Thesis Project Portfolio

AWS Cloud: How Web Applications Can Improve Product Usability
(Technical Report)

Actors Which Inform Uses of Machine Learning Models for Sustainability at Amazon Compared to Academia

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

My capstone research project as a computer science student was a reflection on my internship experience at AWS this past summer. I worked on AWS Genomics CLI to make the product, which does batch processing for DNA sequencing workloads, easier to work with a smaller learning curve. In order to address this problem I developed a full stack web application which transformed the AWS Genomics CLI into a web app using Next.js and Flask alongside Docker and a number of AWS services. It is important to consider the human and social dimensions of this web app because DNA sequencing workloads can be major privacy concerns, incorrect results can be bad for scientific results, and there could be racial and/or sex based concerns on the differences found by the results. For my capstone paper, I believe that the most important STS theories would be reflective practice, tacit knowledge (particularly documenting my tacit knowledge), and black boxes. I chose these three because the first two encapsulate the meaning for me writing the paper, reflection and self improvement. The black boxes is a good theory for my paper because the Genomics CLI could for the most part remain a black box while I developed the website. On the other hand, my STS research paper is on the differences between the actor networks involved in the creation of machine learning models for environmental sustainability between academia and Amazon. It will use Actor Network theory as a framework for understanding the planning of the research and the evidence will be collected through document analysis. I believe the research will show that businesses are much more impacted by customers and business goals rather than pure environmental sustainability. On the other hand I believe academia will be much more driven by true sustainability, personal researcher goals, and the location of funding. In concert, my STS research paper and capstone project are a good way for me to understand the company I will be working for after college and how I can improve my own work whilst also impacting social issues at the company.