

COMP4026 Project Plan

Student: Reece Cripps

Student ID: 20403076

Course: Computer Science (With Artificial Intelligence) MSc

Project title – The comparison between machine learning strategies and mathematical strategies for a trading bot on the cryptocurrency market

Statement of the research problem – I will be creating crypto trading bots with multiple machine learning techniques such as, ANN and SVM (possibly regression trees if time allows for them) and mathematical techniques like different variances of the Moving average technique explained in [1].

The problem to solve will be the best algorithm for finding the most profit made and accuracy of prediction for the machine learning techniques as well as the reliability of the models.

This problem is interesting because cryptocurrency markets exploded over lockdown and AI technology hasn't been properly explored in these areas. In the financial markets trading bots are used all the time. There also are not many papers about which trading methods are the best to use. Instead of sharing knowledge people are monetising their findings in this research field.

Related work – My work will be building on examples such as [2] and [3]. These researchers have used different AI techniques to predict crypto currencies (SVMs, reinforcement learning) but haven't fully explored ANNs which is something that I plan on doing in my project. Furthermore, researchers have mainly done analysis on the top coins, and I plan on using the methods I implement on some smaller coins as well.

There also isn't much research into trading bots and the different methods that can be used on such a volatile environment. Most of the trading bots that already exist are different companies selling them for people to use without saying how they work.

Methodology – To address my problem I will be creating an SVM and ANN and possibly a regression tree. For these machine learning methods, I will use data from 2018 – 2021 (train on 2018-2020 and test 2021) in daily intervals and compare using F-measure and root mean square error to evaluate my results. For the mathematical methods I will be using them on the 2021 data so that it is fair comparison between the two categories. During the run, I will be comparing the profits made, reliability of the models and the accuracy too.

Secondly, I will be comparing the algorithms using real-time data to see how good they are in real-time as well as previous years.

Algorithm design is good for solving my problem because I will need to look at a variety of different methods and techniques to determine which is the best for a trading bot. Unfortunately, I won't be able to look at every algorithm, but the most popular techniques will be looked at.

Programme of work –

WP1 – ‘Introduction’ – write up the introduction, aims, requirements/objectives for my dissertation. For this I will need to do background research into the crypto market and methods used by researchers. (1-2 pages)

(M1) – Have first few introductory pages finished

WP2 – Literature review. Look at research papers related to the topic. Work out what kind of strategies I will need to implement, and which API should be used to collect data about the crypto market. Look at other trading bots that already exist and how they are designed and work.

(M2) – Write the literature review chapter of the dissertation.

WP3 – ‘Initial GUI code’ – write the GUI that will store all the bots. For each bot page, put up the predicted graph vs actual graph. Buy/Sell orders and overall profit to make it easier when it comes to evaluating the results. The data should also be written to an excel file to make it more readable.

(M3) – Have the GUI setup to allow for the bots to be written.

WP4 – ‘implementation of the bots.’ Implement each bot one at a time. For each bot have a live bot and a bot from 2018-2021 (for the machine learning strategies). For each mathematical bot have a live example and a 2021 example too. For the live bots use data in 3 hourly intervals from the past week (mathematical) and for the machine learning strategies try multiple training examples (firstly 2018-2021, then just train on 2021 and then just train on the year so far).

(M4) – have all the bots implemented

WP5 – ‘Write the design and implementation section’. Talk about the software design and the design of the features in the program used to achieve a solution to the problem.

(M5) – implementation chapter of the dissertation finished

WP6 – ‘collect and evaluate the results.’ Look at the results from the bots and create graphs and illustrations that show how each bot performs. Compare the machine learning methods with other machine learning methods to determine the best and likewise for the mathematical strategies. After the best of each category is found compare across categories.

