Stock Market Prediction Algorithm

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Computer Science 478

Abstract

In stock market prediction, it is often difficult to estimate future behavior based on the past market activity. Using technical analysis, one may develop indicators which can assist in predicting the upcoming price action of a particular security. Using the technical analysis of indicators in real time, one may make educated decisions that can help them collect profits through arbitrage in the markets.

Using machine learning, it is possible to develop algorithms that can perform calculations and make generalizations about how the market will behave in the near future. Our attempt was to build use a machine learning model, with indicator values as inputs, which was able to produce an estimated 18% APY.

(Your abstract should concisely answer the following three questions: 1) what problem are you addressing? 2) what approach are you taking to solve the problem? 3) what are your results?)

1 Introduction

1.1 Fundamentals of Market Behavior

The stock market can be simplified as a place where buyers and sellers of company shares go to exchange their shares for money and money for shares. One would hope that if they buy a share of security, that it would increase in value. After the increase in value, one would then sell said security. This process of “buying low” and “selling high” is called arbitrage. There exist individuals who engage in this process many times a day to secure profits using the principle of arbitrage. In the ideal case, one would buy his or her shares when the security’s value is lowest, and then sell when its value is highest. But this process is immensely easier said than done. Markets almost always behave unpredictably, and human emotion quite often disrupts regular patterns of price action.

Over the years, individuals have created *market indicators,* which are numerical summaries of previous price action based on market behavior. The vast majority of these indicators are based on the recent prices and volumes of shares traded over a particular period of time. In practice, indicators can be used as visual aids for making trading decisions, but their graphical use is based on numerical values, which makes this easy to incorporate into machine learning.

Because of the ease of making

Descriptions of AI in market movement today.

The *478 Group Projects* will follow the format of papers submitted to the 2009 *International Joint Conference on Artificial Intelligence*. Your paper is due at the beginning of class the day you give the oral presentation. This document briefly describes what is expected for your group's paper.

1.1 Length of Papers

Your paper will likely be about six pages in the IJCAI format: 1 page for title, abstract, and introduction to your problem, 2 pages for description of your approach to solving your problem, 2 pages for presenting results, and 1 page for discussion, conclusions and future work. These are rough guidelines and individual papers may vary.

1.2 Word Processing Software

As indicated above, we are "borrowing" IJCAI document style templates for this assignment. IJCAI has kindly prepared and made available a set of LATEX macros and a Microsoft Word template for use in formatting your paper. You are s*trongly* encouraged to use one of these two formats. If you are using some other word processing software, please follow the format instructions given below and ensure that your final paper looks as much like this sample as possible.

2 Style and Format

2.1 Layout

Print manuscripts two columns to a page, in the manner in which these instructions are printed. The exact dimensions for pages are:

1. left and right margins: .75*"*
2. column width: 3.375*"*
3. gap between columns: .25*"*
4. top margin—first page: 1.375*"*
5. top margin—other pages: .75*"*
6. bottom margin: 1.25*"*
7. column height—first page: 6.625*"*
8. column height—other pages: 9*"*

All measurements assume an 8-1/2*"* × 11*"* page size. For A4-size paper, use the given top and left margins, column width, height, and gap, and modify the bottom and right margins as necessary.

2.2 Format of Electronic Manuscript

For the production of the electronic manuscript, you must use Adobe’s *Portable Document Format* (PDF). A PDF file can be generated, for instance, on Unix systems using ps2pdf or on Windows systems using Adobe’s Distiller. There is also a website with free software and conversion services: http://www.ps2pdf.com/. For reasons of uniformity, use of Adobe’s *Times Roman* font is strongly suggested. In LATEX2e, this is accomplished by putting

\usepackage{times}

in the preamble.[[1]](#footnote-1)

Additionally, it is of the utmost importance to specify the American **letter** format (corresponding to 8-1/2*"* × 11*"*) when formatting the paper. When working with dvips, for instance, one should specify –t letter.

2.3 Title and Author Information

Center the title on the entire width of the page in a 14-point bold font. Below it, center the author name(s) in a 12-point bold font, and then center the address(es) in a 12-point regular font. Credit to a sponsoring agency can appear on the first page as a footnote.

2.4 Abstract

Place the abstract at the beginning of the first column 3*''* from the top of the page, unless that does not leave enough room for the title and author information. Use a slightly smaller width than in the body of the paper. Head the abstract with “Abstract” centered above the body of the abstract in a 12-point bold font. The body of the abstract should be in the same font as the body of the paper.

