Solution Document: Group 11194

Machine Learning-Driven Long/Short Pair Trading in cryptocurrencies

Project specifications

- The project was aimed at building a complete robust and easy to use system, employing modern machine learning and deep learning tools.
- These techniques were adopted to design, test and evaluate long/short pair-trading strategies for cryptocurrencies.
- The specification was focused on creating some structured workflow to be able to select cryptocurrencies, predict movement of their price relationships and decide whether to buy or sell, for generation of risk-adjusted stable returns.
- In realizing this, the system collected historical crypto data, cleaned it and further tested whether two assets could move together in the long-run or not, employing deep learning model for forecasting price spreads.
- The specifications also included a decision-making component which employed machine learning for determining most profitable and safe trade sizes from the forecasted risks.

Solution Architecture

- Data layer collected daily prices and liquidity information from select cryptos from 2016-2016.
- Statistical layers employed cointegration tests for identifying asset pairs that historically moved together.
- Forecasting layer adopted LSTM neural networks, for predicting price gaps behaviors between series.
- Allocation layer adopted machine learning models (Ensemble and Random Forests) to decide when to go long or short, and capital to be allocated.
- Backtesting was used for simulating how the proposed trading strategies would perform across real markets, with the inclusion of transport costs.
- The architecture informed how AI approaches could aid in viable crypto trading systems' development.