

Supervised Learning
Classification of Bitcoin Price Development

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Abstract

- rising importance of Bitcoin (market cap comparable to large multinational companies such as Facebook and Tesla) - volatility higher than stockmarket, different asset - Bitcoin price prediction offers trader advantage over non-rational traders - here: focus on classification of Bitcoin price (up or down) - techniques:

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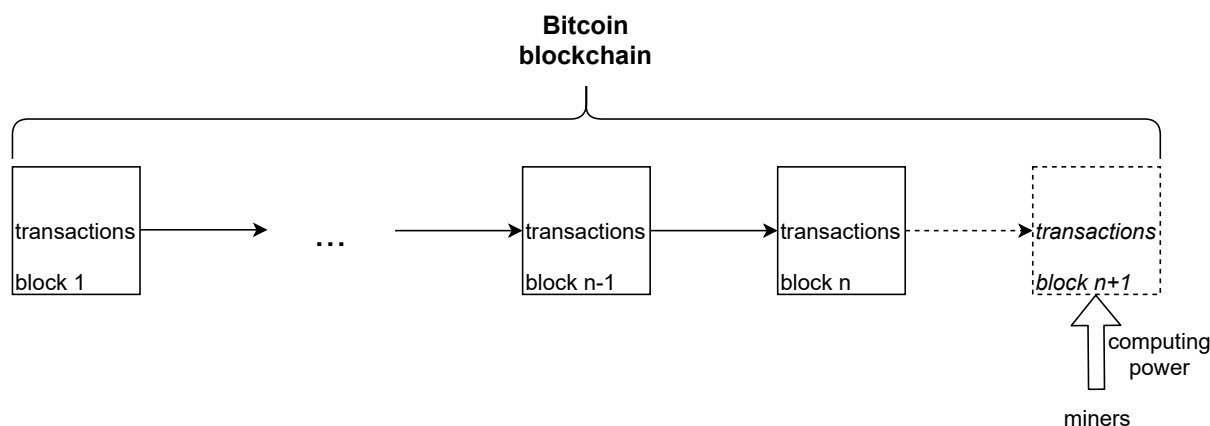


Figure 1: This is a simplified visualization of the Bitcoin blockchain.

1 Introduction

- cryptocurrency from 2009 developed by an unknown individual or group under pseudonym Satoshi Nakamoto [1] - currently cryptocurrency with largest market cap of 750 billion, comparable to market cap of companies like Facebook or Tesla [2] [3] - one hand: classical asset with price driven by demand and supply, can be traded on exchanges (like stock exchanges) - other hand: where do they come from? -> blockchain, can be mined using computational resources via process called hashing, block size
- so far: classification accuracies of 51-55 percent - here: comparison of logistic regression,

2 Dataset

2.1 Bitcoin Time Series Data

- data taken from Blockchain.com API [4] - features: classical asset data & Bitcoin specific data - in total 3576 days for all the features - exclude market cap, transaction vol., miner's revenue

2.2 Supervised Learning Approach

- moving window approach with window size m and prediction horizon of 1 - label 1 if next day sees Bitcoin price increasement, else label 0 - use moving/sliding window technique to transform time series data into labeled supervised learning examples for a classification task

3 Theory

- logistic regression - GAM - neural network

4 Implementation & Software

5 Results

6 Discussion

7 Conclusion & Outlook

Outlook: - Google searches [5], Twitter [6] - consider individual transactions [7] - predict major crashes [8] [9] [10]

