

# **Thesis Project Portfolio**

## **The MR Scraper: Turning Data to Knowledge**

(Technical Report)

## **Analyzing ChatGPT Through the Social Construction of Technology**

(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

**Kevin Cooper**

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Department of Computer Science

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## **Sociotechnical Synthesis**

My technical paper and STS research paper are most related to my University of Virginia (UVA) major and minor degrees. I am majoring in computer science and minoring in data science. My capstone paper is based on my internship work and the research paper focuses on the artificial intelligence (AI) model, ChatGPT. The summer before my fourth year at UVA, I interned at General Atomics Commonwealth Computer Research, Inc (GA-CCRi) as a backend software engineer intern, and I worked on a project called the MR Scraper. The scraper was a tool used to retrieve data from our GitLab Application Programming Interface (API) and format it in such a way that it is concise and understandable. My internship was directly correlated to my computer science degree whereas my STS research paper had a more data science premise. The topic of my research paper came to fruition because of the recent publicity spike of AI models like ChatGPT. I was interested in the many new AIs releasing, but ChatGPT especially caught my eye when I was instructed not to use it in one of the syllabus lessons for my computer science class during my last semester.

My capstone is about the MR Scraper and how I helped to cement it into the GA-CCRi infrastructure. Before my time there they started working on the scraper, but had stopped developing it so they could work on other projects. The implementation that they were working with had issues and known flaws. I followed the software development life cycle to implement my solutions to these flaws. The MR Scraper successfully extracted crucial information from the API, including author details, timestamps, comments or titles, and approvers for all GA-CCRi's projects and merge requests. This data was then processed and formatted to align with the requirements of Grafana, a graphing model used for data visualization. The integration of the MR Scraper allows the company to view the evolution of code changes through visually

appealing graphs and tables, significantly enhancing productivity and aiding effective resource allocation.

The STS research paper is about the large language model called ChatGPT. It works by predicting the next word or phrase when given a prompt. After the user sends a statement to ChatGPT, like they would talking to a chatbot, the program will use its trained model to predict the next word or phrase in its response. It will continue to make these predictions until a full answer is given. ChatGPT's response capabilities makes it a powerful tool for various applications, including research assistance and programming support. Instead of helpful tools, it can also be used to completely write essays and complete programming assignments. These reasons worry professors about students violating the honor code and using it to complete assignments. My paper helps to understand ChatGPT through the Social Construction of Technology framework and looks at the relevant social groups and how they have collaborated and will continue to do so until the technology has stabilized.

My capstone provided a healthy reflection on my work at GA-CCRI. I did not fully comprehend the value behind visualizing the productivity of a team. I knew I was helping out the company with my work, but I now know how viewing the graphs and tables could optimize the company's productivity as a whole. I am also glad I could have a deeper dive into a topic related to my data science minor with the research paper. After writing it, I am even more interested in the upcoming machine learning models and I'm both excited and scared for what the future brings with AI.