

**Sociotechnical Synthesis**

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## **Introduction**

The intent behind conducting this technical project and STS research paper was to practice developing a fully integrated embedded system while taking the time to understand the implications of creating such a device. The technical project aimed to implement an autonomous pancake printing device which could dynamically respond to picture requests from a user's mobile phone. Since the technical project automated an artistic process traditionally performed by humans, the STS research paper examined the effects that shifting toward automation has on individual workers as well as the labor market.

## **Technical Project and STS Research**

For my technical project, I worked in a team of five students to conceptualize and implement our automated novel culinary device – the Pancake Printer. The goal behind the Pancake Printer was to practice creating a fully functional integrated hardware and software system. The printer was connected to an application that users could access on their mobile devices to upload images. The images were processed into line art using computer vision and the art was then converted into a set of motor instructions. The motor instructions were sent to a microprocessor which served as a control center for controlling the pump and movement of the dispenser to draw the uploaded image on a griddle in batter. This device reflected the material learned in various courses throughout our Computer Engineering degree program, including Application Development, Machine Learning, Algorithms, Embedded Computing, and Electrical Engineering Fundamentals, but also gave my team more experience with full-system integration, managing a budget, and allocating work within a team.

In my STS Research, I further explored the implications of automated devices such as the Pancake Printer by researching the effects of automation on labor. I began by defining automation and exploring both historic and current public attitudes toward the use of automation in the workplace. I found that automation can be leveraged to improve working conditions for employees when used properly but can also be used to take advantage of workers. Though there exists a prevailing fear that automation will replace jobs, my research revealed that automation is unlikely to cause mass unemployment in the near future. Instead, it tends to create growth in some areas while replacing jobs in other sectors. Thus, to avoid job insecurity, workers should focus on upskilling programs that improve their higher cognitive skills, social and emotional skills, and technological skills, since these are areas that automation has not yet mastered. Policymakers can support the shifting job markets by offering upskilling programs and regulating companies to ensure that employees continue to enjoy safe work environments.

## **Conclusion**

My technical project experience drove home the importance of communication within a team and demonstrated the excitement of developing innovative technologies to accomplish novel tasks. In conjunction, my STS research accentuated how crucial it is to consider the effects of these technologies that extend much beyond the lab. Specifically, since the Pancake Printer is a device that could in theory be used to automate certain jobs in food service, I found it extremely useful to explore the ethical implications of my work. As an engineer, the importance of considering the potential consequences of newly developed technologies were reiterated, and I will continue this practice during my years as a professional engineer.

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