

Thesis Project Portfolio

Making Astronomical Data User-Friendly: An Interface for the Sloan Digital Sky Survey (Technical Report)

An Analysis on the Samsung Galaxy Note 7 Failure Through Actor-Network Theory (STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

My technical and STS research projects, although they vary in topic, are connected by their focus on how technologies are shaped by broader sociotechnical networks. For my capstone, I propose developing a user-friendly platform that will improve access to Sloan Digital Sky Survey (SDSS) data by eliminating the need for users to write complex SQL queries. At the same time, my STS research paper analyzes the failure of the Samsung Galaxy Note 7 through the lens of Actor-Network Theory (ANT), revealing how technological failures are often brought about by the misaligned relationships among human and non-human actors. Together, these projects have deepened my understanding of how the success of a technical system depends on the coordination of many different actors.

My technical report outlines the design of a web-based interface that will enable non-technical users to query astronomical data through an easy-to-use graphical interface. The application will utilize a React frontend and Django backend with a PostgreSQL database. Some of the features include a real-time query preview, query history, and caching mechanisms to enhance efficiency. The system will be developed using Agile/Scrum methodologies to allow for iterative refinement based on user feedback. The overall goal is to broaden access to astronomical research by creating an accessible and efficient tool that minimizes the technical barriers to data exploration.

My STS research argues that the Samsung Galaxy Note 7's failure stemmed from a breakdown in its supporting actor-network. By applying ANT, I examine how misalignment between Samsung executives, engineers, battery manufacturers, regulatory agencies, media, and consumers led to cascading failures. The analysis reveals how rushed production timelines, ineffective recall strategies, and shifting public perception destabilized the network and

ultimately resulted in the product's withdrawal. ANT provides a framework for understanding that technologies do not fail in isolation; they fail when the networks that sustain them are disrupted.

Working on both papers simultaneously has shown me the importance of integrating technical functionality with sociotechnical awareness. While my capstone aims to improve usability and performance, my STS research highlights how trust, communication, and coordination among stakeholders are equally important to a technology's stability and survival. Moving forward, I intend to apply these insights in my professional practice by considering the broader social context in which technologies operate. ANT has shown me a valuable perspective for recognizing and addressing potential points of instability within technical systems.