrate alternative data sources for richer feature sets.

II. LITERATURE SURVEY

- Stock Market Prediction Using Machine Learning

In 2018, V KRANTHI SAI REDDY, developed this Project and named as “Stock Market Prediction Using Machine Learning” and has been published in the “International Research Journal of Engineering and Technology (IRJET)”.

This project focuses on predicting stock market values using machine learning techniques, specifically Support Vector Machine (SVM) and Radial Basis Function (RBF). The project aims to address the challenges associated with stock market prediction, such as market volatility and the influence of various factors on stock prices. The introduction provides an overview of stock market prediction, highlighting the importance of accurate predictions for investment decision-making. It discusses two common approaches to stock analysis: fundamental analysis and technical analysis.

Additionally, it mentions the increasing use of machine learning techniques in stock market prediction and sets the context for the project. The main objective of the project is to develop a financial data predictor program using machine learning techniques. The program utilizes historical stock prices as training data and aims to reduce uncertainty associated with investment decisions. The methodology section outlines the approach taken in the project. It specifies the use of Support Vector Machine (SVM) and Radial Basis Function (RBF) for predicting stock market values. SVM is a supervised learning model used for classification and regression tasks, while RBF is a type of kernel function commonly used in SVM algorithms. The project likely utilizes historical stock market data as input for training the machine learning models. This dataset would include information such as stock prices, trading volumes, and other relevant factors that could influence stock market movements. The project would involve implementing the SVM and RBF algorithms using Python programming language. Python is widely used for machine learning tasks due to its extensive libraries such as scikit-learn and TensorFlow. The success of the project would be evaluated based on the accuracy of the predictions made by the machine learning models. In the project, they proposed the use of the data collected from different global financial markets with machine learning algorithms in order to predict the stock index movements. SVM algorithm works on the large dataset value which is collected from different global financial markets. Also, SVM does not give a problem of over fitting. Various machine learning based models are proposed for predicting the daily trend of Market stocks. Numerical results suggest the high efficiency. The practical trading models built upon our well-trained predictor. The model generates higher profit compared to the selected benchmarks. Overall, the project aims to demonstrate the effectiveness of five machine learning techniques, particularly SVM and RBF, in predicting stock market values. By leveraging historical data and advanced algorithms, the project seeks to provide valuable insights for investors in making informed decisions in the stock market.

- Stock Price Prediction using Machine Learning Algorithms

SHREYA PAWASKAR 2022, To assess the “Stock Price Prediction using Machine Learning

Algorithms” in the “International Journal for Research in Applied Science and Engineering Technology (IJRASET)” which is available at www.ijraset.com

The project embarked on an exploration of the intricate domain of finance, specifically targeting the challenging task of stock market prediction through the lens of machine learning methodologies. Recognising the formidable obstacle posed by the market's inherent volatility, the project's primary aim is to attain heightened levels of accuracy and precision in forecasting stock returns. This endeavour is propelled by leveraging the latest advancements in artificial intelligence and harnessing robust computational capabilities to navigate the complexities of financial markets. To achieve its objectives, the project adopts a multi-faceted approach, employing a repertoire of machine learning algorithms, including Multiple Linear Regression and Polynomial Regression. These algorithms are carefully selected for their efficacy in capturing and utilizing repetitive patterns ingrained within financial data. Key parameters such as date, volume, open, high, low, close, and adjusted close prices are meticulously integrated into the predictive models to enhance their predictive capabilities. The efficacy of the developed models is rigorously assessed through the lens of standard strategic indicators, notably Root Mean Square Error (RMSE) and R2 score. Lower RMSE values and higher R2 scores are indicative of superior model performance, thus serving as benchmarks for evaluating predictive accuracy and efficacy. This rigorous evaluation framework ensures that only the most robust and reliable models are selected for deployment in real-world scenarios. The significance of accurate stock market prediction cannot be overstated, as it plays a pivotal role in aiding investors and market institutions in making well-informed decisions to maximize profits and mitigate risks. By providing actionable insights into market dynamics and trends, these predictive models empower stakeholders to navigate the complex landscape of financial markets with confidence and clarity. Furthermore, the project sheds light on the burgeoning role of machine learning in finance, offering a unique perspective on understanding financial data and market behaviour. These algorithms not only facilitate decision-making processes but also adapt and evolve in response to changing market conditions, thereby

enhancing their predictive capabilities and resilience in 6 dynamic market environments. In conclusion, the project represents a concerted effort to harness the power of machine learning in revolutionizing stock market prediction. By leveraging advanced algorithms and robust computational techniques, the project aims to provide pragmatic solutions to the challenges faced by investors and market institutions in navigating the volatile and unpredictable landscape of financial markets. Through rigorous evaluation and continuous refinement, the project endeavours to push the boundaries of predictive accuracy and efficacy, ultimately delivering tangible value to stakeholders in the finance industry.

