Seminar and Technical Report

on

Three Phase Intraday Stock Recommender System using Recurrent Neural Network

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Abstract

Stock Price prediction is very difficult because of the highly nonlinear nature of the stock prices that vary over a given time period. Our main aim is to predict those stocks that behave homogeneously, i.e. those stocks that vary similarly in a given time period. In this paper, we have showed that we can construct a stock recommendations system using Recurrent Neural Networks and K-means Clustering. We have taken the Standard and Poor's (S and P) 500 Index Data to create our model. In this study, we apply an RNN to predict the stocks prices, we use our predicted prices to gather information about the stocks which are very profitable, stocks that are risky, and the one that rise and fall together, and then use the K-means clustering to recommends stock which behave in a similar manner.

1 Introduction

From the past two decades, stock market has become one of the hottest topics among the machine learning enthusiasts. Predicting the stock market trends is becoming popular day by day. Stock price prediction is one of the most difficult things to do because it depends on so many things, like physical factors, foreign markets trends, domestic market trends, news, people sentiments etc. but with the advancement in the field of neural networks it has become comparatively easier to predict the stock prices accurately up to a good extent. In this study, we have built a Stock Recommender Syste which helps us in performing intraday trading effectively and also helps in minimizing the risk associated with intraday trading. Basically, the main aim of a recommender system is to give you better options to choose from. It is used by most of the e-commerce companies, which helps in increasing their business, and it also help the users to select the objects effectively. With the development in the field of neural networks, computing power has significantly improved and more and more real world recommender system have been developed and are used throughout the industries.

2 Literature Review

A hefty amount of work has been done in the field of stock price prediction. Past studies [1] Fama(1965, 1970) have shown that it's impossible to predict the stock prices accurately as it depends on so many factors including the domestic market trends, population sentiments, news, foreign market trend, etc., this paper shows that, the stock price time series follows a random walk model which makes it less likely to be predictable. But with the recent advancement in the machine learning, it has become possible to predict the stock prices accurately up to a good extent.

[2] Atsalakis surveyed techniques including Multi-linear regression, ANN, ARIMA, ARMA, Genetic Algorithm, RW and other models, which can predict stock prices. Probabilistic Neural Networks was used by Chen to forecast Taiwan stock index, [3] implemented SVM (support vectors machines) for NIKKEI 225 index.

Previous work for creating stock recommender system includes [4] model based on data mining approach, [5] an ARM based model for Indian stock exchange, [6] used temporal trading association rules, [7] using association rule mining for creating stock trading recommender system.

3 Why, What and How of the research

This research helps us to achieve the fundamental goal of investing in stock market i.e., to understand the nature of the stocks and their behaviours in the upcoming time which will ultimately help us in deciding which stocks to choose for recommendation. This research uses Recurrent Neural Network equipped with LSTM layers which helps us in the achievement of good predictions. It compares the result with the previous works done in this field using different models. This Stock Recommender System recommends stocks which 1.) can give maximum profits among all the stocks considered. 2.) are not very risky and 3.) which perform similarly, means which rise and fall at the same time. We are using a set of companies to create our model and it will give recommendations from those companies to choose which stock to buy.

4 Possible Applications

Basically, we are trying to understand the future behaviour of the stock market on the basis of previous performance of the stocks and the information about the company's

stocks. It helps the traders to make buying or selling decision. By analyzing the past and current stocks information, investors and traders attempt to maximize profits and minimize loss in the markets informed decisions. To analyze the stocks is a very challenging task as it requires a deep understanding of the stocks and market trends, and of other factors including current industrialized policies, effect of foreign markets, country's financial situation, past market behavior, etc. and the other major reason is the volatility of the stock market due to which, it becomes very difficult to understand the market trend and predict the stock prices accurately.

5 Own Views

The work done in this research is quite appealing, and the problems they are trying to solve seems difficult. Instead of using RNN, some other methods can be used, or we can go for some other complex model like ARIMA or GA, which can helps us in making better predictions and for the purpose of recommendations, we can also improve. The dataset taken for this research has data of last 5 years, which can also be increased which will eventually help us in getting better understanding of the behaviour of stocks and their trends. We can also incorporate some more features, instead of just looking on the numerical values, we can also try sentiment analysis which can helps us in producing better results.

6 Conclusion

This research produces better predictions than the previous methods employed. Work on recommending stocks is still under observations, i.e., how can we improve the quality of the recommendations, currently this research uses K-means clustering but there are

also some other methods which can be used and produce comparable results.

References

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