Stock prediction

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Abstract

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1 Introduction

2 Related Works

Over the past couple of decades, numerous and diverse approaches on predicting stock market were studied. The works evolved from statistical analysis, the cornerstone of the whole stock market prediction study. Machine learning techniques were later applied to enhance the prediction performances. Recently, deep learning models came into play and are now leading the development of the stock prediction field.

Financial analysis like stock market prediction rely on two opposing, but complementary approaches which are technical analysis(TA) and fundamental analysis(FA)**(Bettman et al., 2009)**. Both methods, applied with statistics, machine learning and deep learning, has played an important role in financial analysis.

Technical Analysis(TA): TA methods lay its focus only on numerical and quantitative features of a stock i.e., open, high, low, close price, and volume. Especially, statistical analysis, by its nature, focus on the evaluation of the relationship of these features. For example, the autoregressive integrated moving average (ARIMA) model is applied in stock prediction, a time series forecasting task, by defining the future value of a variable as a linear combination of past values and past errors(Ariyo et al., 2014). Bhuriya et al.(2017) tested the performances of various regression models such as linear, polynomial, and Radical Basis Function (RBF) regression on stock prediction based on the features mentioned above. TA methods are also combined with machine learning and deep learning, making promising progress in the predicting task. For example **Ding and Qin(2019)** employed recurrent neural network(RNN) through long short-term memory(LSTM) network using historical price data as input. One downside of TA based methods however, is that it fails to capture other stock-affecting factors that are directly or indirectly relevant to stock movement.

Fundamental Analysis(FA): FA models are based on the fact that there are underlying forces other than historical prices**(Suresh, 2013)**. FA models made progress by leveraging natural language processing(NLP) methods, us-

ing text data as variables. **Hu et al. (2018)** used sequence of related news to predict the stock trend. In a similar context, **Xu and Cohen (2018)** forecast stock movement by jointly exploiting text and price signals where they used Twitter as text data. These text-combined approaches made way for analyzing unstructured data in the stock predicting field. The limitation of these approaches however, is that they treat each stock as independent of each other, failing to capture the inter stock relations. To resolve the issue, several graph-based models were introduced. **Chen and Wei(2018)** captured information of related corporations with graph convolutional neural network. **Feng et al.(2018)** models the temporal evolution and relation network of stocks. Taking this further, **Sawhney et al.(2020)** blended inter stock relations with price and textual data in a hierarchical temporal fashion.

Motivated by these preceding works, our method uses ...

3 Model

4 Experiments

5 Result and Analysis

6 Conclusion

7 References