

# Automated Bitcoin Trading – Feinkonzept

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May 10, 2025

## Contents

<b>1</b>	<b>Research Objectives</b>	<b>2</b>
<b>2</b>	<b>Contents of Thesis</b>	<b>2</b>
2.1	Market Mechanics . . . . .	2
2.2	From data analysis to trading strategy . . . . .	2
2.3	Risk & Position Size . . . . .	2
2.4	Automation and Test Run . . . . .	3
<b>3</b>	<b>Project Timeline</b>	<b>3</b>
<b>3</b>	<b>Expected Delivery</b>	<b>3</b>

# 1 Research Objectives

1. Identify statistically significant signals that indicate potential price movements.
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

I briefly outline what Bitcoin is and what the value of Bitcoin represents. How Bitcoin works as a digital currency and why specifically I chose Bitcoin as my trading instrument.

### 2.2 From data analysis to trading strategy

I search for statistically significant signals by testing an idea using basic methods such as conditional probability comparisons and hypothesis testing, implemented in Python. the difference between cumulative buy and sell orders within a certain range of the current Bitcoin price, which I use as a signal for local demand-supply imbalances I plan to use several indicators and combine them into a trading strategy. A orderbook delta is the difference between cumulative buy and sell orders within a certain range of the current Bitcoin price, which I use as a signal for local demand-supply imbalances. Different strategies with various indicator combinations will be evaluated using backtesting on historical data and walk-forward analysis.

***Indicator** statistics used to measure current conditions as well as to forecast financial or economic trends.*

### 2.3 Risk & Position Size

I manage risk by determining trade sizes and setting clear price levels for when to exit trades, both for protecting against losses and taking profits.

***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

I automate the process of calculating live signals and executing trades on the exchange. The algorithmic trading system will be written in Python and will be run on a PaaS, and includes monitoring for trades and errors with automated alerts. Finally, 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.