CS495 Senior Seminar

The Impact of Computer Automation on the World

Dr. Robert Lowe

Authors: Jonathan Harsy, Sean Poston, Qizheng Ma, Daniel Harig

2-11-2021

ABSTRACT

Automation can be defined as a technology concerned with performing a process by means of programmed commands combined with automatic feedback control to ensure proper execution of the instructions. The resulting system is capable of operating without human intervention. This report attempts to showcase the impact computer automation plays on the world. Some factors/variables that can be affected by automation include product quality, cost, and particular job needs. Altogether we wondered how this topic affects society. Through cross-examination and research we determined if automation offers more pros than cons, and we offer our conclusion on its effects on issues like employment, wages, personal wellness, and other business aspects.

INTRODUCTION

Computer technology is an evolving field of work. With the first television premiering roughly 40 years ago, to the brand-new iPhone that dropped this year. Many factors and branches make up computer technology, all affecting society in their own way. One of these branches that is of great important is computer automation.

Automation is the use of technology to accomplish a task with as little human interaction as possible. In computing, automation is usually accomplished by a program, a script, or batch processing. Automation has become a subject of much importance over the last few decades. On one hand, it's a wonderful testament to man's ingenuity. People no longer have to perform risky, life-threatening jobs nor trivial, mind-numbing tasks. This has both saved lives and cut costs of labor for many businesses. However, automation has also uprooted thousands from their jobs and could continue to do so in the future without proper action.

While the benefits are many, the negatives cannot be ignored. This report is an attempt to show the impact of computer technology, specifically automation, on society. Our topics can be broken down into three categories: pro-automation, anti-automation, and a conclusion where the pros and cons will be examined for a final insight.

PRO-AUTOMATION

The further along technology progresses, the more users there will be. Along with the progression there will come many benefits. Computer technology simultaneously creates and destroys jobs. With the development of new computer science ideas and technologies, many young people will find it convenient because they can accept and learn the new concepts and technologies quickly. However, for the middle-aged and elderly people, coming to accept these new ideas and technologies will take more time. As an industry itself, computer technology

creates jobs in new areas such as programming, computer-aided design and animation, Internet marketing, and online publishing.

From a business standpoint, computer technology creates jobs in new areas such as programming. “According to Evans Data Corporation, there are 26.4 million software developers worldwide in 2019, which is expected to grow to 27.7 million in 2023 and 28.7 million in 2024 “ (Team). More jobs means more/greater income, creating more consumers. This overall puts more money back into the economy creating a healthier economic flow.

Another positive outlook for computer automation is its ability to perform a broad scope of work, in most cases much more efficiently that a human could. Things like AI or robots possess the ability to mass produce nearly identical goods in a fraction of the time of a human while making a better quality product with a smaller margin for error will make a company more money. Automation of robots help us perform task that could be otherwise hazardous or harmful. Ponder this scenario: Mars is a giant and cold desert with very little gravity or atmospheric pressure. The pressure is nearly a vacuum compared to what we are accustomed to here on Earth. “The surface pressure is well below the Armstrong limit for the unprotected human body. The Armstrong limit is the minimum altitude beyond which the boiling point of water becomes so low that it is almost equal to the normal temperature of the human body” (Daftardar). This means that a person’s bodily fluids would evaporate and become dried out. Without protective gear a person wouldn’t last longer than 2 minutes (Daftardar).While protective gear and labor cost of a person pose greater factors and room for error than automated robots. Without the Mars rover, we would be limited to study Mars. This example just helps to show the possibilities that are opened to help us gain an understanding of all modern sciences. By the given explanation, automation through robotics opens up more investigative insights for scientific discovery for certain environments and factors, given that a robot can potentially out-live a person.

Automation can also help us in the healthcare field, performing the most basic to the most extreme of task. One hospital in San Francisco is using robots to deliver food and medicine to patients. Thus making the job of caring for patients a little bit easier. Surgery is a necessary part of medicine, and automation's role in this industry is likely to see an increase. The demand for microsurgery robots is growing exponentially. "Globally, the industry was worth $0.7 billion in 2017. By 2024, it is expected to be worth $1.7 billion, a growth of 139%. Robotic microsurgery and related automation software improves outcomes, reduces hospital stays, and minimizes scarring."(Technology.org)

Automation does not necessarily mean massive robotic arms and assembly lines that stretch beyond the imagination. It can be as simple as automating software tasks that do not require human oversight, like IT automation, or chat bots. Instead of spending their time doing repetitive and sometimes tedious tasks that can be better carried out by a computer over and over, these employees can be doing something more productive (Technology.org). These forms of automation help to improve employee productivity. Computer automation technology is rapidly growing and brings along many benefits with it.

ANTI-AUTOMATION

While the positives of computer automation are many, there are still quite a few negatives. One of the cons being the role that computer automation plays in the industrial workplace. Most people are skeptical of or fully reject the idea of having computers replace them. "A study by the National Bureau of Economic Research issued in 2017 reviewed the increase in industrial robot usage between 1990 and 2007 on US local labor markets. The study found that robots definitely reduce employment and wages. Through the examination they

estimated that one more robot per thousand workers reduces wages by 0.25-0.5 percent" (Roy). Wages and income levels are fully impacted by the automation of jobs.