- Stock Market Prediction Using LSTM Recurrent Neural Network

Adil MOGHAR & Mhamed HAMICHE 2020, Evaluation for the “Stock Market Prediction Using LSTM Recurrent Neural Network” published in “International Workshop on Statistical Methods and Artificial Intelligence (IWSMAI 2020)”. III.

The abstract of this paper underscores the persistent challenge of investing in financial assets due to the unpredictable nature of financial markets. It highlights the pivotal role of machine learning in contemporary scientific research, particularly in addressing complex tasks that traditionally necessitate human intelligence. The article sets forth the objective of constructing a predictive model using Recurrent Neural Network (RNN) and Long-Short Term Memory (LSTM) models to forecast future stock market values. Specifically, the paper aims to evaluate the precision of machine learning algorithms and assess the impact of epochs, a parameter governing the training of neural networks, on model improvement. The introduction provides a comprehensive overview of the widespread utilization of machine learning in quantitative finance, encompassing various applications such as portfolio management, investment processes, and other financial operations. It delineates machine learning as a methodology that relies on data to unveil patterns without explicit programming instructions. The narrative underscores the significance of employing machine learning models to forecast future asset values, offering a mechanism to efficiently amalgamate disparate sources of information for enhanced predictive capabilities. The introduction also underscores the utility of Recurrent Neural Networks (RNNs), particularly

LSTM models, in financial market prediction. It cites research comparing the accuracy of LSTM and autoregressive integrated moving average (ARIMA) techniques, with LSTM emerging as superior in forecasting time series financial data. Inspired by these findings, the paper aims to leverage an ML algorithm based on LSTM RNN to forecast adjusted closing prices for a portfolio of assets. The ultimate goal is to develop the most accurate predictive model to forecast future values for the portfolio, thereby facilitating informed investment decisions in the volatile landscape of financial markets. This paper proposes RNN based on LSTM built to forecast future values for both GOOGLE and NKE assets, 7 the result of their model has shown some promising result. The testing results confirmed that their model is capable of tracing the evolution of opening prices for both assets. For our future work they had tried to find the best sets for both data length and number of training epochs that better suit our assets and maximize our predictions accuracy.

III. EXISTING SYSTEM

Traditional methods of stock price prediction, such as technical and fundamental analysis, encounter several drawbacks in the face of modern financial markets. Firstly, these methods often rely heavily on historical data and patterns, which may not accurately reflect current market conditions or future trends. As financial markets evolve and become increasingly complex, historical patterns may lose their relevance, leading to less reliable predictions. Additionally, traditional methods may struggle to account for sudden shifts in market sentiment or unexpected events, such as geopolitical crises or natural disasters, which can significantly impact stock prices.

Disadvantages

- Limited Evaluation Metrics.
- Data Dependency.
- Market Volatility.
- Model and Algorithm Interpret ability.
- Overfitting Risk.
- Generalization.
- Limited Data Feature.

IV. PROPOSED SYSTEM

Our Proposed Model for the Stock Price Predictions involves leveraging Machine Learning Algorithms,

