CRYPTOCURRENCY ANALYSIS FROM A CONSUMER-FACING PERSPECTIVE

A COMPARISON OF ETHEREUM AND BITCOIN

A Thesis Prospectus

In STS 4500

Presented to

The Faculty of the

School of Engineering and Applied Science

University of Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science in Computer Science

By

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October 7, 2022

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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Introduction

The summer of 2022, I worked at Tesla Motors. Tesla Motors is an electric vehicle manufacturing company, with hands in various other clean energy-related fields. Some include solar panels, batteries, and robotics.

Tesla is involved in mobile routing services. This means that rather than having Tesla vehicle owners bring their cars into a shop to get it fixed, Tesla allows vehicle owners to go on an app and schedule Tesla technicians to *come to them*.

When someone does this, it generates a route for technicians to take – there are many consumers and various constraints based on the technician's knowledge and the parts they have with them. The issue that was plaguing Tesla was that technicians always had to know where they would start and end their days in order to get a route, and they didn't always know this. My technical project explains how I went about solving this problem for Tesla.

My STS project, on the other hand, is unrelated. It will look at the two cryptocurrencies Bitcoin and Ethereum and compare them from a consumer perspective. It will look to investigate which cryptocurrency is more promising for consumers, and what the fallout will be if one cryptocurrency 'takes over.'

This question is quite important, because investigating in cryptocurrency is something Americans and people all around the world are naturally hesitant about. Cryptocurrencies are

volatile, and if Bitcoin or Ethereum wins, that means the other will become obsolete. Also, consumers need to know their money is secure and that it is retrievable when they need it.

Technical Project Abstract

Electric vehicle manufacturer Tesla does mobile servicing, sending technicians to customers in need of maintenance. However, the app that the technicians use to get their routes was unable to handle events when the technician did not know where they would be starting or ending their days. Investigating other repositories on GitHub and other companies that have faced this routing logic challenge provided some insight, though it was not perfectly compatible with Tesla's code base. Many companies had solved either the start or the end location being missing, but not cases in which both are missing.

To solve this, I modified the cost grid for the routing logic along with changing the route construction logic. Through cost heuristic changes, technicians are now able to schedule their appointments without a start or end location (or both or neither). One small issue is that, when both a start and end location are missing, the vehicles routed by the app increase. This means that more vehicles are needed to get the technicians to the designated vehicles about 0.01% of the time, so future work will involve fixing this is the route construction logic.

Research Question

Ethereum and Bitcoin are the two-most well-known cryptocurrencies around the globe. Ethereum came into existence *after* Bitcoin, and it attempted to solve some of the problems that it thought Bitcoin had. Bitcoin was made by Satoshi Nakamoto (a pseudonym) and Ethereum by Vitalik Buterin. The two cryptocurrencies are quite different, and I will seek to investigate which of these cryptocurrencies is preferable to invest in, based on various factors such as their use as a currency, security, energy usage, scalability, and open-source development.

I also will research how the scams and collapses of cryptocurrencies may be regulated to aid consumers. To be more specific, the FTX collapse, and other scams are constantly plaguing cryptocurrencies. Using Latour's actor-network theory (ANT), I will try to determine whether the FTC should get involved, or any other government agencies for that matter (Latour, 1980, 28). I find it prudent to also utilize some moral frameworks (utilitarian, virtue ethics . . .) in my research.

These two currencies are mainly used as a currency (how odd!). They are like fiat currency, in a way, which is a currency the government issues and it has value because people trust the government. The difference is these currencies are trusted because *many people* trust them, hence the decentralization aspect of the currencies.

These are the factors I have chosen to investigate for many reasons. Firstly, for a cryptocurrency to be 'good,' it must be secure. The entire point of a cryptocurrency is to

anonymize and decentralize transactions. This is done through the magic of the *blockchain*, which I will delve deeper into in my STS project. At a high-level, though, the blockchain is a record-keeper of transactions. Through clever hashing algorithms, zero-knowledge proofs, and various mathematical theorems that are way over my head (for now!) the blockchain tries to accomplish a secure, anonymous, decentralized ledger for transactions.

