Forecasting Prices Using Stock Market Index Data

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December 2022

1 Introduction

Stock markets from across the world are tracked using indices that measure a section of the stock market, such as the Nasdaq Composite Index. Price forecasting is a very important task in the financial industry, as it can be used to guide strategies.

Historically, financial institutions have used discretionary methods to make investment decisions – they rely on fundamentals and the judgement of analysts [1]. However, with the rise of big data and computational power, systematic methods have become increasingly popular – institutions use rules-based strategies that are implemented by a computer and involve little to no human intervention [1]. Systematic methods enable decisions to be made quickly, which leading market makers and high-frequency trading firms such as Jane Street Capital and Hudson River Trading use to exploit arbitrage opportunities and maximise profits by trading at high volumes [2].

In this project, we will investigate the following question: can we use regression models on stock market index data to forecast prices effectively?

2 Methodology and Dataset

2.1 About Stock Exchange Data Set

2.2 Data Cleaning

2.3 Data Exploration

2.4 Feature Engineering

2.5 Data Filtering

2.6 Regression Models

2.7 Models Evaluation

3 Results

3.1 Ridge Regression

3.2 LASSO Regression

3.3 LSTM Regression

4 Discussion

4.1 Limitations of the Study

4.2 Future Work

References

[1] C. R. Harvey, S. Rattray, A. Sinclair, and O. Van Hemert, Man vs. machine: Comparing discretionary and systematic hedge fund performance *The Journal of Portfolio Management*, vol. 43, no. 4, pp. 55–69, 2017.

[2] I. Aldridge, *High-frequency trading: a practical guide to algorithmic strategies and trading systems*, vol. 604. John Wiley & Sons, 2013.