Problem/application:

In the financial industry, stock price prediction has constantly been a popular field of research, because stock price predictability is one of the most important concerns for investors. According to many widely accepted studies, the financial markets, and particularly stock markets, have been proved to be predictable in some scenarios. While different features are available for prediction, such as general economic climate and social media effects, most studies focused on analysis of past trading patterns.

Motivation:

In the last decade, there has been a huge increase in the application of artificial neural network (ANN), which is a result of exponentially enhancing computing power. The performance of ANN models on natural language processing, image recognition, and etc. has shown a promising future. Deep learning, an architecture that is based on ANN and utilizes multi-layer neural network, is becoming increasingly successful in many different areas due to improvements in data availability, algorithms and etc. As a result, applying deep learning on stock market prediction has become a field of interest.

Previous studies have mostly focused on stock price prediction at a low frequency. As machine learning techniques evolve in the area of finance and performance of current models become unsatisfactory, there has been growing interest in developing models using deep learning with high frequency trading data. The reason of deep learning being a potential fit for stock market predictions is that such architecture is capable of conducting feature extraction from large-scale raw data without the need for prior understanding on predicators and discovering relationship among features and labels without the need for sufficient financial knowledge. However, widely accepted study in this field is still insufficient. With the increasing availability of high frequency trading data, better understanding of trading pattern will likely to lead to better prediction of stock price.

Impact:

By utilizing deep learning and high-high-frequency trading data, this new model obtains more satisfactory prediction in stock market fluctuations. Although the results in this study is not a complete demonstration of model effectiveness, we believe that they do indicate a promising direction of research in the field of stock market prediction. (在这里加一些以后的studies可以进行的对model的改进) These potential improvements will require much more computing power and better data availability, which are beyond the control of this project group. With increasing amount of investors entering into the market, satisfactory stock price prediction will bring higher return for investors and further improvement in capital scale. Thus, we hope and expect to see additional human, hardware and data resources in this field of research in the near future.