Project C 17 – MARKET CRAWLER

Davis Krumins, Audris Mihailovs

Business understanding

Throughout history, trading has always been a part of human nature and is one of the few professions that haven't changed in millennia. The only thing that has changed has been the platform on which the trading is done. Stock trading dates back as far as 1792 but we are focusing particularly on cryptocurrency trading which can be dated back to as recently as 2009 when the first major cryptocurrency called "Bitcoin" was created. And the main goal of any single trader or company is by using these "currencies" or assets to create a profit. This case is no exception, as businessmen our goal is to make money and this can be achieved through creating a "trading bot" capable of assessing the market and current prices of assets and trading (buying/selling) them accordingly in a profitable manner. Luckily for us, it is easy to see the criteria and success of our business model because it can only go 2 ways, either it makes us money or it loses it.

The requirements for this business model seem to be small however they can also be a major obstacle. For example, all we need to run our "trading bot" is to have a computer and an internet connection, but this also proposes problems such as having a faster internet connection can mean that we are able to execute our buy and sell commands more accurately as well as if our computer is "not the best" it is not capable of running the software as fast as possible which can also cause us to lose precious moments which results in lost profits, but as we are not Berkshire Hathaway we must do with what we have. Every single app that allows you to trade stocks or cryptocurrencies has the following statement "Cryptocurrency trading is subject to high market risk. Please make your trades cautiously. You are solely responsible for your trading losses." And this is our biggest risk in case we decide to trade with real money and the best contingency for it is to use the wonderful option of trading with "virtual money" which allows us to train our bots using fake money on real market prices thus giving us a real representation on how they would perform in the real market. Terminology for this field is wide and that's why people get PhD degrees for understanding even a portion of it, but the main ones we are focusing on are "bullish or bearish market" which represents the market movement (going up or down), "Bollinger bands" which indicate the prices that stand out of the moving average and can hint at moments best for buying, "Candlestick" is a type of chart which shows the high, low, open and close prices. The costs for running this business currently us is zero however when we start trading with real money we will have to pay a commission of 0.1% of the trading amount to our chosen brokerage, but it has its benefits because we can choose the size of our trades as well as it gives us a detailed description on how our "trading bots" are performing.

For data mining, we are mostly focusing on "backtesting" where we run our trading bots on market data that has already happened in the past and we asses how they perform and the decisions they

make thus giving us an indication of how they will be performing in the real market. Having a 100% success rate is impossible and as the great expert on Wallstreet and writer Burton Malkiel stated “A blindfolded monkey throwing darts at a newspaper's financial pages could select a portfolio that would do just as well as one carefully selected by experts” which gives us our main success criteria which are to train our bot to outperform a human trader which hopefully is not that hard.

Data understanding

Gathering data is very easy in our case because most of the applications already provide all the data that could be used as well as our currently used FreqTrader gives us the possibility to do “backtesting”. The main requirement for our data is that it contains the historical prices of our chosen cryptocurrencies. This data is widely available both in Binance, Kraken and separately in Nomics and Cryptodatadownload it is freely available and we can adjust for the time periods and even average prices of a given time period (for example, 5min, 30min, 1hr or 24hr etc.). Selection criteria were relatively simple because Freqtrader supports most of the major cryptocurrencies and those are also the ones we are using for data mining, however, we put more focus on only the biggest ones for testing because there is no need to test all the trading strategies on all the historical data of every coin because whether the bot is successful or not can already be concluded from just a couple of runs.

Data as we mentioned is very straightforward, however, it does offer more to us than we need, for example, it contains such fields as the overall count of coins, coins currently traded, coin activity (how much has been traded in a period of time), highest and lowest prices of coins in a certain period of time and other not so relevant information because our focus is put on the price of a coin at a certain time and these are the only parameters we need because everything else requires a rework of the FreqTrader system and thus is not in the scope of our work.

As the data is abundant we have a lot to choose from, however simply taking the whole history and all the prices the coin has been at is not very efficient, because bitcoin started off at a value of 0.0010 dollars and currently is worth around 15k dollars, thus taking the initial slow years when the price was very low is poorly representative of the current situation and would not benefit our trading bot. Another issue we have to deal with is to cut out points of extreme from the data such as begging of the coronavirus, the war in Ukraine, the collapse of FTX or maybe even some of the crazy tweets made by Elon Musk because these are not likely to repeat (except maybe tweets) and if they do the whole market crashes and capitalizing on it is sadly almost impossible. And this is due to the fact that if our system is capable of anticipating a major crash in the market it will miss 90% of all the small movements on the other hand if it can anticipate 90% of small movements it is not able to anticipate the big crashes and, in our case, we want to focus on quantity over extreme cases. As we have performed initial backtesting we are certain the data available suits our needs and is usable without having to adjust it too much.

Planning your project

Because our project consists of trying out multiple methods our plan of action consists of the following steps:

1. (Setting up the FreqTrader, docker and Telegram bot, done only once)
2. Research and discuss possible trading strategies and whether we want to try it
3. Implement the trading strategy in our setup
4. Hyperoptimize the strategy to the best of our knowledge if required
5. Try the strategy in “dry-run” and backtesting
6. Assess the efficiency of the strategy by looking at the profit/loss and number of trades
7. If the strategy surpasses our expectations we implement it in real money trading

The steps from 2-7 get repeated for every strategy and the times vary because some of the strategies we try are slightly outdated and sometimes they don’t have the installation guide which makes our job a lot harder. Steps 2 and 4 take approximately 2hr, step 3 can vary depending on the complexity of the installation. Step 5 takes less time for actual work and more time waiting for the results(we have been running dry runs for a month constantly already), and step 6 takes approximately 1 hour. And we divide the workload mostly by both looking for strategies and implementing them ourselves thus ensuring an equal amount of time we both contribute.