

## CS3072/CS3605 FINAL-YEAR PROJECT: TASK 1 - PROJECT SYNOPSIS

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<b>Programme</b>	Computer Science	<b>Specialism</b>	Software Engineering
<b>Provisional Title</b>	Development of a system that performs automated trades to support price uniformity across different cryptocurrency exchanges.		
<b>Problem Definition</b>			
<p>During volatile times like economic uncertainty or major news events, the price of cryptocurrencies can vary by a huge margin on different exchanges. This is mainly caused by emotional trades humans make when there is some FUD (fear, uncertainty, doubt) in the news. Even the market makers of big exchanges like Coinbase sometimes can't keep up with the volume mass selling or buying which can result in huge slippage or even temporary trading halt just to stabilize prices.</p> <p>Furthermore, the price slippage can vary from one exchange to another, leading to huge price differences for the same coin. Such big price movements can also lead to automatic liquidations especially from people that leverage trade coins of the futures markets like Binance Futures.</p> <p>According to Cointelegraph, 95% of Bitcoin traders loose money over time and this is one of the many reasons why it happens. So, my solution could not only create more stable prices across exchanges, but also reduce the risk of investors losing money in the markets due to high volatility.</p>			
<b>Aims and Objectives</b>			
<p>The aim of my project is to use AI to identify arbitrage opportunities and perform market trades in real time. If done correctly, this should stabilize crypto prices across different exchanges.</p> <p>To achieve this aim, the system will need to:</p> <ol style="list-style-type: none"> <li>1. Monitor crypto prices across top major cryptocurrency exchanges</li> <li>2. Identify arbitrage opportunities</li> <li>3. Perform risk assessment of the opportunity</li> <li>4. Perform reward assessment of the opportunity</li> <li>5. Decide if risk to reward ratio is acceptable using AI and perform trades</li> <li>6. Evaluate the results of the trades in terms of profits or losses generated and price uniformity across exchanges.</li> </ol>			
<b>Background Sources</b>			
<p>Problem:</p> <ul style="list-style-type: none"> <li>• <a href="https://www.cnbc.com/2017/12/13/bitcoin-futures-briefly-halted-after-plunging-10-percent.html">https://www.cnbc.com/2017/12/13/bitcoin-futures-briefly-halted-after-plunging-10-percent.html</a></li> <li>• <a href="https://cointelegraph.com/news/day-trading-bitcoin-why-95-of-traders-lose-money-and-fail">https://cointelegraph.com/news/day-trading-bitcoin-why-95-of-traders-lose-money-and-fail</a></li> </ul> <p>How arbitrage trading can solve this:</p> <ul style="list-style-type: none"> <li>• <a href="https://online.hbs.edu/blog/post/what-is-arbitrage">https://online.hbs.edu/blog/post/what-is-arbitrage</a></li> <li>• <a href="https://academy.binance.com/en/articles/what-is-arbitrage-trading">https://academy.binance.com/en/articles/what-is-arbitrage-trading</a></li> <li>• <a href="https://economictimes.indiatimes.com/definition/Arbitrage">https://economictimes.indiatimes.com/definition/Arbitrage</a></li> <li>• <a href="https://coinmarketcap.com/alexandria/article/how-to-benefit-from-crypto-arbitrage">https://coinmarketcap.com/alexandria/article/how-to-benefit-from-crypto-arbitrage</a></li> <li>• <a href="https://www.techtimes.com/articles/258631/20210331/impulseven-how-an-ai-enabled-arbitrage-bot-is-transforming-crypto-trading.htm">https://www.techtimes.com/articles/258631/20210331/impulseven-how-an-ai-enabled-arbitrage-bot-is-transforming-crypto-trading.htm</a></li> </ul>			

Examples of existing arbitrage trading bots:

- <https://www.cryptohopper.com/features/exchange-arbitrage>
- <https://www.pionex.com/blog/pionex-grid-bot/>
- <https://bitstgap.com/crypto-trading-bot/>
- <https://docs.trality.com/trality-code-editor/api-documentation>

### Approach

The system will retrieve live data from top major crypto exchanges and using AI, it will identify and assess different trading opportunities.

Not all trades need to be 100% profitable, but overall, the system shouldn't lose money while performing these trades because that would be unsustainable. Therefore, the AI will need to decide statistically which trades will be executed and which won't be based on the risk to reward assessment.

The most important risks are probably the confirmation time when sending a coin from 1 exchange to another. This is because if the delay between buying the token on one exchange and selling it on another is too big, then the arbitrage opportunity might disappear. In the best case this can lead to a break even but in the worst cases this can also lead to a loss when selling the token.

The confirmation time for a crypto transaction is even harder to predict because different cryptocurrencies have different block times and different exchanges have different policies when it comes to the number of block confirmations they need to see before considering the transaction as settled.

For this project I won't need to collect any data from people but will use data freely available to everyone about the cryptocurrency's prices on different exchanges.

### Evaluation

The project will succeed if the arbitrage trades, result in a price stability across exchanges over time and the trades performed didn't lose money.

The profitability part can be calculated in terms of tokens gained or lost; or it can be calculated in British Pounds. Both give a valuable insight so I think I will probably do both.

Evaluating how our trades influenced the price uniformity across exchange can also be evaluated by simply looking if I bought on the exchange that had a low price and sold on an exchange that had a bigger price. Obviously, the bigger the transaction is, the bigger the influence will be on the price when the trades are executed.