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Introduction

Algorithmic trading is a system of trading where buy and sell signals are automatically generated by mathematical models.

Algorithms

The three algorithms used in this project are moving average crossover, mean reversion, and pairs trading.

Data

Data was collected every five minutes for the top one hundred cryptocurrencies between October 5, 2017 and January 24, 2018. The data was collected with a Python script calling coinmarketcap.com's API on a Raspberry Pi.

Trading Fees

1. Broker Fees

These are the fees that the broker charges to exchange your cryptocurrency. This project used Kraken's trading fees of 0.16% when selling and 0.26% when buying.

2. Network Fees

This is the fee charged by the currency's miners to to perform the transaction.

3. Wallet Fees

Wallets are used to safely store cryptocurrency on a user's computer. Wallet fees vary by wallet. Since some charge no fees, they are ignored in this project.

Moving Average Crossover

The Moving Average Crossover test trades a single currency. It attempts to predict when the currency's price will rise and when the price will fall. The algorithm will buy whenever a rise in price is predicted and sell whenever a fall in price is predicted.

This graph is an example of using a 1.5-day moving average on the cryptocurrency Litecoin. The blue line represents buying and holding and the orange represents the algorithm. The algorithm avoids many of the drops in the currency's price in the right section of the graph.

Pairs Trading

The Pairs Trading strategy trades two currencies back and forth. The algorithm attempts to predict when one currency's price will rise and the other's price will fall. It then sells the falling currency and buys the rising currency.
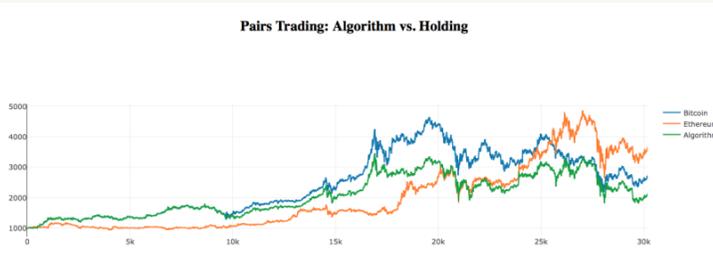
This strategy is useful in the stock market and for commodity trading, where cointegration is found between prices. However, cryptocurrency prices all follow a similar trend. Most cryptocurrencies follow Bitcoin's price: their prices are rising when Bitcoin's price is rising and their prices are falling when Bitcoin's price is falling. Since most of them follow a similar trend, this pairs trading strategy did not prove useful for cryptocurrency.

Website

The research is published on http://capstone.mikethebro.com The user can enter parameters such as moving average distance and starting cash. They can also select a strategy and choose any of the top five cryptocurrencies.
The server uses a Python backend with the Tornado server framework. Front-end graphs are displayed using the Plotly library for JavaScript.

Future Research

Further research will be conducted on taking more strategies used for stock trading and testing them in the cryptocurrency market. Modifications will also be tried on these strategies. Additionally, pairs trading strategies will be tried with different pairs that are more likely to have cointegration. This may include matching stocks and cryptocurrencies together to find usable pairs.

Sources

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3. Murphy, Casey. "Moving Averages: Strategies." *Investopedia*, 2 Apr. 2018, www.investopedia.com/university/movingaverage/movingaverages4.asp