

Effects of Automation on Society and Solutions for the Problems

STS 4500 Prospectus

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Overview:

Many people have started to realize that automation will influence their lives after seeing all the news about ChatGPT after its release in November 2022, but not many fully understand the potential that automation has to transform our whole society. I plan on doing a literature review of the effects of automation on society, and the potential solutions to the problems it will cause in order to bring about a greater understanding.

Positionality:

As a third-year computer science student, seeing the abilities of generative AI like ChatGPT to write functional code and generate well written responses has made me wonder about the stability of my future career options, and more broadly, the effect of automation on society as a whole. Since childhood, I have always loved building and creating, and this led me to engineering as a field of study, where I picked computer science because of its interesting problem-solving challenges. Though I do not have experience in the creation of automation systems, I have been using ChatGPT to help do school assignments, especially coding these past few months, and hope that this use will help further my research.

Problematization:

What happens when autonomous vehicle technology is perfected, and it becomes cheaper to buy a fleet of self-driving trucks than to pay the salaries of truckers? What happens to these truckers, uber drivers, taxi drivers, and delivery drivers as their career is taken away from them? This is just one example of the many industries that automation will disrupt in the coming years. Frey and Osborne argue that “47% of total US employment is in the high risk category”, meaning that the job “could be automated relatively soon, perhaps over the next decade or two” [2]. This massive loss of jobs will have a massive effect on society, so how do we assure a stable transition for those who lose their jobs? What is the role of the government in regulating automation, so that they can keep the people happy and have their needs met, but also to keep the economy strong?

Guiding Question or Main Argument:

What will be the effect of automation on society, and what are the solutions to prepare for and mitigate its worst effects?

Projected Outcomes:

I hope that analyzing automation and its effects will lead to a greater understanding of what the future will look like, and how we can make progress now to prepare for that future. I do not believe that most people understand the transformation that the world will undergo through automation. For example, many people attach a lot of self-worth to their career, so if they can start attaching self-worth to other aspects of their life now, it will help them be happier if they were to lose their job to automation.

Technical Project Description:

For my technical project, I plan on writing about the internship experience that I will have this summer. This summer, I will be working at Wells Fargo in Charlotte, North Carolina as a Software Development Intern. I will be working on the Auto-Lending team, which is a technical team that oversees the data for loans for car purchases and helps to inform business decisions. I plan to discuss how my work helped offer documented value to Wells Fargo. I am hoping to learn more about Wells Fargo's plans to use automation, and that it will help me understand more about a corporation's perspective on automation.

Preliminary Literature Review & Findings:

Many studies have been done trying to estimate the impact of automation on the workforce such as the number of jobs that will be lost and the types of jobs most likely to be impacted. One such study explains that there are two main schools of thought about the effect of automation, Replacement and Augmentation [1]. The replacement idea is that automation will be able to replace jobs entirely, whereas the augmentation believes that automation will increase productivity in people's jobs by automating routine and unnecessary tasks. One study estimated "between 400 and 800 million individuals could be displaced by automation and need to find new jobs by 2030 around the world" [3], which supports the replacement school of thought. An article about autonomous driving postulated that fully self-driving cars that can drive in any situation will take until 2030 to reach the market, but features such as interstate driving will come out sooner [4]. This article supports the augmentation view, in that soon routine tasks like interstate driving will be automated, but more complicated driving edge cases will take much longer.

Some of the suggested solutions to automations effect on society include Universal Basic Income, retraining, providing jobs, and enhancing earned income tax credit [5]. Universal Basic Income is where the government would pay all citizens a basic income so that they can provide for their basic needs. Some of the problems that arise from UBI are that work satisfies peoples "higher order needs of social identity and self-esteem" [5], and that the money has to come from somewhere.

Some have suggested a tax on automation to pay for UBI or one of these other solutions, but the problem is that the "tax system is designed to tax labor more heavily than capital" [5], but automation replaces labor, so much of this tax will be lost. If a tax was implemented on the capital behind automation, this capital would likely move to another country without these taxes. I think that STS work could lead to greater understanding of the different stakeholder perspectives, and how different stakeholders will be affected by automation.

STS Project Proposal:

To me, STS is an analysis of the relationship between technology and society, and how we as engineers need to consider the implications of the technology we create and the effects, intended and unintended, it will have on society. Sometimes this effect is small, but for automation technologies this effect will be life changing for most people and will transform

society. Since automation technologies are directly working towards doing tasks previously done by humans, this impact will be immediately felt by those humans.

I will approach this issue from a values and policy viewpoint. I think that a policy viewpoint is a good viewpoint to explore solutions from, as most of the solutions will be policy solutions. The government will play a huge role in protecting people from being left behind in society after losing their job to automation, so viewing these effects from a policy viewpoint will let me see from a different side than my own perspective. I think it will also be important to view the situation from a values perspective, as this will provide an insight into how the corporations see the situation and how people will view the situation.

Friedmans Value Sensitive Design [6] looks at the values of different stakeholders, such as users, developers, people who lose jobs to automation, people who increase their productivity due to automation, corporations who increase profits due to automation, and society, and seeks to design technologies that align with these values and promote responsible practices. I think VSD would help me because of the many different stakeholders and their vastly different values. I can look at how different the different groups could benefit from automation, and how they could be harmed. This will help me explore solutions more specific to different stakeholder groups. I plan on using Friedmans Value Sensitive Design, specifically the Stakeholder Analysis method, as analyzing the effects of automation on different stakeholder groups will help me understand its effect on society.

Since so much of this research concept deals with what will happen in the future, I think the method that makes the most sense is literature review. I will be able look at the predicted effects of automation, which has been well researched and see which groups it will affect the most, such as educated vs non-educated. There have also been solutions that have been proposed, so I can research and analyze these solutions.

Barriers & Boons

My main limitation is a lack of expertise in the topic areas. Although I am a computer science major, I have not had any training with Machine Learning or Artificial Intelligence that would help me analyze literature or research their possibilities, nor do I have any policy expertise. I will try to overcome these by doing more research to make sure that I fully understand the topics. Also, the topic of “effect of automation on society” is too large, and I will have to drill down to a more specific area of automation, such as autonomous vehicles, autonomous manufacturing, etc.

References

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