LONDON ANALYTICS

# INVESTMENT PRODUCTS AND SERVICES

# Introduction

## ALGORITHMIC TRADING BENEFITS AND PROBLEMS

Financial markets have always attracted the strongest minds of this world, because they have high liquidity, sometimes seem predictable, demonstrate high volatility and the potential to earn on them. The price knows everything, each of it's movements is due to certain actions of the market maker, institutional participants or a large number of companies and individual traders. An imbalance of supply and demand generates price movements on which companies and traders are trying to generate profit.

All trading consists of two simple trading operations: BUY and SELL. After the BUY operation is completed, the trader is in the LONG position, earns on rising prices, then closes the position with the opposite SELL order.

*Example of LONG position on a trading account*

The opposite is another type of position - SHORT. In this case, the broker or the exchange gives a temporary trading asset as a loan, the trader sells it, after which he is in the SHORT position and receives profit from the price drop. Then the trader closes the position with a BUY order, returns the loan and receives a price difference.

*Example of SHORT position on a trading account*

Algorithmic trading has many obvious advantages. Such as automatic risk control, strict decision-making system, testing on the historical data and analysis of transactions, the absence of a human factor. However, despite all these advantages, algorithmic trading has a number of difficulties that all experts face. These difficulties include:

1. The complexity of the technical process.
2. The lack of universal software that is able to implement various ideas of analysts.
3. Inaccuracy and slowness of technical analysis indicators.
4. The difficulty of building effective and profitable strategies.
5. Permanent market variability, that makes it extremely hard to keep up with, constantly changing trading strategies.
6. The difficulty of validating strategies and checking for overtraining/overfitting. In other words, it is difficult to make sure that the result on historical data is not a coincidence and the strategy will be profitable in the future.

# OUR ADVANTAGES

Our team has managed to solve all the problems of algorithmic trading that we know. We have developed such a concept for creating trading strategies that very easily matches with the task of automation and application of AI/ML solutions.

First of all, our algorithms are based on the experience of trading and automation of various trading ideas. We have worked with different analysis methods: indicators, classical technical analysis, pattern analysis, VSA, order book analysis, psychological models, genetic algorithms, neural networks and other AI/ML methods.

We are sure that an efficient strategy is similar to a living organism, which is mutated and adapted. The strategy should consist of various methods of analysis, simultaneously solving many problems of recognition and adaptation. The market has a number of features and rules: trends are formed, there are various scenarios of volatility changing, performing various reactions of participants to overbought/oversold assets, manipulations by a market maker and much more. Understanding all these and analyzing is the only way to make efficient and profitable strategy.

Our specialists have extensive experience in algorithmic trading, as well as experience in the professional use of mathematics. We know the weaknesses of the “dry” mathematical approach, we are familiar with the problem of “lagging” indicators of technical analysis, the difficulty of recognizing visual patterns, and we know how to solve such problems.

# AlphaCube - AI/ML Automated Investment Solution

## VISION AND GOALS

The project's goal is the automatic generation of a diversified portfolio of investment strategies and their execution on world stock, FX and cryptocurrency markets. We are developing a fully automated solution that continuously learns and adapts to the market by leveraging data-driven technologies to find new strategies for profitable trades. It is the only possible way to automatically generate significant profit, in market where multiple machine learning algorithms and AI operate.

Strategies automatically execute LONG and SHORT trades across multiple markets at scale, by leveraging machine learning, algorithmic trading and AI.

In addition to this goal, we use our already developed models and experience in programming, analysis and machine learning to create the most effective and safe portfolio of automated strategies.

## ALPHACUBE BENEFITS

**Any world market**
We currently have integration with three key global markets:

1. USA stocks exchanges.
2. Forex brokerages.
3. Cryptocurrency exchanges.

It is possible to connect with any other world market, exchange and brokerage.

