

STOCK MARKET ANALYSIS AND PREDICTION

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Abstract - In the financially volatile market, such as the stock market, it is important to have a very precise prediction of a future trends. It is mandatory to have a secure prediction of the values of the stocks due to volatility in stocks. Predicting a non-linear trend requires advanced algorithms of machine learning. This paper contains study of various machine learning algorithms such as RNN (recurrent neural networks), LSTM (long short term memory) with different feature selection. The results of this study will show that the algorithms of Neural network give considerable profits. Sentimental analysis on the company provides sentimental insight of the company values, reputation and its market capitalization.

This paper is mainly confined to the stock market behavior and is intended to devise certain techniques for investors to make reasonable returns on their investments.

1. INTRODUCTION

Predicting the Stock Market has been the bane and goal of investors since its mere existence. Everyday billions of rupees are traded on the exchange, and behind each rupee is an investor hoping to profit in various ways. Companies rise and fall based on the behaviour of the market. The Stock Market and its associated challenges find their way into the public imagination every time it misbehaves. The 2008 financial crisis was characterized by films and documentaries based on the crash. The common theme among those productions was that very few people knew how the market worked and would have reacted. In the modern age of data, it can be devised using computational resources and historical price analysis to get an insight in the future events of the market.

Testing of results is done based on the facts that emotions affect the decision-making process of individuals. Sentiment analysis on Twitter data is done to find the public emotions at any situation [1]. These tweets and past stock data values have further been used to predict sentiment of a stock and provide analytics respectively.

2. OBJECTIVES

In the past decades, there is an increasing interest in predicting markets among economists, policymakers, academics and market makers. The objective of the proposed work is to study and improve the supervised learning algorithms to predict the stock price. The technical objectives will be implemented in Python. The system must be able to

access a list of historical prices. It must be able to provide analytics, predictions and sentiment using historical data and live twitter data. It must also provide an instantaneous visualization of the market stocks/index.

Aim:

1. To predict the opening and closing price of company stocks.
2. To get data from twitter using Twitter API for sentimental analysis.
3. To get graphs regarding the share market and its analysis using scraped data and knowledge gained using neural networks.
4. To get overview of stock market.

3. PROPOSED ARCHITECTURE

The system needs data from the internet to perform analysis and prediction to get the insight on the stock prices in the future. First step is the collection of data from the internet. The data from twitter pages of the companies can be collected using tweepy. This data collected from the sources will be filtered depending on many factors such as recentness, connection to company and much more [3]. The stock market data will be gathered from official sites of BSE (Bombay Stock Exchange) and NSE (National Stock Exchange).

This data along with the share data will be used by the prediction model to predict the shares in future with sentimental analysis as a supporting important part of it. The prediction models are Recurrent Neural Network, Long Short-Term Memory which will give us the prediction for the market.

The data generated from the prediction model will be graph's consisting of stock price along with many analytical indicators and the prediction of upcoming trend for near term of the stock with current market sentiment score. These indicators can be used by the user to make his analysis and invest for maximum profit.



Fig -1: Proposed Architecture.

4. DATASETS

Two main datasets have been used in this paper:

1. BSE, NSE values from the listing date of the company to the most recent data will be considered. Data sets were available on nseindia.com from which fetched Open, Close, High and Low in prices.

2. Publicly available Twitter data of the same period and Includes timestamp, username and tweet text of each text during that period. This information is used to get the sentiment of the people towards the stock [2].

5. PROPOSED SOLUTION

A. Design:

A system will be designed to provide a friendly interface to its users.

B. Stock Search:

This section will enable the user to find the Stock they are looking for and load the data of the stock selected by the user into the system. The quote will consist of details including Day Open, Day High, Day Low, Previous Day Close. The user will also be able to see the predictions for the stock (details in the next segment).

C. Stock Analytics and Predictions

This section will display Analytics and Prediction using various models on any stock. Based on certain assumptions, the future stock value for near future will be portrayed in here with interactive visual graphs that will make understanding the assumptions much easier. Moreover, this section will also have the gauge meter which will give us an overview of the sentiment for the stock. The algorithms used for prediction are Recurrent Neural Network (RNN), Long Short-Term Memory (LSTM). For this purpose, Keras API along with TensorFlow backend is used. Keras and TensorFlow are open-source library which help in data mining, machine learning and data sciences in Python.

D. Sentiment Analysis:

This section makes use of Tweepy API to gather tweets regarding that stock which user has searched in Stock Search and then returns Sentiment Score on a scale of 0 to 100 and displays it with the help of a bar graph.

E. Tickers:

This section will display live tickers of various indices and currencies which will give the user meaningful insights on what is going on in the market at any given point of time.

6. PORTFOLIO MANAGEMENT

Once prediction of these BSE/NSE values is done it can be used by the trader to make intelligent selling and buying decisions using the analytics, predictions and the by judging

the current market sentiment. Our decisions are based on the assumption that we can hold at most one stock at a time. The following steps need to be followed:

A. Pre-Computation

The Historical Opening and Closing prices of all the stocks are stored [4].

B. Buying Decisions

In case the predicted stock value for the following day exceeds the closing price of the stock then the stock is bought.

C. Selling Decisions

In case the predicted stock value is less than the closing price of the stock price then the stock is sold.

3. CONCLUSION

The proposed model investigated the simultaneous effect of analyzing different types of market sentiment along with historical numeric attributes for understanding stock market behavior. This proposed model improves the prediction accuracy for the future trend of stock market due to the feature selections and the algorithms used which are trained to a specific number of times for efficient results. RNN and LSTM are very useful in predicting stock prices and portfolio management will help us in making profitable decisions regarding our stocks.

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