

The Predictive Power of the Ethereum Transaction Network

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The cryptocurrency market has attracted the attention of many investors in recent years since its high volatility offers a great opportunity for speculation. In contrast to other markets, all transactions are publicly available in this self-organized market. This fact, represents an unprecedented scenario for the research community, as it enables to understand and explain the evolution and adoption of a financial system by capturing the complex behavior that emerges from the relationships between users.

In this work we focus on the Ethereum Blockchain and the main goal is to find if the properties of the underlying transaction network provide further and useful information to forecast the evolution of the price. To this end, we have analyzed all the transactions under a complex system perspective, in which nodes represent the accounts that operate in the system and links represent the transactions between them.

First, we analyze and describe the dynamics and evolution of the system by analyzing its structure and computing its properties over time. We found that the transaction networks are highly heterogeneous, where a small fraction of addresses tend to trade with the vast majority, while most addresses hardly trade with others. We also found that the networks are disassortative and present very low clustering.

Next, we build two machine learning models to predict the trend of the price. The first one serves as a base model and considers a set of the most relevant features according to the current scientific literature—including technical indicators and social media trends. The second model considers the features of the base model, together with the network properties computed from the transaction networks. We found that the full model outperforms the base model and can anticipate 46% more rises in the price than the base model and 19% more falls. In addition, we found that the full model is 19% more accurate on average than the base model when predicting the future trend of the price. Hence, we conclude that the transaction network contains relevant information to explain the evolution of the price, that is not captured by classic indicators.

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