Aalto University
School of Science
Degree Program of Computer Science and Engineering

Deep Neural Networks for Financial Data

Bachelor's Thesis

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ABSTRACT OF
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Contents

1 Introduction

1.1 Background

Financial prediction and forecasting has always been at the core of the free market model. Traditionally, predictions and pattern recognitions have been made manually by humans, who then have used this to their advantage in, for example, the stock market. New methods for gaining an edge over competitors are always being developed, and all this development nowadays take place in the realm of computer science.

Software that utilizes sophisticated algorithms, and even basic machine learning, are being used worldwide in all kinds of markets, and these methods are constantly being developed[1]. But there has not yet been any larger adaptation of deep machine learning by any major financial player. These deep neural networks are not widely used at all in time series prediction.

If there is a niche for these deep machine learning methods, what is it, and can it compete with other contemporary methods?

1.2 Problem description

The different possible uses for deep learning in analysing and predicting financial time series have not been as well documented as other methods. This thesis is looking at the results of studies done regarding the usage and performance of a specific set of deep learning method applied in financial data series. The goal is to be able to draw some overreaching conclusions as the possibilities and efficiency of these deep learning methods compared to other contemporary and more broadly used ones. Results are approached mainly from a business perspective, meaning that the competitive power and monetary value creation potential of a prediction method is valued more than the research or scientific value of it.

1.3 Problem definition and purpose

The purpose, as briefly stated in the previous sub-chapter, is to assess the business potential and competitiveness of a specific deep learning method when used for forecasting in a financial market. There are a number of questions very central to this purpose, that are reiterated in one form or another troughout this thesis.

- Is the method viable for business in a specific financial context?
- Will the method be regarded as an opportunity or as a curiosity?

On top of this, some back of the envelope calculations are presented regarding the actual costs of designing, setting up and running a financial operation based upon the methods discussed in this thesis. This will amount to a very rudimentary business case for a hypothetical entrepreneur.

1.4 Restrictions

The conclusions drawn in this thesis are based on one case of deep machine learning, in only a few financial markets.

1.5 Material and methods

2 Title for Results chapter

2.1 Titles for any number of subchapters

3 Analysis and Interpretation

TODO: Analysis and Interpretation

4 Conclusion

TODO: Conclusion

Sources

[1] Michael Galas Philip Treleaven and Vidhi Lalchand. Algorithmic trade review. *Communications of the ACM*, 56(11):76 – 85, November 2013.

A Esimerkkiliite

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