

Automated Bitcoin Trading – Feinkonzept

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May 10, 2025

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1 Research Objectives

1. Identify statistically significant signals that indicate potential short-term price moves.
2. Convert the most promising signal(s) into an executable rule-based strategy.
3. Evaluate performance via back-testing and a four-week live test (16 Jun – 14 Jul 2025).
4. Document robustness, limitations and possible improvements.

2 Contents of Thesis

2.1 Market Mechanics

Outlining what Bitcoin is and what the value of Bitcoin represents. I go into the basics of auction theory and why it is important for understanding how markets work. I also discuss the efficient market hypothesis and its relevance to algorithmic trading.

2.2 From data analysis to trading strategy

I start by visualizing the data using simple line charts and scatter plots to identify intuitive patterns that appear statistically relevant. These patterns are then tested for statistical significance using basic methods such as conditional probability comparisons and hypothesis testing, implemented in Python. I plan to use several indicators and combine them into a trading strategy. Different strategies with various indicator combinations will be evaluated using backtesting on historical data and walk-forward analysis.

***Indicator** is a statistical measure for current market conditions.*

2.3 Risk & Position Size

Dive into risk management on how I handle position size and how I set the stop-loss and take-profit levels.

***stop-loss** Is an order to sell a position if the price drops below a certain level which marks the invalidation of your initial ideas of the trade. **Take-profit** Is an order to sell a position if the price rises above a certain level which marks the end of the trade.*

2.4 Automation and Test Run

Dive into how I automate the trading process and live signal calculation. I explain how the bot is set up to run automatically, how signals are processed, and how orders are sent to the exchange. Go into the basics of the mechanics behind the bot and what kind of libraries I used in python. Where it is running on a PaaS. I also cover how I monitor the system, log trades and errors, and set up alerts for any issues. Finally, I explain how I run a test phase (paper trading) to make sure everything works as expected before using real money.

PaaS is a cloud platform as a service. It is a platform that allows you to run your own software in the cloud remotely.

3 Project Timeline

Phase	Weeks / Dates
Exploratory analysis & signal ideation	KW 17 – KW 21 (24 Apr – 26 May)
Parameter tuning & dry-run (paper trading)	KW 22 – KW 25 (27 May – 23 Jun)
Live deployment (real funds)	KW 28 – KW 31 (8 Jul – 4 Aug)
Result analysis & thesis writing	KW 32 (5 Aug – 11 Aug)
Editing, final layout, submission	KW 33 – KW 35 (12 Aug – 1 Sep)

This timeline could change and is just a rough estimate.

3 Expected Delivery

- Python code for data handling, back-testing and live execution in a GitHub repository.
- Example datasets already available at GitHub repository.
- A statistical report comparing other strategies I tested and other signals I considered.
- Final thesis detailing methodology, live results and critical reflection.