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Machine Learning Based Stock Prediction and Analysis

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Abstract: India's stock market is extremely variable and indeterministic, which has a limitless number of aspects that regulate the directions and trends of the stock market; therefore, predicting the uptrend and downtrend is a complicated process. This paper presents advance method for stock price prediction and forecasting using companies financial performance on quarterly and yearly basis. This helps the investor to stay invest for Long term. There are many factors that influence stock price prediction, such as company fundamentals and internal (earning per share (EPS), dividend per share, and book values) and external factors (government rules and regulations, inflation, and other economic situations, such as gross domestic product (GDP), money supply, fluctuation in oil prices and environmental conditions).
The proposed system has been implemented as a web app using Django and React. The React Web App displays all live prices and news received from the self-built Django Server via web scraping. Additionally, the Django server serves as a bridge between the React frontend and the machine learning algorithm built with Keras and further enhanced with scikit-learn.

Keywords: Django Server, React Web-App, Recurrent Neural Networks, Stock Market Prediction, Time Series, Scikit Learn, Machine Learning

1. INTRODUCTION

The Positive economic growth in indian stock market has influenced in last two decades has fascinated many investors. However, investors face a challenge of predicting stock prices in their investment strategies; hence, tools that can provide them with accurate information about the stock price are crucial. There are many factors that influence stock price prediction, such as company fundamentals and internal (earning per share (EPS), dividend per share, and book values) and external factors (government rules and regulations, inflation, and other economic situations, such as gross domestic product (GDP), money supply, fluctuation in oil prices and environmental conditions). Many studies aimed to address the issues of stock price prediction, ranging from the traditional approach to the recent data mining applications. However, these studies cannot be generalized because there is no perfect system that indicates the exact movements of stock prices.
The Stock Market of India ranks 5th in the world in terms of market net worth. At the moment, there are more than 5000 companies are listed in NSE. India's economy is based mainly on agricultural exports and related services such as software development and

technical support. Regrettably, stock market trading accounts for only 4% of India's gross domestic product. It, therefore, is far less than the average for other developed countries like the USA is around 55%. This underutilized asset has the potential to be more effectively monetized to aid India's development.
This section discusses the shortcomings of conventional stock price prediction methods and the advantages of applying machine learning.

A. **The conventional method for analyzing stocks**
The stock market is highly variable and indeterministic due to various parameters impacting price movements in numerous sizes and layers. According to efficient market theory, the market corrects itself, meaning that the current share price represents the appropriate total combined price, which is neither excessively low nor excessively high. In simple terms, "the market is unbeatable," suggesting one cannot defeat the market, yet existing evidence shows otherwise. By monitoring stock movement patterns, it is possible to forecast market trends.

The conventional approach emphasizes technical and fundamental analysis to forecast the share market on a massive level, which very seldom transforms to low-level selected stocks forecasting. Some particular stocks, on the other hand, lead to overall price movements in the market.

a. **Fundamental analysis**

This strategy is primarily concerned with a company's prior success and reputation. Stocks that are prone to a positive price increase are filtered using performance criteria such as P/E ratios. It relies on the assumption that successful businesses will remain beneficial in the long run due to the market's rewarding nature.

b. **Technical analysis**

This strategy relies on forecasting future pricing using time- series analysis on historical trends. RSI, Bollinger Bands, VWAP, Moving averages are a few of the many indicators used to analyze and study the market trend and understand how the market is moving.

B. Stock market analysis with a modern perspective Machine learning methods such as SVM, RNN, and EML,
developed by computer scientists, can evaluate and conduct information discovery at large scales in a short period. RNN is used to forecast stock market prices in this research paper.

a. **Qualitative Research**
Newsfeeds about the stock market significantly impact the market trend, resulting in a downward trend in lousy sentiment and an upward trend when there are positive sentiments. As a result, media/social networks and the share price are correlated and uncertain. Therefore, news acts as an essential medium for analyzing how a stock would perform on a subsequent day. Stocks mimic each other in times of crisis, resulting in market collapse. News can give the public a view of how the company is performing and how it might perform in the future.

b. **Quantitative research**
Most markets now have historical information readily available. One can use these historical values to study and analyze how a particular stock has been performing. This data can also be studied using various Machine Learning Algorithms

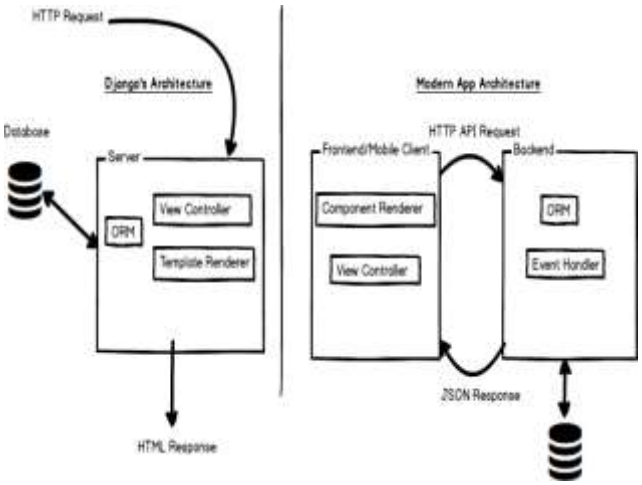
to analyze the upward and downward trends of the data to generate predictions for the future. Such algorithms prefer learning the movement of a single stock rather than many

different stocks cumulatively as each stock moves and trades differently. Additionally, these models can also perform under a variety of situations and economic conditions.

