

Thesis Project Portfolio

Automatic Proposal Formatting Tool

(Technical Report)

Automatic Proposal Formatting Tool: Analysis of Automation on the Low-Skill Workers
(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

Every day new automating technologies are being developed and introduced into society forcing low-skill laborers into unemployment. These automating technologies improve the efficiency of businesses' systems, allowing them to cut costs and increase productivity. This portfolio documents two research projects centered around automating technologies. The science, technology, and society (STS) research paper analyzes how the adoption of these automating technologies affects the power imbalance of low-skill workers and their employers. While the Capstone project is a case study on one of these automating technologies, an automatic proposal formatting tool for a defense company that allows compliance workers to easily format proposals. These projects focus on how automating technologies affect the people who adopt them, whether that be by displacing workers or increasing productivity. The STS research paper answers the research question: “How does automation affect the relations between low-skill workers and the companies they work for?” The paper explores the effects of automating technology on workers and how it changes their power in the workplace. The Capstone automatic proposal formatting tool is an example of one of these automating technologies. The final deliverable for the technical Capstone project is a completed working prototype, that was then turned the project over to a legacy team working for the client.

Despite the benefits offered by automating technologies they adversely affect the landscape of work by devaluing labor. The devaluing of labor as a consequence of automating technologies has been coined “technological unemployment” by economics scholars Daron Acemoglu and Pascual Restrepo (Acemoglu & Restrepo, 2020). This “technological unemployment” is seen primarily in low-skill jobs that correspond with low complexity tasks (Acemoglu & Restrepo, 2017). The STS research paper aims to analyze the impact of

automating technologies on the relationship between low-skill workers and the companies they work for. Specifically, the paper focuses on the power inequality between the low-skill workers and their corporations. The research presented in this paper is analyzed using both political technology and technological determinism frameworks. These frameworks illuminate how automating technologies affect the power and authority in the relationship between low-skill workers and their employers. This research concludes that as automating technologies are adopted and devalue labor, the power of low-skill workers decreases because employers can replace labor costs with automation. Furthermore, this research informs engineers of the second-degree consequences, in the form of inequality of power, that technology can bring. Finally, the results of this research help inform policymakers of the need to create programs to support low-skill workers harmed by “technological unemployment.”

For the Capstone project, the research team created an automatic proposal formatting tool for a defense company that allowed compliance workers to easily format proposals. Agile methodologies were used to organize the project and split it into parts so individual teams could work on it simultaneously. The tools that were used in the project include: Github for version control, Python for the coding language, Jira for project management, and Zoom for communication. Using knowledge gained from classes taken at the University of Virginia, the team gained many soft skills. The team completed a working prototype, then turned the project over to a legacy team working for the client. The final application showed great promise in reducing the time compliance workers spent changing proposal formatting, which in turn will save money for the client. Since the team only were able to finish a prototype which includes a graphical user interface and title page formatting, future work will be needed to add the formatting for the body of the compliance documents.

The two projects in this portfolio have similar motivations, which gives insight through the common theme of automating technologies changing its users' lives. The Capstone project and STS research paper were not conducted simultaneously. After the completion of the Capstone project and report, the STS topic was then picked. Despite completing each project at different times, it was interesting to see the possible effects of the Capstone project through a different lens after performing the STS research. The Capstone project also gave a real-world example of an automating technology that, in essence, could take away someone's job which is the problem that the STS research paper grapples with. This portfolio shows that one new technology, in this case automating technologies, can have far reaching effects that surpass the immediate problem that the technology is trying to fix.

Works Cited

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