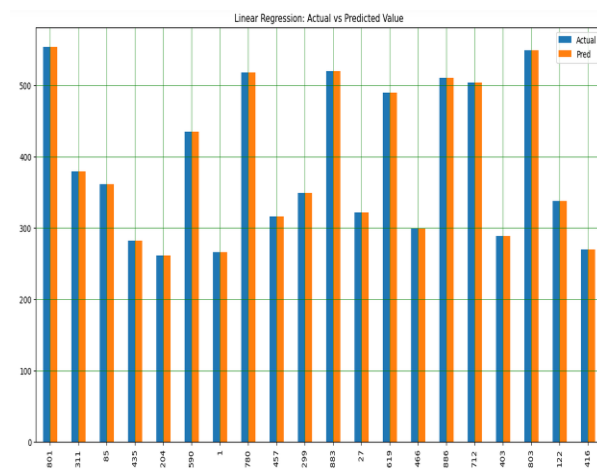
specifically Supervised Learning Algorithm, Linear Regression, Support Vector Machine (SVM), K-Nearest Neighbors (KNN) and Decision Trees. These algorithms are used to build a predictive model using the Netflix Dataset. This model aims to accurately predict the Time Period in which the stocks can give High Profits by analyzing the features in the dataset such as: Date, Open, High, Low, Adj Close, Volume and the predicted target variable Close. After extracting the dataset goes under few processes:

- Feature Engineering
- Data Standardization
- Cross Validation

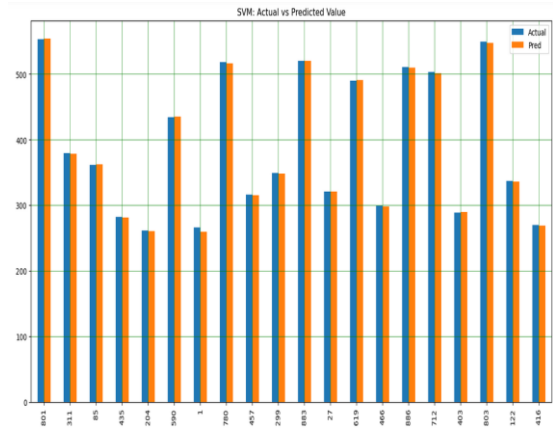
Advantages

- Accuracy: These Machine learning algorithms have the potential to provide more accurate predictions compared to traditional methods.
- Adaptability: These models can adapt to changing market conditions and incorporate various features to improve prediction performance.
- Automation: Once trained, the models can automate the prediction process, saving time and effort for investors.
- Risk Assessment: Predictive models can help investors assess and mitigate risks associated with stock investments.
- Insights: Through analysis of feature importance and model performance.

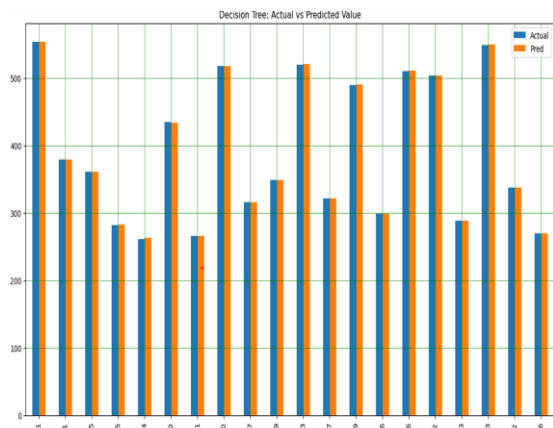
V. RESULTS



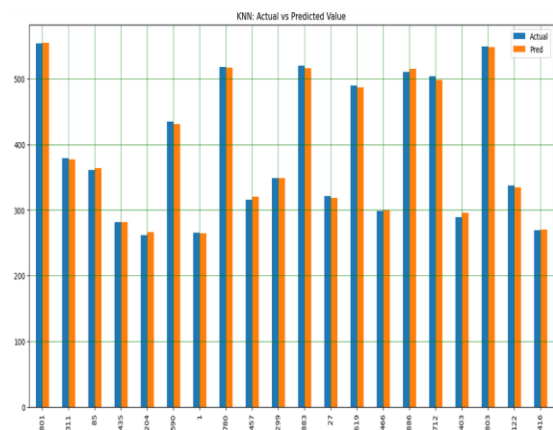
The Outcome from the Linear Regression Model



The Outcome from the SVM Model



The Outcome from the Decision Tree Model



The Outcome from the KNN Model

CONCLUSION

This project successfully predicts Netflix stock prices using various machine learning algorithms, aiding investors in decision-making processes related to stock investments, buying or selling strategies, and risk assessment.

FUTURE SCOPE

- Implement ensemble methods to combine predictions for improved accuracy.
- Explore deep learning architecture to capture patterns in stock price data.
- Integrate alternative data sources for richer feature sets.
- Experiment with advanced feature engineering techniques to enhance model performance.
- Collaborate with domain experts to validate and refine predictive models.

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