Thesis Project Portfolio

Software Engineering: JavaScript and React Utilization for Startups

(Technical Report)

Bitcoin and the Negative Effects on The Environment

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

Technology is always ever evolving to be more intertwined with the progression of humanity, and this continues to hold true for the software technology of today. There are many feats that we as humanity can achieve by possessing the power of software advancements, such as modernizing many areas of life. However, there is also a cost that comes with some areas of software technology. Software technology can have unintended consequences that can drastically affect a large amount of people if certain principles are not kept in mind during the creation of new software. Both the technical report and research paper address these two conflicting sides. The technical report focuses on detail about my internship using JavaScript for web development at a start-up company, whereas the research paper focuses on a different side of software technology with the environmental impact of the energy intensive cryptocurrency technology.

The technical report details the work I did with JavaScript and React during my Fall 2022 semester and how they were used to help innovate business in the art market. The company that I worked with, RevArt, acknowledged the issues that artists had to deal with when promoting themselves for commissions for companies. My work as a software engineer intern was to help improve the user experience on RevArt's website using JavaScript, React, and GitHub. Though the work primarily focused on improving various functions, user interfaces, and input fields to make the website as intuitive as possible, this was all done to encourage more artists and companies to sign up with RevArt. This was accomplished through weekly meetings with employees from a variety of fields to determine the best way to arrange these attributes.

The importance of my project when reorganizing these many elements in JavaScript and React during this internship was to demonstrate how much of an impact the emerging web market can have on the art industry. The traditional art industry has a reputation of being

extremely rigid for up-and-coming artists, truly only preferring already established artists in the market. The introduction of RevArt into the art market was to help democratize the market in general, allowing fewer known artists to create deals with companies. Introducing software technology and web development to more industries will help to create more versatility in how these industries can conduct business in the future.

On the other hand of software technology, cryptocurrency has been a technology that has promised a novel transaction but has been riddled with various issues along the way. One of the more pressing of these issues is regarding the environmental impact of the technology with the use of the blockchain technology that is used to validate transactions as unique, whether two parties are transferring money to one another or if an individual is “mining” to obtain one of these unique instances on the blockchain. The process behind this validation involves a proof-of-work model that requires a tremendous amount of energy to create these instances of tokens. These computations that are conducted are typically utilizing fossil fuels to generate this energy, leading to further carbon emissions in the atmosphere. Even when the blockchain or mining computers are hooked up to renewable energy sources, the price for using the energy skyrockets and negatively affects others living within the immediate area of these facilities.

There have been many cryptocurrencies that have been created and distributed online, with many of them being plagued with the environmental and computational issues mentioned previously. The industry leader, Bitcoin, is infamous for large amounts of carbon emissions that are attributed to both transactions on the blockchain, and the variety of mining farms used by the consumers. In comparison, Ethereum is the only major cryptocurrency company that has implemented a green policy that switched their entire proof-of-work model to a proof-of-stake model. Unfortunately, a good majority of cryptocurrencies have followed the precedent set by

Bitcoin with the proof-of-work model for validating blockchain transactions rather than that recently established by Ethereum. For the future, if there are no efforts to lessen or reverse the current trends with carbon emissions within the cryptocurrency industry, it may be more than enough to push us over the edge to a climate disaster on Earth.

From both the technical report and the research paper, two different sides of software technology are explored in greater detail to display certain strengths and flaws of areas of the technology. This is done primarily to illustrate how us humans need to consider both sides of this technology with future innovations and breakthroughs in software technology, and if this brand new innovation will help or hinder us in the long run.