

Innovations into the Adoption of Digital Automation

(Technical Paper)

Investigating the Adoption of Digital Automation

(STS Paper)

A Thesis Prospectus Submitted to the

Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements of the Degree
Bachelor of Science, School of Engineering

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Fall, 2022

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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Introduction

This past summer, I had the opportunity to work as a Technology Analyst Intern at Wells Fargo in Charlotte, North Carolina, as part of their University Programs Summer program. While I was there, I earned valuable work experience working in office for the Commercial Mortgage Servicing department at Wells Fargo. For the ten weeks I was employed, I was assigned the task of writing a program that would automatically scrape large folders containing loan documents for important information, and transform that information to a spreadsheet. The task itself wasn't overly difficult, and I was able to complete the program and train the people who would use it on how to work it before my internship ended. However, during my time there I was struck by how much pushback there was to adopt new automated solutions. It took a while for my project to be approved, even though it ended up being estimated to save as much as 400 hours of productivity a year.

In this paper I will introduce how digital automation using software has been used to revolutionize productivity in recent years. I will also investigate the societal repercussions of adopting advancements in digital automation, including the effect they have on labor markets and the responsibilities of those in positions of power to adapt to digital automation adoption.

Technical Discussion

The program I developed for Wells Fargo searched documents that were several hundred pages long for specific statements that dictated the order in which to pay a loan. The location of these payment priority statements was largely arbitrary, which made it difficult to locate them by normal means, usually taking 5–10 minutes to find, separate, and enter these statements into a spreadsheet. My program did the same task in a single second. Computers have been arguably

one of, if not the most important developments of the past century. Being able to make computations faster than a human ever could has drastically changed the rate at which humans have advanced technologically.

The automation we have now is equal parts complex and beneficial. We have seen more advancements in digital automation (which automates brain power) over classic automation (which automates muscle power) now more than any other time in history (Chen et al., 2021). Machine learning is one of the biggest developments in modern automation. Advancements in machine learning, which I considered using in my program for Wells Fargo, allow for more than just menial tasks to be completed through automation. Applications can now think like humans. They can make art like humans, recognize faces like humans, and they can predict human behavior like humans. In most cases, they can do these actions both faster and more accurately than humans can as well. These designs for programs, if handled properly, can provide benefits to humanity far into the future.

One of the most visible ways digital automation has helped us is through robotics. Robotics combines aspects of both classic and digital automation by automating tasks that use manual labor while using software to dictate the robots' actions. Automation through robots is one of the most well known forms of automation due to a robot's physical presence, but there has been an increasing shift toward robotics as a purely digital form of automation. This is the idea behind Robotic Process Automation, or RPA. RPA is the idea of allowing robots to control other computer systems, similar to how a human would control it (Asquith et al., 2019). An example of this would be a robot that searches a network or file system to make conclusions about the data it finds. This is what the program I made for my internship did. The script pulled data from existing Wells Fargo file systems, and extracted data from the files in the same way a human

would. RPA can be expanded to other fields of study and to more elaborate solutions. The concept behind making a computer use a computer can seem redundant, but it has far reaching applications and benefits. Robotic Process Automation is quickly becoming an essential tool to accelerate production in increasingly competitive markets (Madakam et al., 2019). Already RPA is being adapted to a growing list of automated processes, such as caregiving, driving, and surgery. Regardless of which field RPA is being applied to, the driving force behind its innovation is the Machine Learning and Artificial Intelligence used to make decisions.

The script I produced for my internship used no Machine Learning. That is to say, it did not use trained data - if it attempted to extract important sentences from a different type of document than it was designed for, it would almost certainly fail. In contrast to my program, many machines today are fed training data in order to know how to respond to certain situations, and thus, learn as they work. This is the concept of Artificial Intelligence, or AI. The ability for a computer to think like a human would have enormous implications for how labor is used. Modern AI has far more uses than menial tasks like knowing when to press a button, but rather can be useful in more complex situations, like identifying human emotions or predicting criminal behavior. AI has even been tested to perform pediatric surgery independent of human involvement (Wall et al., 2019). If we can trust machines to do our surgery, the applications of their use are endless. Different approaches to Artificial Intelligence have also served to broaden the impact of AI on different fields of study. Neural networks can be used as mechanized brains to think and predict like a human mind. Newer AI tools like fuzzy logic and genetic algorithms can be applied to more niche situations to provide better solutions for novel problems (Sanders et al., 2013). As AI continues to develop, the use of computers as thinking machines will only be limited by human imagination on how to implement them.