Now, all cryptocurrencies use and design their blockchains uniquely. There are advantages to disadvantages to each design, and this is what I will compare and contrast with Ethereum and Bitcoin.

That's quite a lot of math and technical information, but I will use this to propel a deep search into how this is affecting consumers in terms of scams and volatility. These have been problems for cryptocurrency ever since it becomes, and the consumers deserve an answer as to how to defend themselves, and a statement of what should be done to remedy these problems in the future.

Another massive factor to consider with cryptocurrencies nowadays is energy usage. This is a huge deal for multiple reasons – 1) in some cryptocurrencies, energy usage is so high that it is quite literally a concern for the planet. Bitcoin miners (which I will explain in my STS project) use more energy than the *entire country of Argentina* (Gonzales, para 2, 2022). It goes without saying that that is not good for the environment. Nor is it good for many miners, who invest in mining equipment (machines that do work on the blockchain, which I will detail in the STS

project). Why? Because the electrical costs generally outweigh any money they make in the mining process.

Next, we move onto scalability. This is a broad term, so to clarify, I mean scalability in the sense that the cryptocurrency has potential for growth and improvement. Are there design choices that may impede the cryptocurrency's growth? Are there interesting features that may accelerate its growth and potential (Buterin, 2013)? What proof methods do they use for verifying the blockchain's integrity (Hetler, n.d.)? That is what I will investigate here.

Lastly, open-source development is quite important (Adams, 2022). Open-source development means that the code which the cryptocurrency runs on is able to be changed by anyone (with an approval process). Open-source technologies tend to be more robust, secure, and overall better. I will not just ask 'is this cryptocurrency open-source?' but I will also examine the size of the open-source community. The larger the community, the faster the code base can be modified. This is great, because it means new features can be added quicker and bugs can be fixed sooner.

These factors – security, energy usage, scalability, and open-source development – are the benchmarks I will use to compare the two cryptocurrencies Ethereum and Bitcoin in my STS project.

Methods/Frameworks

There are various stakeholders in the realm of cryptocurrency. I will be using actor-network theory to examine them. Actor-network theory is an STS framework which, at its core, asserts that everything is an 'actor' which is a part of a network.

I will draw the conclusion that the network is all people affected by the cryptocurrency. The cryptocurrency itself is an actor (i.e. Bitcoin or Ethereum are both actors). Consumers are also actors, as well as developers (the people who create the codebases Bitcoin and Ethereum run on), the government, businesses, and the environment.

I identify these actors, because while there are more, these are the ones *most affected* by cryptocurrencies. With limited time, labor power, and whitespace on a page, I find it right to only focus on the most crucial actors in the network.

The most crucial actor, which all other actors connect to, is the cryptocurrency itself. Bitcoin and Ethereum are examples of this actor. The way these actors are designed (by another actor, the developers) will have intense effects on all the other actors. That is, the cryptocurrency is the center of the network I am investigating, and therefore it is the actor I will spend the most time on.

As developers are the ones who create the cryptocurrency itself, I will consider their motives and interests. This will largely be discussed when I investigate the open-source communities surrounding the cryptocurrencies.

Consumers are arguably the second-most important actor. My paper is focused on investigating why consumers should invest in one cryptocurrency or another. As such, I find it prudent to ensure that I understand the consumer's perspective. I will speak more about the consumers and the developers in the relevant social groups section.

The government is a crucial actor. Legality of cryptocurrency is always in question. Cryptocurrencies are renowned for laundering money and being used for criminal activities. The government keeps a keen eye on them, but it is hard for them to do so. Why? Because the entire point of a cryptocurrency is to remain anonymous and decentralized. This makes it incredibly challenging to track transactions.

Businesses are also interested in cryptocurrency. Some are considering making their products purchasable and sellable via cryptocurrency. At one point, one could purchase Teslas with Bitcoin. This is no longer the case, but nevertheless more and more companies are beginning to accept cryptocurrency. Notwithstanding, it is a bit risky considering the volatility and 'fog' surrounding cryptocurrencies.

