Thesis Project Portfolio

Enhancing Intelligence Operations: A Database-Centric Approach for Data Consistency and Management

(Technical Report)

Technological Frontiers and Talent Wars: Navigating Intelligence Recruitment in the Digital Age

(STS Research Paper)

An Undergraduate Thesis

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

University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Sociotechnical Synthesis

Introduction:

The relationship between traditional espionage methodologies and technological advancements in intelligence recruitment and operations forms the foundation of my undergraduate thesis portfolio. My technical project focuses on the work that I completed at my internship where I worked on enhancing a web application used by intelligence agencies to covertly communicate with targets. The use of such tools requires special training for the users. The users must have some understanding of how the tool works to understand the possibilities and limitations. Similarly, my STS project focuses on how intelligence agencies have changed their recruitment practices due to the creation and adoption of technological tools specifically with AI and social media. The projects go hand in hand as one works on the development of such tools while the other explains the STS consequences in the creation and adoption of them in the context of recruitment.

Technical Project:

My technical project involved the migration of data to a database and creation of a pipeline to maintain data consistency among multiple independent servers. The data for the web application was stored in a JSON file which was poorly organized resulting in duplicate data and difficulties in processing the data. I designed a database and wrote a script to migrate the data to the database. The database schema was made to allow for the creation, read, update, and deletion of data, and it adhered to 3rd normal form which is the standard in database storage. The second portion of the project involved the creation of a Continuous Integration/Continuous Deployment (CI/CD) pipeline to fix data inconsistency across multiple servers. The web application was deployed to several servers. It was paramount that there be no connection between the cores, but

another goal was that the data among the cores should be consistent with each other. The solution was a CI/CD pipeline that used a secure shell protocol to fix inconsistencies which were triggered by any updates to the development server's data. This allowed for data across multiple servers to be consistent enabling seamless propagation of changes and enhancing data management efficiency. The project demonstrated successful resolution of data inefficiencies and laid the groundwork for future refinements in data management practices.

STS Project:

In my STS research paper, I explored the intricate dynamics of intelligence recruitment and operations in the digital age, with a focus on the evolving methodologies, challenges, and implications inherent within this clandestine realm. The central claim of the paper is that the active adoption and creation of technology enables agencies to recruit skilled individuals more efficiently. Through actor-network theory, the paper establishes the connections between technologies such as AI and social media to intelligence agencies and how these organizations shift their recruitment practices. I examine how the choices made by agencies in their reactions to the creation of technology affects how individuals are scouted and hired within them. The work calls for a balanced approach that prioritizes innovation while remaining ethically responsible, ensuring that technological advancements serve to improve recruitment practices while safeguarding against unintended negative impacts.

Concluding Reflection:

Participating in both projects concurrently afforded invaluable insights into the intricate interplay between technology and human agency across varied contexts. While my technical endeavor delved into the intricacies of technological tools utilized by intelligence agencies, my STS research shed light on the socio-political ramifications of technological innovation within

the realm of intelligence operations. Immersing myself in the technical nuances of database design and CI/CD pipelines deepened my understanding of technology's role in optimizing organizational efficiency and efficacy. Conversely, exploring the sociotechnical implications of intelligence recruitment prompted thoughtful examination of the ethical and strategic dimensions associated with technological integration in covert operations. By synthesizing insights from both endeavors, I acquired a comprehensive understanding of the dynamic interplay between technology, society, and clandestine practices, emphasizing the significance of interdisciplinary exploration in navigating multifaceted socio-technical challenges.