# THESIS PORTFOLIO

## CRYPTOCURRENCY MINING STRATEGIES

(Technical Report)

## DATA COLLECTION: WHY IS IT SEEN AS A PROBLEM?

(STS Research Paper)

An Undergraduate Thesis submitted to the Department of Engineering and Society

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Bachelor of Science, School of Engineering

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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# SOCIOTECHNICAL SYNTHESIS

## Technical Topic – Cryptocurrency Mining Strategies

Cryptocurrency has grown into a large market, with cryptocurrencies like Bitcoin holding over 30,000 USD in the past year. With the increasing value of cryptocurrencies, mining is becoming a target of exploitation. Many dishonest mining strategies and their implications are explored in “Cryptocurrency Mining Strategies”, a compilation of several research papers on different cryptocurrency mining strategies. When miners use more profitable strategies, other miners will tend to form cooperative mining pools using that strategy, which can lead to majority mining groups. Recently, reinforcement learning was used to find optimal mining strategies in changing environments of cryptocurrency mining systems, which could pose a threat to proof of work cryptocurrencies if adopted by large mining pools. The technical paper proposes further research into combatting optimal strategies using similar reinforcement learning methods.

## STS Research Topic – Data Collection: Why is it Seen as a Problem?

New artificial intelligence and machine learning technologies require a lot of data to properly function, and as these technologies have become more popular, data as become more desirable. With over four and a half million gigabytes of data used each minute by Americans alone, there are massive amounts of data being collected each day. Many people are uncomfortable with their data being collected, and “Data Collection: Why is it Seen as a Problem” inspects the many reasons for people’s unease with data collection. Using the Actor-Network Theory methodology, this research paper analyzes the relationships between the actors in the actor-network. These actors include companies, the government, consumers and citizens, data engineers and analysts, the data infrastructure, data collection methods, and malicious

hackers, each of which have unique relationships with each other that shine light on the reasons for people's discomfort with data collection. Many of these relationships show an imbalance of control, with consumers and citizens typically having the least control over their own data. The research paper proposes a few solutions targeting the lack of control of consumers and citizens. Although the solutions are not perfect, they offer some directions of future research into developing more effective solutions.