1028025

Trading Strategy Discovery in the Cryptocurrency Market using a Genetic Algorithm

This is a consolidated report, providing anonymous feedback from two assessors (one of whom is an examiner). The two assessors considered your dissertation independently, before agreeing on a recommended grade. The reports were written in advance of that reconciliation and contributed to the process by which the examination committee arrived at an agreed, final grade.

Assessor A

Overall

You present an implementation of generic algorithms for algorithmic trading, evaluated on Bitcoin data. Your introduction to the field, literature review and overall prose are very well written. The application itself, unfortunately, is rather simple. Furthermore, there are some basic tenets of algorithmic trading that you did not take into account (some knowingly, some not), making your results inapplicable to real-world scenarios. Code snippets are informative, but the main algorithms were not adequately explained or exemplified.

Background

In Chapter 1, you provide a broad introduction to the main topics that come together in you dissertation. After am overview of the challenges in the field, your motivation for choosing genetic algorithms in the context of algorithmic trading is clearly spelled out. In Chapter 2, you present a remarkably thorough review of existing literature and the lessons it taught you.

Application

In Chapter 3, you provide a suitable discussion of your design and implementation. However, the main algorithms are presented as pseudo-code listings and their individual logic/sub-routines are not presented in detail nor exemplified in action. Your choice of strategies for mutation is reasonable, but quite simplistic: I understand that composability proved challenging, but I nevertheless would have expected some additional sophistication in the implementation.

In Chapter 4, you benchmark your algorithms and present the results from the perspective of a handful of different metrics. Your results appear moderately positive, but unfortunately they are inapplicable to real-world scenarios:

1. As you correctly point out at the end of Chapter 4, you didn't consider any trading costs, fees or price slippage. These factors are absolutely crucial in algorithmic and high frequency trading, and their introduction is infamous (especially within FX) for turning seemingly excellent strategies into money-gulping black holes.
2. You evaluate your strategies on a fixed time interval: this is subject to selection bias, as some of the strategies are bound to have performed better than others. There is no guarantee that a strategy that performed well overall would have performed well on a given time sub-interval, nor that it will perform well in the future.

Reflection

In Chapter 5, you reflect on your results, remark on ethical considerations associated with algorithmic trading (already expounded in the introduction) and make suggestions for future work. However, as explained in the previous section, I don't agree with your conclusion that the results show promise for this approach in real-world algorithmic trading scenarios.

Presentation

Your prose is very clear and convincing throughout. You include many figures, of varied format, to supplement your explanations, though not all figures are especially informative. Figure sources are accurately documented but figures from outer sources are low resolution. Your inclusion of python code snippets is informative. However, code listings would have been clearer in a monospaced, sans serif font, possibly with additional syntax highlighting, and more clearly separated from the main text. The mathematical symbol for set belonging is corrupted throughout. There were some broken section/image references and some incorrect references (e.g. the reference to listing 3.3 on p.43 should have been to listing 3.2)

Assessor B

Overall

The dissertation investigates novel trading strategies for trading the Bitcoin cryptocurrency asset. Technical indicator-based trading and genetic algorithms are studied for this purpose and a genetic algorithm software system implemented in Python.
Overall, this is a very good piece of work. You have demonstrated not only to be able to apply what you studied but also to be capable of conducting your own research and learning new concepts and techniques to solve your specific problems.

Background

The presentation of the background of the project is very good. All the relevant principles, concepts and techniques have been illustrated are the right level of detail and the context of the work introduced. Moreover, you have conducted an extensive literature search and analysed the results.

Application

The main contribution of the work clearly evolves around the three goals that you originally set for the project, i.e. research whether technical indicator-based trading is a viable option for algorithmic trading of bitcoins, explore if genetic algorithms can help in the discovery of novel trading strategies and finally design and implement a fully functioning end-to-end genetic algorithm software system for this specific context (Chapter 3). In Chapter 4 experiments are run and the results analysed with respect to your research questions.

Reflection

Overall, there is an excellent level of reflection throughout the dissertation. I felt that more could have written in the conclusion chapter where the a-posteriori analysis of the project felt rather factual and rushed, although still informative. Similarly, I would have liked to see a summary section in Chapter 4 (like you have done in all the other chapters).

Presentation

The dissertation is generally well written and structured. As a minor remark, as far as I could see the acronym TI was never explicitly expanded. Finally, a list of acronyms would have also helped.