Another flaw of computer automation and the accelerating rate of development of technology is how fast it progresses. It begs the question: can humans keep up? Technology is advancing faster than society can handle. As a small-scale example: the elderly struggling with smart phones). This can deter people from trying to pursue new technology because they are afraid to fail or do not want to put in the effort required. While the people pioneering these advancements are able to understand them and wholly learn them, this pattern will lead to mass confusion for most of society or require some type of education or training to understand (Handly).

Computers help to make our lives easier, but this may in turn come with some consequences such as vision and physical health problems. People who expose themselves to computers for extended periods of time may be prone to headaches and experience pains in their neck, wrist, arms, or back. These pains usually come from a person staying in a fixed position when using a computer screen or keyboard for a long amount of time. These habits can also cause muscle pain due to fatigue, and vice versa (Barboza). Working on computer automation software requires a lot of screen time for the eyes. One of the most common diagnoses that comes with this is Computer Vision Syndrome (CVS). CVS symptoms include blurred vision, headache, dry eyes, and eye strain. These symptoms are usually temporary and become less severe when a person is not using the computer. However, if not monitored, the strain could cause other health and vision problems. Vison factors include the glare on the computer screen, the reduced level of contrast of text to the background, and letters not being as sharp or clear as on paper (Barboza).

One notable con of computer automation technology is real life “understanding” and the way that this lack of understanding can have a negative role in the workplace. A given scenario for the inability to failover to manual operations if systems and automation fail; a banking system experienced problems, so tellers had to manually process transactions for customers by keeping hardcopy ledgers that would later be input into the system. Retirees were brought in because the “modern” employees couldn’t perform the task (Shacklett). Another workplace variable affected by computer automation is the limited understanding of the business itself. As employees become more distanced from the core task of a business, the probability of the employee being able to think independently about how the business can benefit from what they do drastically decreased. Automation can breed out business knowledge because it creates a level of abstraction between the employee and the business process. The employee no longer becomes a decision maker and is more like a zombie. This can create morale issues for employees, who feel their talents aren't being taken advantage of (Shacklett).

Finally, automation in the workplace comes from “poor business performance at customer touch points” (Shacklett). An example would be interactions with automated call attendants. The task of actually getting to talk to a “real person” seems impossible, so we finally give up. Companies still invest in this even though it puts customer goodwill at risk.

CONCLUSION

Computer technology is an evolving field of work. Many branches/concepts make up computer technology, all affecting society in their own way. One of these concepts, computer automation is drastically affecting the world. Automation has become a subject of much importance over the last few decades. The use of technology to accomplish a task with as little human interaction as possible has left an ecological footprint. Benefits like mass production, overall product quality, ability to perform precise task (like surgery), and increase in job

opportunities (for certain fields) and scientific understanding of not just computer science, but all sciences. On one hand, it's a wonderful testament to man's ingenuity. People no longer have to perform risky, life-threatening jobs nor trivial, mind-numbing tasks. This has both saved lives and cut costs of labor for many businesses. However, automation has also uprooted thousands from their jobs and could continue to do so in the future without proper action. While the benefits are many, the negatives cannot be ignored, physical health and vision to be a few. The progress of computer technology brings the pressure of learning these new ideas/concepts. Computer technology is constantly developing with the times. Creating vast amounts of computer science related opportunities. Therefore, it is important that people engage in these advancements to be technologically sound. Computers have their own advantages and disadvantages. A solution offered to anyone/business negatively affect is to "formulate new plans to understand the training needs of their staff, the skills that will be needed in the future, and offer programs to bridge the gap and equip employees with skills for the digital future" (Technology.org). It's impossible to answer if technology is good or bad. Overall, computer automation offers more pros than cons. But those making decision should continue to monitor and reassess the situation and expand this knowledge. However, without any hesitation, computer technology will continue to grow and have more of an impact on society as time and technology progresses.

WORKS CITED

Barboza, Sean (2021). What Are the Negative Effects of Computers? *Healthfully*. healthfully.com/negative-effects-computers-8054040.html

Daftardar, Ishan (2021, January 27). How Long Can You Survive On Various Celestial Bodies Without A Spacesuit? *Science ABC*. www.scienceabc.com/nature/universe/long-can-one-survive-planet-without-space-suit.html

Handly, Emer (2018, February 21). Can We Keep up with How Fast Technology Is Evolving? *The College View*.www.thecollegeview.com/2018/02/21/can-we-keep-up-with-how-fast-technology-is-evolving/.

Roy, Soumik (2019). Can Automation Create More Jobs than It Destroys? *TechHQ*, techhq.com/2018/09/can-automation-really-help-create-more-jobs-than-it-destroys/.

Shacklett, Mary (2018). 3 Reasons Why Automation Can't--and Shouldn't--Solve Every Business Problem. *TechRepublic*. www.techrepublic.com/article/3-reasons-why-automation-cant-and-shouldnt-solve-every-business-problem

Team, D. (2020, February 9). How Many Software Developers Are in the US and the World? *Daxx Software Development Teams*. https://www.daxx.com/blog/development-trends/number-software-developers-world

Technology.org (2019).10 Ways Automation Is Improving Human Lives. *Technology.org*. www.technology.org/2019/08/23/10-ways-automation-is-improving-human-lives/.