Thesis Project Portfolio

Data Engineering: A Full Stack Approach to Monitoring Data Freshness
(Technical Report)

Utilizing Actor Network Theory as a Lens to Analyze the New Orleans Levee System Failure During Hurricane Katrina
(STS Research Paper)

An Undergraduate Thesis

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Aditya Penmesta

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Department of Computer Science

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Sociotechnical Synthesis

My technical work and STS research are primarily connected on the basis of the conceptual framework of Actor-Network Theory, otherwise known as ANT. ANT is the concept that engineering problems are something that is not reducible to either an actor or network individually; rather a network is made up of heterogeneous elements, both animate and inanimate, that are linked to each other for a period of time. In my technical paper, I highlight all the components and people that played a part in my summer internship technical project, whereas in my research I look into compounding effects of different actors that led to the New Orleans levee system failure during Hurricane Katrina. Although focused on different engineering practices and problems, these two research concepts are binded by the fact that they involve a variety of actors which, together, result in the success or failure of entire systems.

In my technical paper I highlight an internal data monitoring dashboard that I developed for Flowcode, a QR startup focused on connecting offline customers to online brands, as part of my internship. Built from the ground up, this dashboard specifically traced all customer facing analytics to their origin in the company data warehouse, reporting on the freshness and quality of data. By deploying this, internal stakeholders at the company could quickly diagnose data outages and inconsistencies, increasing the efficiency of this previously manual process by significant levels of magnitude. To bring together a robust solution that met all the necessary requirements, I used a variety of computer science technologies, which I delve into throughout the paper and explain all their interconnection to each other. In my research paper, I unpack the numerous actors which played a role in the fatal outcome of Hurricane Katrina, specifically the actors that were involved in the construction and hubris behind the New Orleans levee system. In

the fallout of this incident, many were quick to blame the U.S Army Corps of Engineers, which were the group in charge of engineering the project. However, my primary argument is that they were one of many that shared the responsibility of what happened, and I use ANT as a framework to prove the other actor's role in the systematic failure of the levees which led to one of the largest climate related disasters in history.

Writing these two projects simultaneously opened my eyes to how interconnected the basis of most professional engineering practices are, despite the different knowledge base required for each one. After you peel back the layers of most systems, you realize that there are a variety of actors that let them run correctly or incorrectly, and the success of an individual system heavily depends on how well these components operate together. Although I understood this for my field, computer science, working on the research paper made me realize that the importance of interconnectivity is a common truth for all practices, further cementing itself as an integral part of my professional perspective moving forward.