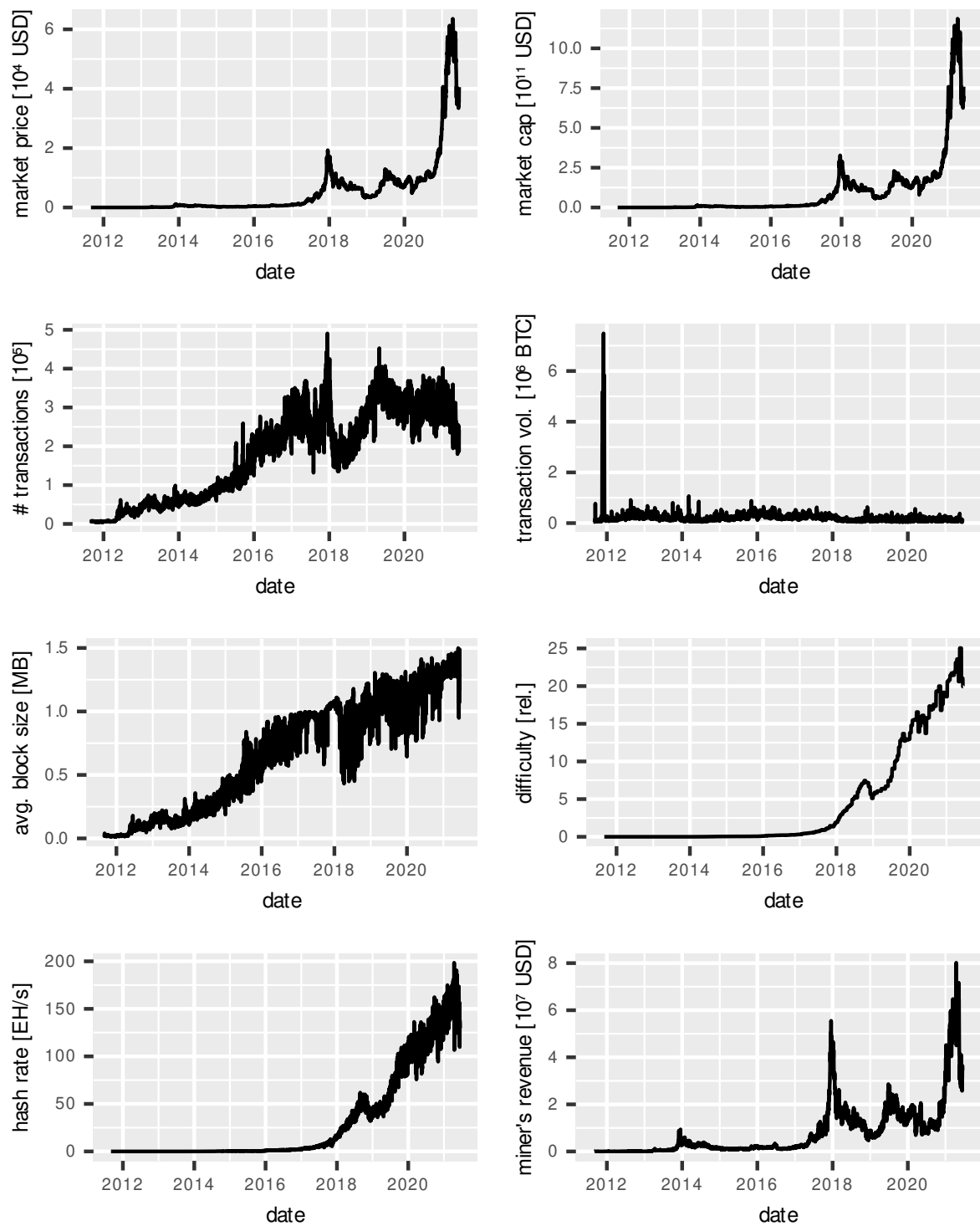


Figure 2: time series of label and features.