The abstract should be a concise, one-paragraph summary describing the general thesis and conclusion of your paper. A reader should be able to learn the purpose of the paper and the reason for its importance from the abstract. The abstract should be no more than 200 words long.

2.5 Text

The main body of the text immediately follows the abstract. Use 10-point type in a clear, readable font with 1‑point leading (10 on 11).

Indent when starting a new paragraph, except after major headings.

2.6 Headings and Sections

When necessary, headings should be used to separate major sections of your paper. (These instructions use many headings to demonstrate their appearance; your paper should have fewer headings.)

Section Headings

Print section headings in 12-point bold type in the style shown in these instructions. Leave a blank space of approximately 10 points above and 4 points below section headings. Number sections with arabic numerals.

Subsection Headings

Print subsection headings in 11-point bold type. Leave a blank space of approximately 8 points above and 3 points below subsection headings. Number subsections with the section number and the subsection number (in arabic numerals) separated by a period.

Subsubsection Headings

Print subsubsection headings in 10-point bold type. Leave a blank space of approximately 6 points above subsubsection headings. Do not number subsubsections.

Special Sections

You may include an unnumbered acknowledgements section, including acknowledgments of help from colleagues, financial support, and permission to publish.

Any appendices directly follow the text and look like sections, except that they are numbered with capital letters instead of arabic numerals.

The references section is headed “References,” printed in the same style as a section heading but without a number. A sample list of references is given at the end of these instructions. Use a consistent format for references, such as that provided by BibTEX. The reference list should not include unpublished work.

2.7 Citations

Citations within the text should include the author’s last name and the year of publication, for example [Gottlob, 1992]. Append lowercase letters to the year in cases of ambiguity. Treat multiple authors as in the following examples: [Abelson *et al.*, 1985] or [Baumgartner *et al.*, 2001] (for more than two authors) and [Brachman and Schmolze, 1985] (for two authors). If the author portion of a citation is obvious, omit it, e.g., Nebel [2000]. Collapse multiple citations as follows: [Gottlob *et al.*, 2002; Levesque, 1984a].

2.8 Footnotes

Place footnotes at the bottom of the page in a 9-point font. Refer to them with superscript numbers.[[2]](#footnote-2) Separate them from the text by a short line.[[3]](#footnote-3) Avoid footnotes as much as possible; they interrupt the flow of the text.

3 Illustrations

Place illustrations (figures, drawings, tables, and photographs) throughout the paper at the places where they are first discussed, rather than at the end of the paper. If placed at the bottom or top of a page, illustrations may run across both columns.

Illustrations must be rendered electronically or scanned and placed directly in your document. Line weights should be 1/2-point or thicker. Avoid screens and superimposing type on patterns, as these effects may not reproduce well.

Number illustrations sequentially. Use references of the following form: Figure 1, Table 2, etc. Place illustration numbers and captions under illustrations. Leave a margin of 1/4-inch around the area covered by the illustration and caption. Use 9-point type for captions, labels, and other text in illustrations.

Acknowledgments

Market work of each source used. Investors Exchange API for providing the Apple Inc. (AAPL) information. The NASDAQ and New York Stock Exchange (NYSE) for being market makers to provide accurate data. The preparation of these instructions and the LATEX and BibTEX files that implement them was supported by Schlumberger Palo Alto Research, AT&T Bell Laboratories, and Morgan Kaufmann Publishers. Preparation of the Microsoft Word file was supported by IJCAI. An early version of this document was created by Shirley Jowell and Peter F. Patel-Schneider. It was subsequently modified by Jennifer Ballentine and Thomas Dean, Bernhard Nebel, and Daniel Pagenstecher before arriving at its current form.

A LATEX and Word Style Files

The LATEX and Word style files are available on the IJCAI–09 website, http://www.ijcai-09.org/, on the “Documents” page. These style files implement the formatting instructions in this document.

The LATEX files are ijcai09.sty and ijcai09.tex, and the BibTEX files are named.bst and ijcai09.bib. The LATEX style file is for version 2e of LATEX, and the BibTEX style file is for version 0.99c of BibTEX (*not* version 0.98i). The ijcai09.sty file is the same as the ijcai07.sty file used for IJCAI–07.

The Microsoft Word style file consists of a single template file, ijcai09.dot. This template is the same as that used for IJCAI–07.

These Microsoft Word and LATEX files contain the source of the present document and may serve as a formatting sample.

References

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1. You may want also to use the package latexsym, which defines all symbols known from the old LATEX version. [↑](#footnote-ref-1)
2. This is how your footnotes should appear. [↑](#footnote-ref-2)
3. Note the line separating these footnotes from the text. [↑](#footnote-ref-3)