Lastly, the environment is an actor. As covered, energy usage is a massive part of what defines a cryptocurrency. Some cryptocurrencies, like Bitcoin, use *massive* amounts of energy and thus harm the environment. Others have less of an effect.

Relevant Social Groups

The relevant social groups are the stakeholders who are affected by the cryptocurrency. Some of these have been mentioned in the methods/frameworks section of the paper, but I will rehash them and elucidate those that I have not identified.

The main social group affected by cryptocurrencies are the consumers. I will consider consumers based on the 'average' consumer, and I will also briefly touch on high-information users. For average consumers, I will not imagine that the consumer has extensive knowledge of the code behind the cryptocurrencies, the blockchain, etc. Most consumers are those who have heard about the benefits of using cryptocurrency or want to 'get in on the hype' and these will be those I investigate in my project. In the past, some consumers have been deeply aggrieved by painful cryptocurrency bubbles. Some cryptocurrencies have been made by famous people or well-advertised, and then the maker, who minted for themselves a ton of coin, sell all their coin, ruining the investments of the consumers. More, cryptocurrencies are so volatile that they cause deep anxiety to consumers. Yet further, the energy usage of a cryptocurrency is often concerning for environmental lovers.

On the other hand, I also must consider high-information users, like those who got on crypto early. According to Professor Bloomfield at the University of Virginia, the teacher of Cryptocurrency, *whales* are people with lots of cryptocurrency, and they can have *huge* effects on cryptocurrency. These are generally people who got in early and know a lot about it. The Juno (a failed cryptocurrency) catastrophe is a disaster I will go into in my project. Moreover, the FTX

bedlam also will be good to look at, as well as ponzi schemes, rug pulls, recursive sends, phyand so many other scams in cryptocurrency!

Developers are another significant social group. Many cryptocurrencies have large open-source communities, and developers are the backbone of these. How developers get something in return for their services is something I'd like to investigate. Also, I'd like to ensure that they have motives to be meticulous and secure in their code design.

Timeline

I have already performed large amounts of research on these cryptocurrencies. The timeline to complete all necessary research will probably be a few weeks. The actual writing of the project should not take long – perhaps five days to construct, and a week to edit.

I would, however, like to spend some extra time trying to reach out to some of the main interest groups. For example, I think it would be efficacious to contact some real developers or approvers in the open-source communities of either cryptocurrency.

Also, meeting with my technical advisor, Aaron Bloomfield, would be prudent. Not only would he have valuable info on how to structure my project, but he would be useful considering he is the professor of cryptocurrency.

As professor of cryptocurrency, he has and continues to spend large amounts of times investigating these cryptocurrencies. He understands the pros and cons and minute differences between them. Reaching out to him would be quite helpful.

Key Texts

There are four main texts that help me to develop this paper. I will explain what each of them did here.

By far the most useful text in developing this paper was the Ethereum whitepaper. My advisor, Aaron Bloomfield (who conveniently teaches cryptocurrency), recommended this resource.

The Ethereum whitepaper has a massive amount of information, but when parsed carefully, it yields some really valuable insights.

The second is the *Bitcoin vs Ethereum, Similarities and Differences* text which did a fantastic job comparing these two cryptocurrencies. I specifically found the chart showing a market share comparison and other statistics extremely helpful.

The third one I thought was useful was *Bitcoin vs Ethereum – Which is the Better Buy?* This one was useful because it gave a good set of ideas for me to consider, because it was done at a very high level and helped give me a good set of ideas from which I could springboard.

Finally, I liked the simple explanation of proof of work vs proof of state which I found in the appropriately named *Proof of Work vs Proof of State: What's the difference?* article. This was less technical which I liked, because I'm used to hearing about these concepts in a very technical fashion. But, I wanted to ensure that reading this paper was accessible for all readers, and I think that paper helped me to make it so.

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