(M6) – write up the results and discussion section of the dissertation

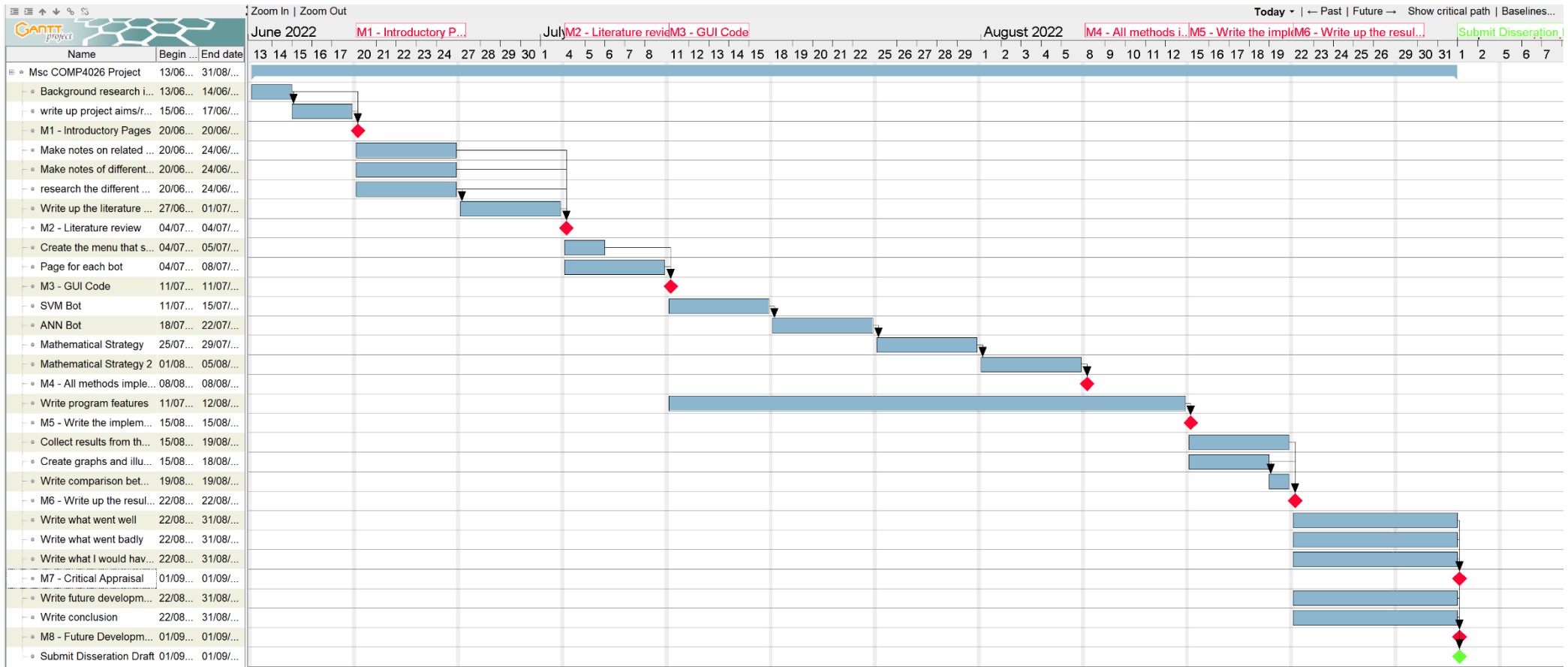
WP7 – ‘critical appraisal’. Write up what went well, what went badly and what I would have done differently. Also, what I have learnt from my project.

(M7) – Write up critical appraisal section of dissertation

WP8 – ‘future development and conclusion.’ For this section write up about what I would do in the future if I had more time, along with what other researchers can do to expand on my research.

(M8) – write the future development and conclusion section of the dissertation

Time Plan –



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References –

- [1] PrimeXBT Editorial Team “Cryptocurrency Trading Strategies: Learn to Profit From Bitcoin, Ethereum, and More”. April 13, 2021. Last visited 09/06/2022. Found at: <https://primexbt.com/for-traders/cryptocurrency-trading-strategies/>
- [2] Hitam, N.A., Ismail, A.R. and Saeed, F., 2019. “An optimized support vector machine (SVM) based on particle swarm optimization (PSO) for cryptocurrency forecasting.” Procedia Computer Science, 163, pp.427-433.
- [3] Borrageiro, G., Firoozye, N. and Barucca, P., 2022. “The Recurrent Reinforcement Learning Crypto Agent” (pp1 - 19).