Measuring predictability in the crypto-currency market

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Abstract

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The bitcoin network went live on 2009 January 3rd. 11 years later financial institutions are finally starting to broadly accept Bitcoin and other crypto-currencies as a legitimate asset class. The first bitcoin ETF was created a month ago (Feb. 2021) in Canada, it made headlines for the volume it attracted on its debut [1]. With both trading volumes and volatility being very high, we wonder about the efficiency of the cryto-currency market. In this paper, we will look at this problem by measuring predictability. First we take a look at entropy-based measures and find information spillovers. Then we take a more empirical approach, looking at prediction models, we find that historical bitcoin on-chain and technical data provides predictability (61% AUC) for future trend directions (ETH) at a daily time-frame. Such performance was attained using the EvoML tool (product of Turin Intelligence Technology), beating all previously developed models.

Chapter 4

Conclusion and future work

The goal of this research was to measure and get as much as possible insight on predictability in the cryptocurrency market. We looked at this problem from different angles, first from a mathematical standpoint with entropy-based measures, then from a more empirical standpoint by evaluating so-called technical analysis and finally, by giving machine learning a chance to find its own patterns through various data sources (on-chain, futures market etc.).

A clear result came out: mathematically and empirically, we were able to record significant predictability based solely on quantitative data.

This research paper does not go in depth into exploring the potential of machine learning for market forecasts, mostly because of lack of time, only supervised learning was explored and presented here. We only scratched the surface but it was enough to proof the existence of predictability. There is still a ton of room for more research in this field, unfortunately it is a field where the best research is most likely kept private.

For my part, I can already say that future research and work will include autoregressive models and reinforcement learning.