

Design of a Prioritization Methodology for Equitable Infrastructure Planning
(Technical Report)

Examining the Ethical, Practical, and Societal Implications of Data Monetization
(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

The Internet is ingrained in almost every aspect of living. It influences what we see, hear, and believe. It goes without saying that the Internet, when used inappropriately, interferes with an individual's free will, for economic incentives of tech giants far outweigh an individual's rights to privacy. That being said, the development of internet applications must prioritize ethics.

Tech giants will appeal to the mass with persuasive advertisements to justify actions that undermine their users. Much of the Internet's economy is driven by the exchange of user data between the tech giants, giving the most unethical companies greatest leverage to dominate the market and controlling certain aspects of users' lives. My STS project analyzes this advertisement-driven economy, also known as Surveillance Capitalism, on the Internet and the ethical and socio-political implications on individuals and society. I applied the Social Construct of Technology theory to explore the interactions and relationships associated with the technologies and the actors involved. I found that a lack of regulations in the development of HTTP cookie which enabled tech companies to track users' behavior across the web is the main reason why user data is the most valuable commodity today. Although the creators of the cookie intended to have safeguards for users from the technology, tech giants stripped those safeguards as there was no regulations from government or industry leaders preventing them from doing so since the technology was in its infancy. The lack of accountability from an early stage has a detrimental effect has exacerbated the issue of personal privacy and online self-determination. DuckDuckGo, a privacy-conscious web browser company said that trying to protect your online privacy today is like to using an umbrella in a hurricane.

In regards to my technical capstone, the American Society of Civil Engineers assert that it is the duty of engineers to protect the welfare, lives, health, and safety of the general public,

not just the vocal minority. This statement is relevant to the current process of prioritizing pedestrian infrastructure in the City of Charlottesville. This presents an opportunity to reduce the human factor in what should be a systematic decision-making process.

My capstone project team worked under Professor Reid Bailey to develop a methodology to prioritize pedestrian infrastructure for elementary school students. We analyzed case studies, state-of-the-art systems, and consulted with our stakeholders to derive insights and common themes. We assembled a clear and equitable framework to our client, the Safe Routes to School Program division of the city.

Our method utilizes systems thinking, geospatial information system, and quantitative analysis to provide relevant information and make data-driven decisions. The methodology is a visual analysis of the pedestrian infrastructure network of the city and an impact assessment of future infrastructure projects. It consolidates information in one location, outlines the current pedestrian network, identifies areas that have received funding in the past and subsequently areas that haven't, and simultaneously assess the impact of potential projects on the walking condition of a neighborhood. The methodology is designed with significant stakeholder input with the intention to inform decision-makers with data to make equitable investment decisions.

I, along with Diana Burden and Jeffrey Basoah, conducted an exploratory study prior to the start of the Capstone. The exploratory study concluded that a walkability analysis of a school district is necessary in order to justify future infrastructure investment. A prototype is created to account for walking aspects and assign numerical scores to walking routes to school. The route scores are used as a baseline to compare the impact of an infrastructure project. During the Capstone project, I drew on interviews with Chris Gist and Drew MacQueen, GIS Specialists at the University to build out the geospatial information component of the Capstone as well as

developing the methodology to assess a route's walkability. I spoke with the Parent-Teacher Organization of Clark Elementary School to understand the problem from the perspective of parents and administrators.

In conclusion, my technical capstone and STS thesis revolves around the idea of fairness for all. Equity and ethics must be prioritized in the intent and execution of the developer. I chose to focus on the ethical implications of surveillance capitalism and creating an equitable planning methodology for the good of the users. A distorted view of what is fair only leads to injustice.