

Forecasting daily Closing Prices of Equity symbols using ANNs



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Abstract

TODO

Keywords: Deep Learning, Artificial Neural Networks, Stock Market, Time Series prediction, Neural Networks

Table of Contents

| | | |
|----------|--|----------|
| 1 | Introduction | 1 |
| 2 | Related Work | 2 |
| 2.1 | Stock Market Prediction models | 2 |
| 2.2 | Testing some math | 2 |
| 2.3 | Testing citations | 2 |
| 3 | Methodology | 3 |
| 3.1 | Dataset | 3 |
| 3.2 | Prediction Model | 3 |
| 4 | Results | 5 |
| 4.1 | Data set | 5 |
| 4.2 | Evaluation Metrics | 5 |
| 4.3 | Results | 5 |
| 5 | Conclusions | 6 |

1 Introduction

The ability to predict changes in stock prices is extremely important to the financial world as it influences trading strategies and reduces risks in the market. Forecasting has long been a problem for the business and technology communities and has seen little advances until quite recently, with the advent of neural networks and deep learning.

Before artificial neural networks, the finance world used other methods to model the time series that arose from the continuous updating of stock prices. Models like the autoregressive moving average model (ARIMA) and the generalised autoregressive conditional heteroscedasticity model (GARCH) are key econometric methods for forecasting time series and are still widely used in finance.

The focus of this project is to provide a comparison between the traditional methods for time series forecasting such as the ARIMA model, and simple implementations of artificial neural networks, in the context of financial time series prediction.

The prices of stocks can be modelled as non-linear time series, which have been at the centre of attention in the finance world since the 1970s with George Box and Gwilym Jenkins popularised their Box-Jenkins method for finding the best-fit of a time series model[2].

2 Related Work

This section will introduce work related to stock market prediction, namely traditional asset pricing models and work related to the development of generative adversarial networks.

2.1 Stock Market Prediction models

ARIMA(1,1,1) data mining can predict stock prices [3]

2.2 Testing some math

Here are two equations:

$$a = b + 1 \tag{2.1}$$

$$\frac{\hbar^2}{2m}\nabla^2\Psi + V(\mathbf{r})\Psi = -i\hbar\frac{\partial\Psi}{\partial t} \tag{2.2}$$

And here is some text with some nice inline math, (x, y) wow γ so cool ρ .

2.3 Testing citations

This is Fama[1] and this is Goodfellow. This is another GAN citation.

3 Methodology

The following section provides details in the construction of the model for predicting stock prices, as well as a breakdown of the data used in the training of the network.

3.1 Dataset

We retrieve data on tickers available at <https://www.tiingo.com/>. The stock exchange targeted in this project is the New York Stock Exchange (NYSE). The data consist of daily values for NYSE listed companies for the period starting January 1, 2018 and ending December 1, 2018. The dataset includes daily information for the `close`, `open`, `high`, `low` prices and `volume` of each trading day.

The data comprise of companies from various sectors listed in the New York Stock Exchange.

3.2 Prediction Model

Here is a sentence, and you can see a nice picture in Figure 3.1.



Figure 3.1: A picture of the Brayford from Google Images.

Also, a table can be found in Table 3.1. You should use a \LaTeX table generator like <https://www.tablesgenerator.com/> if you want to make your life easier.

Table 3.1: Here is a table. The caption goes above like this.

| First name | Last name | Age |
|------------|------------|-----|
| Bob | Bobbington | 24 |
| Joe | Bloggs | 37 |
| Billy | Bob | 10 |

4 Results

4.1 Data set

4.2 Evaluation Metrics

4.3 Results

5 Conclusions

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References

- [1] E. Fama, ‘Efficient capital markets: A review of theory and empirical work,’ *Journal of Finance*, vol. 25, no. 2, pp. 383–417, 1970 (cit. on p. 2).
- [2] G. J. George Box, ‘Time series analysis, Forecasting and control,’ 1970 (cit. on p. 1).
- [3] M. M. Sasan Barak, ‘Developing an approach to evaluate stocks by forecasting effective features with data mining methods,’ *Expert Systems with Applications*, vol. 42, pp. 1325–1339, 3 2015 (cit. on p. 2).

List of Tables

3.1 Here is a table. The caption goes above like this. 4

List of Figures

3.1 A picture of the Brayford from Google Images. 3