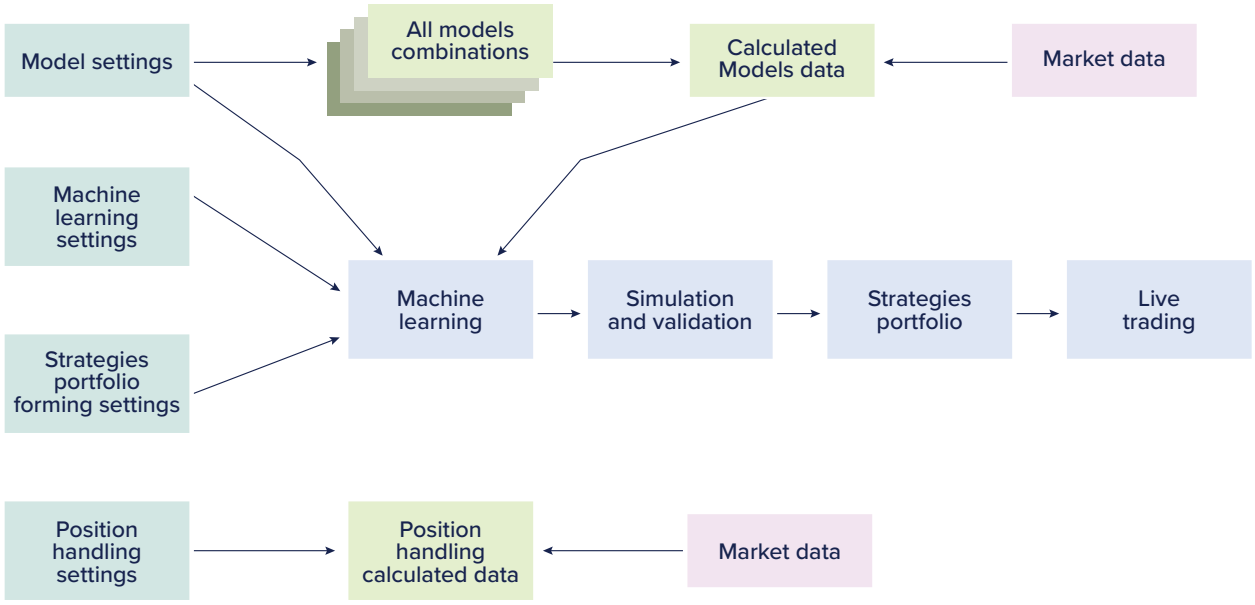
**Different trading strategies**
Diversification with different trading strategies can guarantee a high reliability of strategies portfolio.

**AI/ML based solution**
Ability to adapt to the market and find new effective strategies without human interaction.

**Best profit/risk ratio**
Ability to choose any specifications of trading strategies and to choose the most profitable and most secure strategies.

