Generate and test: improving the automation in trading strategy creation

White Paper

QUANTOM

Abstract

Algorithmic trading consists of activities that do not add much value to the trader. More value can be created by providing a platform that lets its users focus on their most productive areas. However, most commonly this is limited to separating what the trading platform handles for the user and what the user does within the platform. This is an important step in improving the productivity but it is not enough. Users manually encode the strategies as programs but we are at the beginning of a new era where programs will not be written by humans anymore. This unlocks a whole new level of what software can do. The search for the right trading strategy can be reformulated as a search for a computer program and in our domain we describe a *generate and test* method combined with genetic programming as a way to solve this complex task. Novel trading strategies are generated and tested under the supervision of the user, who is freed from the need to embed the trading strategy into a program manually.

1 The Problem

Getting into algorithmic trading can be a daunting task. Most of the standard pipeline does not involve trading or finding the trading strategy, as you can see in Figure 1. Having good data sources and a large quantity of historical data leads only partly to the understanding of the performance of a strategy. Good software engineering and data science are another essential prerequisities for the algorithmic trading success.

Individually, you will find off-the-shelf products and solutions that will solve you one part of the pipeline, but putting it all together is a major undertaking. This will mostly require in-house development and a lot of capital. Needless to say, a host of different skills that are in shortage on the market, are essential for sucessful completion of the pipeline.

The most interesting part, perhaps, is the model selection and testing. This is where the highest value-add activity of the process happens. If a trader could enter this stage directly a lot of barriers would be broken down.

Nevertheless, without easy access to this area, not many traders will be able to practice the search for an algorithmic strategy beyond toy examples.

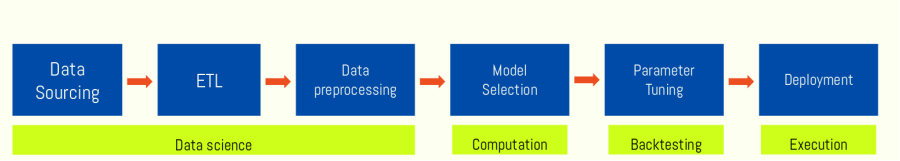

Fig. 1: Algorithmic trading pipeline

And as with any high-level activity without training and practice there is little hope for success. Futhermore, we cannot leverage on typical computer software to help us with tasks that we do not how to solve. Most complex tasks are often solved by decomposing them into smaller units that are solved independently and then re-combined to complete the whole task[2]. Unfortunately, traditional software is not designed to work this way. Here is where genetic programming offers an alternative to solving such complex tasks using computers. This field received first research activity in 1980s and in 1990s already began being applicable for problem solving on a human-like level[1, p.25] .

2 The Current State

In the recent years new companies have started offering online solutions for building models and trading strategies on their proprietory data sets. These could be generally grouped into two categories:

1. *investing into strategies* that were created by users as a form of crowdsourcing of the model selection and testing
2. *tools and data providers* for users to create their own trading systems for invidual trading

An interesting addition is one hedge fund in California, which outsources their dataset in an encrypted form and collects back results from many users around the world, to concatenate them into a meta-model that drives their trading system.

While these platforms are a welcomed development they still do not offer enough help to the users to excel in the area where they could have the most impact and let the computers do the rest. The work that most of the users have to do is to create a manually program. Even if it is a typical machine learning program, it was still created by the expert user.

On the other hand, we have recently seen that using machine learning to create other machine learning programs (like GANs) can create excellent results. In the trading context, we can reformulate the search for the right trading strategy as a search for a computer program. This could work akin to autoML which has the goal of creating machine learning programs that were not created by machine learning

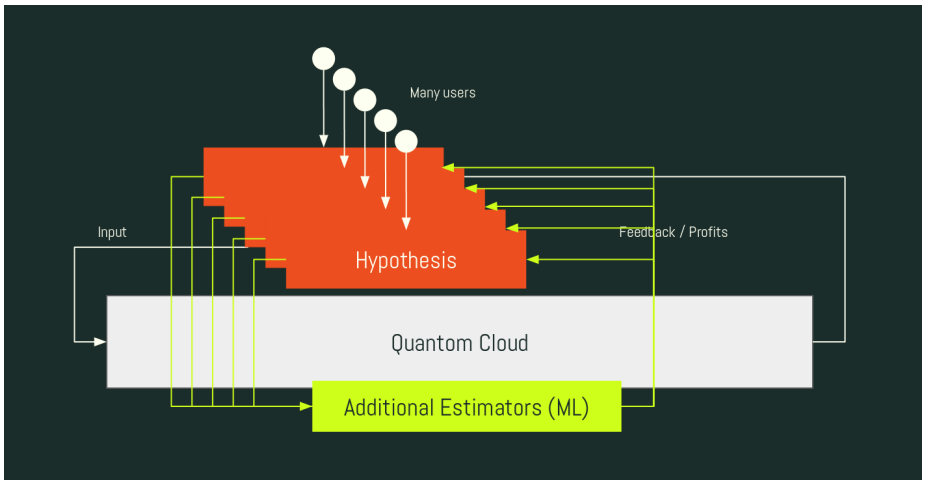

Fig. 2: Beyond backtesting, ML can provide useful guidance during development of trading strategies.

experts but rather were created by a computer. Some recent autoML have achieved good progress[4].