PROPOSED SYSTEM

A. Tech Stack

This section outline the features and algorithm we have used to create a product that can analyse stock on the basis of Fundamental Analysis and companies performance and news about the company.



a. **The Frontend**

The Frontend is a representation of what the user sees. It is the visual component, and frequently the section's sole purpose is to be visually appealing. The Frontend uses React to serve a blank HTML template onto which custom HTML is inserted and styled with CSS. Javascript makes the page dynamic and enables the user to navigate between pages and communicate with the server with ease.

Additionally, the Frontend makes the web app responsive via Bootstrap, which means it adapts to the screen size and resizes itself to look good on any device. The Frontend is enhanced with

JavaScript to provide a more animated and silky view of the page rather than a direct jump.

The primary reason for choosing React over any other Javascript library for frontend development is its fast rendering speed and SEO friendliness. Content delivery Speed acts as

a significant factor when creating a web app, and deploying a React app is as easy as developing one.

b. **The backend**

The Backend speaks about what happens in the background. It is usually associated with handling and dealing with user requests. These requests are received and handled using REST APIs deployed via Django, which is programmed using Python. Python is responsible for communicating between various modules depending on the User's needs.

The Backend uses two databases, namely SQLite, to store user details when they create an account, and MySQL is used to store tabular data like a Stock and its current market price.

Python is also used to create a Recurrent Neural Network Model using Keras, built upon Tensorflow.

The primary reason for choosing Django over any other web framework like Flask is that Django allows us to create APIs using the REST architecture while maintaining an SQLite database. It will enable us to concentrate more on developing functions that we require rather than developing basic and repeatedly made tasks.

B. **Account Creation and SQLite Database**

To use the proposed platform and all of its features, each User must create an account for themselves. Details entered by the User are first validated in JavaScript and then sent to Python for further Validation. In the first stage of Validation, which happens in JavaScript, the data is checked using Regular Expressions. Data Like Email-ID, Phone Number, Pan Number, IFSC Code, to name a few, are all passed through the regular expression. If it passes the regular- expression test, the data is forwarded to Python; else, an error is thrown. Django enables us to quickly and efficiently check and add the User-Inputted data to the SQLite Database in Python. If the data entered previously exists in a database, an error is returned; else, the data is hashed and added.

Sensitive information such as Aadhar Number, Email ID, Password, to name a few, are all hashed using the "SHA-256 hashing algorithm. In the SHA-256 hashing algorithm, the data acts as an input and is passed through a cryptographic hash function which outputs a 64-bit alphanumeric text.

C. **Scraping News and Live Indice Prices**

The dashboard of our application displays live prices, percentage changes, and value changes for the four most popular indices, namely the NIFTY50 and the SENSEX, which are updated every second when the market is open. This data is retrieved from Yahoo Finance via our server and passed to the frontend.

The news section of the dashboard displays the five most recent headlines about the stock market, which are updated every fifteen seconds. Economic Times was used to compile this information because their News is updated the most frequently compared to other news-related websites such as MoneyControl and Yahoo Finance.

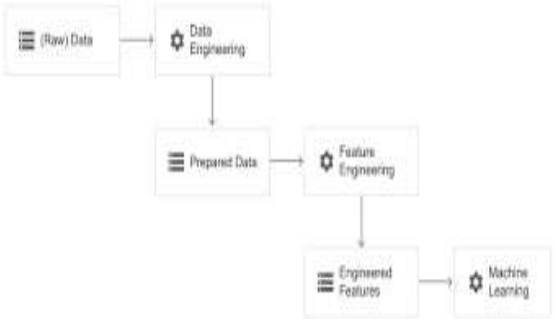
D. **Live Scraping Search Price**

When a user searches a stock, the Stock Name and its respective Stock Code are sent to the server for more details about the stock. The server uses Yahoo Finance to get the fundamentals of the company. This is especially useful for stock traders who prefer to buy for a more extended period. The information is extracted every 5 seconds in which the Current

Market Price, Value Change, Percent Change, Statistics, Information, and much more are extracted, which is then sent to the Frontend.

E. **Prediction Algorithm**

Algorithm Predicts weather the stock will go up on the basis of companies past performance and fundamental analysis. Here we will predict the stock on the basis of eps, PE ratio, net profit of the company and ebidta.This model predicts whether the stock should buy for long term and whether the company is profitable or not. Here we will used machine learning and deep learning to predicts the stock price.



2. CONCLUSION

In this paper, the J48 algorithm, with the help of Rweka to improve the accuracy of predicting the stock price, is used to get a stock recommendation. For this, sampled data is used as a training data set. Of the issues combined with Over-Fitting had been handled in the bagging technique and news-based approach is used to deal with sudden bad news. It is worth to note that in the end, in real-time trading scenarios the model had given good rewards with less risk. Furthermore, as future work, different approaches like clustering and neural network can be included to enhance accuracy. Similar to the news-based system, social media-based sentiment analysis approach c

In this paper the algorithm predicts with the help of ML to increase accuracy of predicting the stock. This algorithm will give the long term buy and hold suggestion. By predicting on the basis of fundamental analysis of the company the risk is low.

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