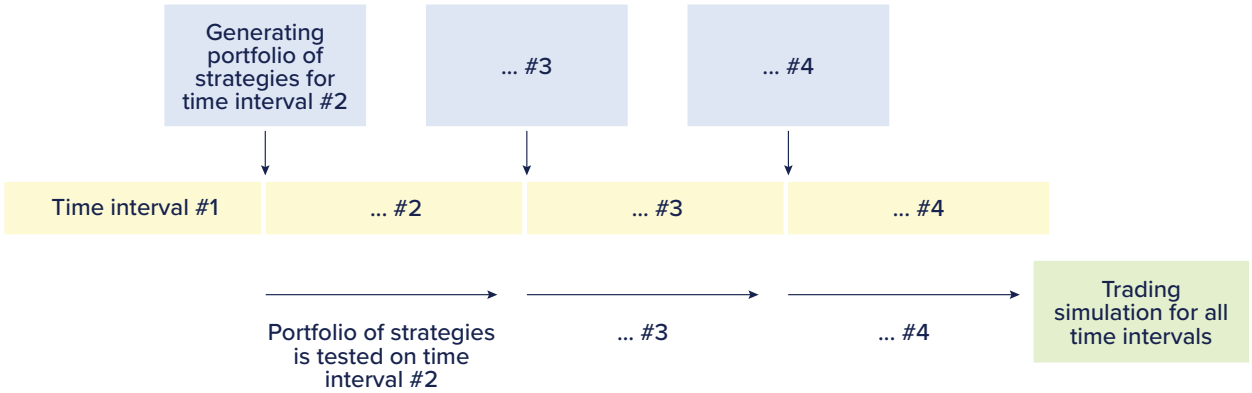
# ALPHACUBE CONCEPT

Using advanced market analysis methods and performing the calculation and caching of necessary market data. Running machine learning algorithms that adapt to the market and find a way to earn by executing trades. Performing simulation and validation to ensure the reliability of detected trading strategies.




# METHODOLOGY PROVABILITY

The project provides the possibility to generate a portfolio of strategies for each time interval and further simulate trading for next time interval. Such simulation with profitable trading results guarantees that generated data-driven strategies portfolio will also perform profitable trading in future.



# TRACK RECORD ON LIVE ACCOUNT

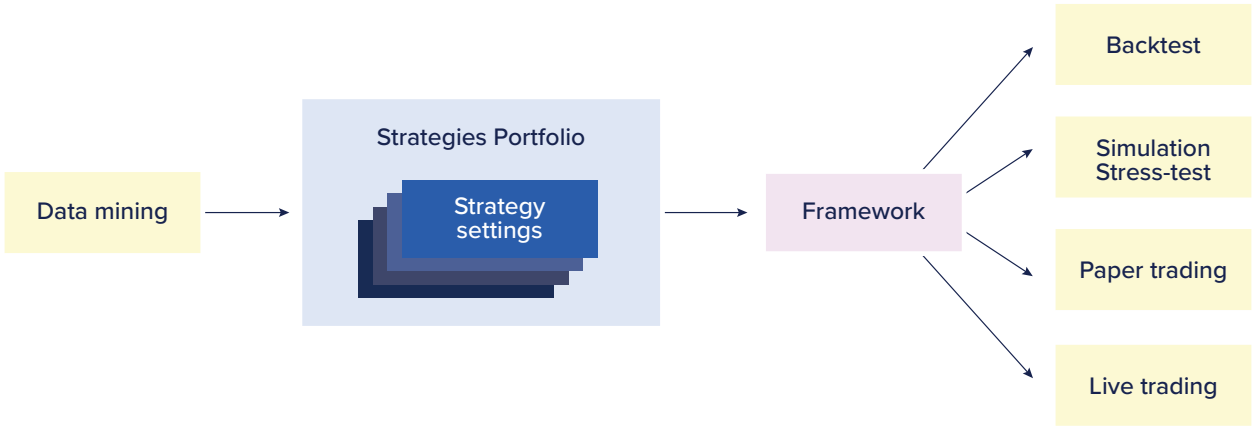
In order to validate our approach, simplified strategies were developed in manual mode according to our methodology. The portfolio of series of trading strategies was launched in live trading on the cryptocurrency Binance exchange.

Portfolio of strategies generated 16.93% of profit during the 3 months test period. With average profitability 5.64% per month and estimated yearly profitability 93% (using compound interest).

These results demonstrate that our approach is able to find profitable strategies and strategies validation process performs the correct selection. Inefficient and overtrained strategies are successfully filtered during analysis.

# FLEXIBLE USAGE OF RESULTED STRATEGIES

Project provides a very flexible and convenient way for strategies analysis, as well as launching them on a live trading account.



# Investment Models

Our company has developed investment models for various tasks. All models receive input data for analysis, perform a comprehensive analysis and provide ready to use results for business.
These models are used in AlphaCube product and also are offered by our company as separate independent products.

All developed models can be used by private traders, investment companies, and also by banks to perform additional analysis, as well as to strengthen existing investment solutions.