Very recently some research has shown promising results when a deep neural network tried to learn trading purely by observing the behavior of traders[3].

3 New kind of systematic trader

Cryptocurrencies are still a young and developing global market and a first of its kind for many reasons. It is the first truly 24/7/365 non-stop market with an almost immediate settlement. These are groundbreaking innovations that create a dynamic emerging market. To be successful in trading in this market we are building a new kind of systematic trading approach.

Our vision is to remove the need for manually programming the trading strategies and focus on providing the computation environment and market data that help our users to generate and test new trading strategies, as well as let them do live trading.

We already handle many of the pipeline steps for the user fully automatically. The users can quickly iterate their trading strategies and backtest them using integrated tools. Once the strategy is ready, it can be deployed into live trading environment. Connecting to user's exchange accounts is fast and easy and we are planning to add many more exchange APIs.

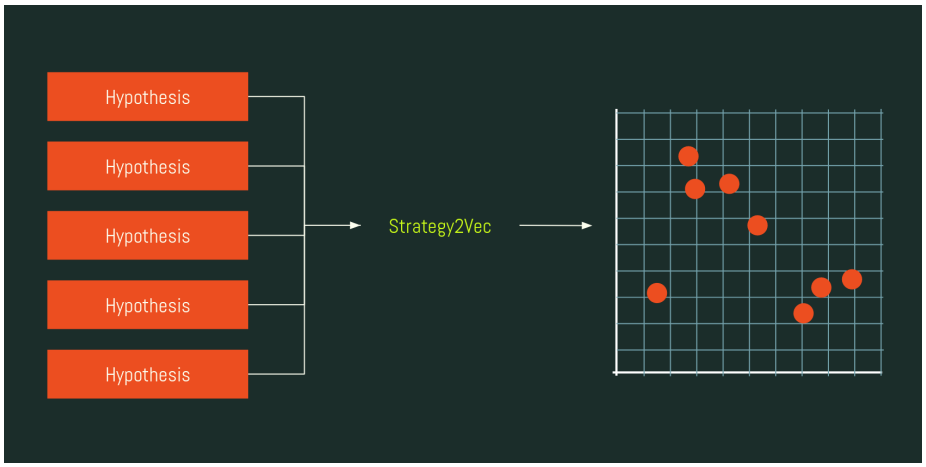

Fig. 3: Embedding an arbitrary trading strategy into a vector space using Strategy2Vec

What we are excited about is the innovation in the space of embedding strategies into vector space which will allow us to give additional performance metrics to the user beyong simple backtesting.

Furthermore, the embedding allows for a controlled creation of strategies by a machine learning system which can combine any number of strategies together and explore their viability.

This is just a step towards the greater vision of removing the manual programming of the strategies altogether. As we evolve, we want to make it easier for anyone to keep an edge in the cryptocurrency trading market. That is why we have made it our mission to help you make profit as a trader.

4 Quantom Compute Credit

Our cloud is an end-to-end solution for systematic trading of cryptocurrencies. This means that you can set up your algorithmic trading in our cloud without the need to use any other tool. You can link your existing exchange account for live order execution.

Payment token

In this section we present an ERC-20 token Quantom Compute Credit (XQC) which is an addition to our platform. XQC can be used to make a payment for any outstanding charges accrued on the platform , and by choosing to pay with the token makes you eligible for a 20% discount.

Available today

XQC is available today and can be bought by completing the form at

https://www.quantomcloud.com/ico.html

Purchase can made by sending Ethereum to the smart contract's address displayed after submitting the form. The initial rate before the tokens are floated on the markets is set at 0.000045455 ETH for each token (roughly US$0.01 at the time of the writting). The total supply is 1 billion tokens and 70% of that supply is permanently stored by the distribution contract. The remainder is kept by Quantom (20% in a 3 year vesting contract), the team (5%) and lastly 5% is reserved for the airdrop.

Airdrop

As a reward for our users we have prepared an airdrop for everyone who have signed up on our platform. Collecting the airdrop is optional and can be done from the cloud platform by providing an Ethereum based wallet's address.

References

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