Stock Prediction Using Convolutional Neural Network

Fateme Rahimi
Department of Mathematics
Shahid Beheshti University
fateme.rahimi1@sbu.ac.ir

Abstract

Predicting how the stock market will perform is one of the is a very hot topic in our life. in recent years more and more people are devoted to the study of the prediction and it becomes easier and easier for us to make stock prediction by using different ways now, including machine learning, deep learning and so on. here, we proposed a deep learning method based on Convolutional Neural Network to predict the stock price movement of Tehran stock market. We set the opening price, high price, low price, closing price and volume of stock deriving from the internet as input of the architecture and then run and test the program.

1 Introduction

There are many machine learning methods that have been successfully applied in various interesting financial problems, such as trend approximation, bankruptcy prediction, investment targets, credit evaluation, and portfolio selection. here, we will use a deep learning framework based on convolutional neural networks to analyze the trading time-series data. this analysis is divided into two parts – Fundamental Analysis and Technical Analysis.

- Fundamental Analysis involves analyzing the company's future profitability on the basis of its current business environment and financial performance.
- Technical Analysis, on the other hand, includes reading the charts and using statistical figures to identify the trends in the stock market.

Our focus will be on the technical analysis part. in this project, deep learning model based on Convolutional Neural Network is proposed to predict the stock price movement of Tehran stock market. We use Pytorch to help us design the model. At first, we will preprocess data and normalize them because each feature has a big difference, otherwise it will affect the result. Then, because the stock data belongs to 1D time series data, we have used a 1D function to do the convolution and set five features including volume, high price, low price, closing price and volume as input.

2 Dataset

We'll be using a dataset from Tehran stocks[1]. there are multiple variables in the dataset: 'id', 'code', 'ticker', 'dtyyyymmdd', 'date-shamsi', 'first', 'high','low', 'close', 'value', 'vol', 'openint', 'per', 'open', 'last'. we will work with below columns:

- The column date-shamsi represent date. this data set contains information from 1382/12/27 to 1399/09/05. note that the market is closed on weekends and public holidays.

[1] https://pypi.org/project/tehran-stocks/

34th Conference on Neural Information Processing Systems (NeurIPS 2020), Vancouver, Canada.

- The columns open and close represent the starting and final price at which the stock is traded on a particular day.
- High, Low and Last represent the maximum, minimum, and last price of the share for the day.
- The vol column represent the volume of stock.

References

[1] Jou-Fan Chen & Wei-Lun Chen & Chun-Ping Huang (2016)Financial Time-series Data Analysis using Deep Convolutional Neural Networks, *2016 7th International Conference on Cloud Computing and Big Data*

[2] Sheng Chen & and Hongxiang He (2018) Stock Prediction Using Convolutional Neural Network, *IOP Conf. Series: Materials Science and Engineering* []