## MARKET MODELS

Models of this category solve the problems of analysis and prediction of price movements. These models can be used as the basis of investment strategies, as well as complement the existing analysis. Each of these models is flexible to use in various financial markets and can be adapted to various investment tasks.

| Model Name | Purpose and Description |
|---|---|
| Pump and dump pattern detector | Recognition of strong up/down price movements with high volatility and calculating the probability of further price movements. |
| Pairs trading statistical arbitrage analyser | Analysis complex for determining the dependencies of various stocks on world markets. The analyser finds related stocks and performs trading actions according to patterns. |
| Market state and volatility analysis | Detecting of trend/cycle/flat state with probability rate. Detecting actual volatility. Model makes predictions according to future market state and volatility. |
| Trend-following, mean reversion, cycle trading models and levels trading | Models that can be used for generating trading signals for different classical trading strategies. |
| Volume-spread analysis | Detecting different behaviors of market-makers and price manipulations according the VSA approach. |
| Custom technical analysis pattern detector using the neural network | Detecting complex figures, curves and patterns. This could be performed by using custom neural networks with OHLCV and grid pattern analysis. |
| Orderbook analysis | Models for a different micro analysis of exchange's orderbook. For example, VWAP, densisty, liquidity distortion. May be used for trading strategies, arbitrage or market making algorithms. |

# PORTFOLIO MODELS

Models of this category solve the problems of analysis and validation of strategies. Models are able to evaluate the effectiveness of strategies, their profitability, detect overtraining and assess the likelihood of their effectiveness in the future.

These models are well suited to funds and investment companies that already have various investment strategies and need high-quality validation and investment portfolio building tools.

| Model Name | Purpose and Description |
|---|---|
| PNL based analyser | Profability, profit/loss ratios and other related analysis. Checking for risks, stability and convicence. |
| Strategy drawdowns and recovery analyser | Calculating the diversification and correlation in comparison with standard investment benchmarks. Also performing similar analysis for disabling inneficient and outdated strategies. |
| MAE/MFE analyser | Calculating maximum adverse/favorable excursion and checking trading signals efficiency. |
| Sharpe and Sortino ratios | Using standard investment approaches for risk-adjusting and checking trading strategies. |
| Investment scoring model | Using all described models in the emsemble complex for investment evaluation and for tasks of machine learning. |

# SERVICES

Our company is constantly faced with various tasks of analysis and development for the investment industry. We also additionally provide a list of services in which we have expertise. Our company developed additional software that should be adapted to specific goals and tasks. Our services help to use such additional software, as well as use the synergy of our specialists and products to solve unique and individual tasks of the investment business.

| Service | Purpose and Description |
|---|---|
| Create custom models using already developed components | Creating new custom models and trading strategies by demand of different customers, bank and funds. Will be performed based on existing components and backtester software. |
| Market portfolio models tuning | For the purpose of increase efficiency of models and trading strategies, it is possible to perform readjustment and adaptation to various financial markets using quantitative analysis techniques. |
| Models optimisation | Automatic optimization of model parameter values for increasing efficiency. A generic algorithm can be applied for this task in the case of solving complex optimization problems. |
| Models backtesting | Testing models and trading strategies on historical market data. |
| Performing stress tests, in-sample, out-of-sample, Monte Carlo | Validating models and trading strategies using different approcahes based on kind and characteristics of strategies. Prevention of “overtrained” strategies. |
| API integrations with financial services | Development of custom API integrations for specific projects with brokerages, exchanges, trading terminals, data providers. |
| Market and portfolio models analysis | Performing manual analysis of different models and strategies for different goals. |
| Machine learning solutions | Development of machine learning solutions for optimising and generating new strategies based on develop models components. |
| Proving trading signals in real-time | Providing trading signals of originally developed and tested trading strategies. |

# CONTACT DETAILS

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