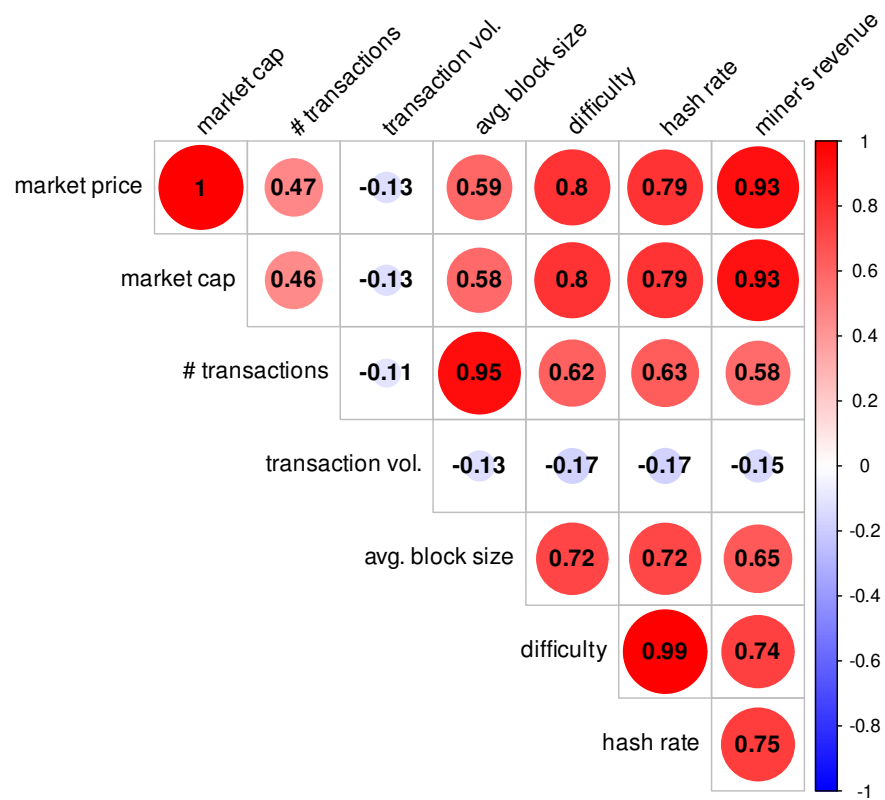


Figure 3: correlation matrix with Pearson's correlation coefficient

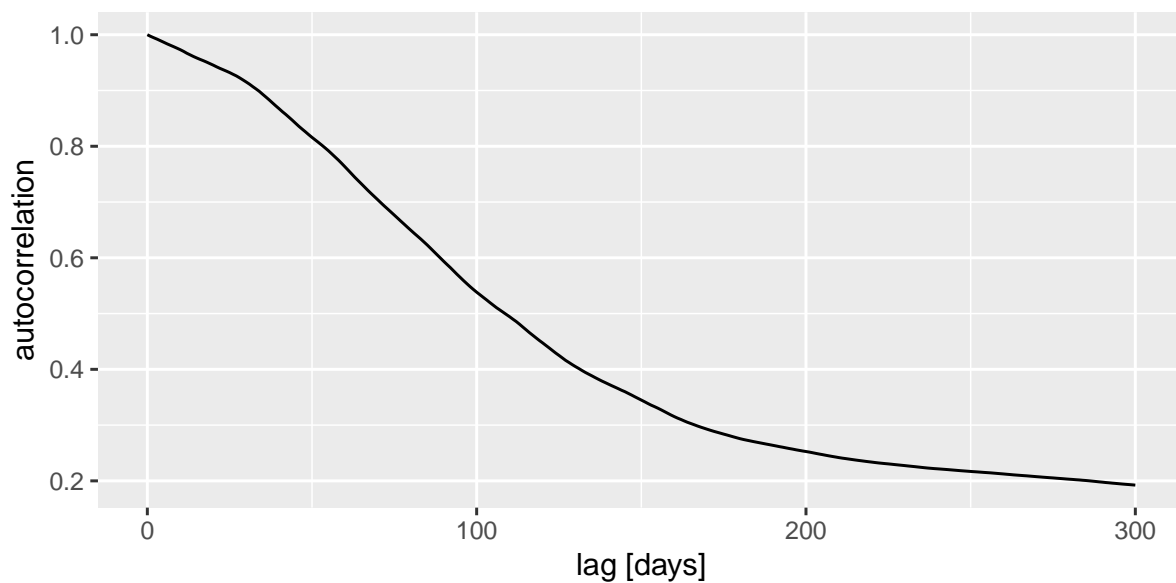


Figure 4: autocorrelation of Bitcoin market price

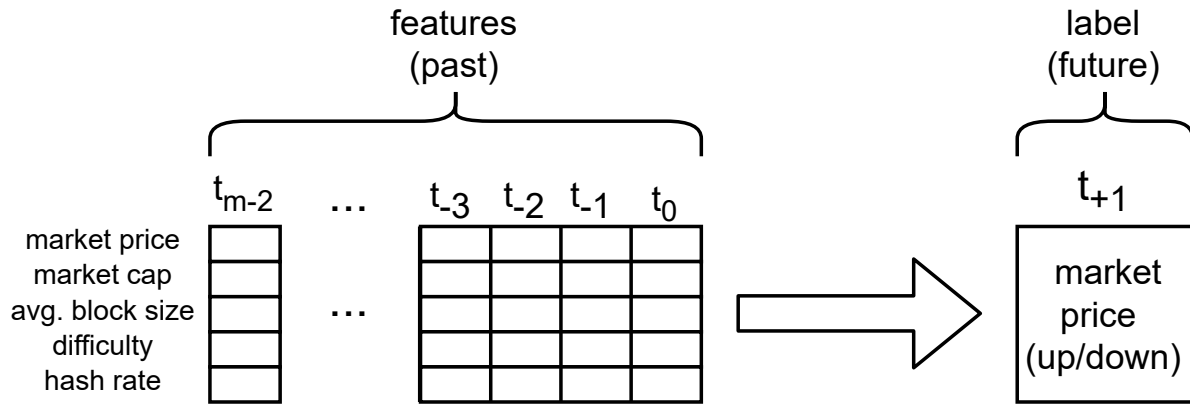


Figure 5: supervised learning example using moving window technique

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