

Thesis Project Portfolio

Tesla Mobile Routing Modifications

(Technical Report)

Cryptocurrency – Ethereum and Bitcoin

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

My technical project involved mobile routing at Tesla, a company where I interned for a couple of months on the Data Science team. Mobile routing is the term Tesla uses to describe how they service people whose cars break down or have problems. Rather than taking the car into a shop, the user can schedule servicing on their app.

This means that there are a limited number of Tesla technicians, a lot of consumers who need servicing, and a limited number of vehicles with the necessary parts to do so. Essentially, this is a classic (albeit more complicated) version of the vehicle routing problem. My task was to make it so that the mobile routing API (Application Programming Interface) did not require the start and end location in order to give technicians their daily routes while also improving the speed and timing of the servicing.

To do this, I delved deep into various codebases which used heuristics to solve the VRP (vehicle routing problem). Some of these included Vroom and Jsprit, two Github repos commonly known for tackling the VRP in effective manners. They use the best, fastest ways to solve it as best as one can. After looking into the code, I had to make modifications and design some new parts of the algorithm in order to fit Tesla's codebase. My technical project describes the changes I made and how I went about this. It also describes the final results and the effect it had on Tesla as a whole.

On the other hand, I also worked on an STS paper this year, and this STS paper compared the cryptocurrencies Ethereum and Bitcoin through an STS lens. I used ANT (Actor-Network Theory) from

Latour to analyze them. I looked at the ways these cryptocurrencies affect consumers and the challenges and benefits of using cryptocurrency as a whole.

To be clearer, one thing I looked at was the rampant scam landscape that taints the crypto scene. Unfortunately, because crypto is decentralized and anonymous, it lends itself to crime and scams. FTX is a great example of this that was widely publicized. Still, there have been plenty of other scams that people need to be wary of before they enter into the dark world of crypto.

However, there are many cool things and benefits of cryptocurrency. Consider Ethereum – its smart contracts are a really interesting way to create DAOs (Decentralized Anonymous Organizations), VOs (Virtual Organizations), interesting hedges in the financial world, smart derivatives, and so much more. Because they are ensured mathematically, they are much more secure in a sense than financial and regular human contracts. Moreover, crypto as a whole ensures that people don't have to trust a centralized institution. Blockchain technology makes it so that a user can put their trust in the ever unchanging mathematical formulas rather than humans, who make mistakes and are deceitful at times.

My STS paper discusses some changes that may need to be made to the crypto scene in order for its prevalence to increase. The goal is that one day people can use crypto effectively and not be super worried about losing all their money in a scam. Currently, there is a lack of trust in crypto, and for good reason. It's not regulated, and when there is no regulation, there are scams. I discuss in my paper where the government might want to step in and how crypto can have positive effects when used correctly.

Lastly, I discuss how consumers should approach the current world of crypto. Until changes are made, consumers simply have to be informed and understand that crypto is not the safest option, even if it is fascinating and has some marvelous benefits. There are many things consumers can do, such as using hardware wallets and saving their wallet addresses in safe places. This has been a problem in the past - people have lost their Bitcoin addresses before it became popular and important, resulting in the loss of sometimes millions of dollars. There are articles about such people searching garbage dumps for their hard drives! Furthermore, they can conduct research and background checks on certain websites to ensure they are not getting ripped off.

Overall, my STS paper compares the cryptocurrencies Ethereum and Bitcoin and discusses their implications, while my technical project is about my work at Tesla.