STS Discussion

When I was finally approved to start my automation project, I questioned my manager about the delay of my project. He responded that some people had concerns that the program I would make would take away people's jobs. These concerns raised a big question for me. If I was really taking people's jobs away by automating this process, is that necessarily a bad thing? The program I made removed the task of searching through entire documents for a few specific sentences, unskilled labor that is done slowly by humans but instantly by a computer.

Automation has been making unskilled labor obsolete for centuries, and is usually the drive of innovation. As more unskilled positions become obsolete due to automation, it opens up more positions for more skilled labor, which in turn drives up wages (Smith, 2018). The higher wages create a higher standard of living for laborers and their new skills. This has been happening for years, so why is there such a stigma around automation taking jobs? The answer may not be as cut and dry as it seems. The unskilled workforce has been expanding, not shrinking (Autor, 2016). Unskilled labor isn't going away anytime soon, meaning the people automation affects isn't just large, it's growing. Saying that automation creates more skilled positions is easy, but can it keep up with the pace at which it displaces less skilled positions? If automation eliminates more jobs than it creates, large numbers of job vacancies created by increased automation using software can be disastrous, compounded further by a growing unskilled labor market (Chen et al., 2021).

A growing trend in labor markets in modernized societies is a shift toward independent work. More and more workers are choosing to do labor on-demand, as personal entrepreneurs. This development has evolved independently of the rise of digital automation, but is nonetheless

affected by it. Increasingly, the labor done by these individual workers is being made obsolete by digital automation, and little has been done to provide safety nets for those affected by this transition (Gruber-Risak et al., 2022). Individual workers are particularly susceptible to instability created from automation phasing out their line of work, due to how recent and unprecedented the trend of independent work is. Governments have been unable to account for the growing number of on-demand laborers in the ever-changing labor market. Sick leave and pensions are examples of protections that these workers do not have access to across the entire world, even in almost all developed nations. As individual work increases, instability created by their displacement will increase as well unless governments create policies to account for those impacted by adopting digital automation. Governments shouldn't feel the need to counteract the move toward individual work either, as it provides increased flexibility for labor to be completed and frees up intellectual capital to be used elsewhere if it is outpaced (Sundararajan, 2017). It is the role of lawmakers to reshape institutions to allow individual workers to thrive, even if the labor they currently provide is replaced with machines. Options like universal basic income can become integral in allowing labor to evolve and digital automation to continue to innovate without having to disrupt job markets.

The reality is that governments should not feel the need to shy away from adopting digital solutions. If handled properly, automation does not remove jobs, it transforms them. A key feature in making automation work is ensuring that capital and resources are evenly spread throughout the population (Lawrence et al., 2017). The main reason those who lose jobs to automation find themselves in economic trouble so often is that the labor that they provide is usually less skilled, which usually results in lower wages. Reducing economic inequality facilitates those who lose their ability to provide labor to invest in learning more skills that they

can then use to find work. As it currently stands, the overwhelming flow of capital is directed toward those who own the automation, and who are generally unsympathetic to those who they displace. Without economic inequality, those who are replaced by automated labor fail to find new work and do not have the capital to find new skills. This creates both a larger wage gap and a larger skill gap. These two issues compound each other, and only lead to further economic and political strife (Spencer et al., 2021). Ultimately, if businesses cannot be sympathetic to their workforce (or simply cannot provide aid to them, in the case of independent workers) then it falls on the role of governments to create and regulate social programs that make it so economic inequality is minimized.

Conclusion

My internship at Wells Fargo taught me a lot more than how to build a program that scraped documents for important data – it taught me to view automation from a wider lens. Utilizing automation has been and will be one of humanity's greatest assets in creating a better future. This gift comes with a cost though. If handled improperly, automation can be costly to our livelihoods. Whether through its abuse, or our inability to keep up with the effects automation has on society, it will always be important to regulate automation in ways that will keep it from destroying as much as it builds.

Word Count: 1748

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