

Ethics of Introducing Robots to the Workforce

● Introduction

The exponential advancement in technology brings new elements to our lives every day. One of the new elements that will affect everyone in the following years is the usage of robots in workspaces. It is a topic that can alter the workforce at its core and also it draws the attention of the mainstream media. Due to these two factors, potential use cases of robots and their effects are topics that are highly discussed with various standpoints, some in favor of their usage and some definitely against it.

Before we dive in, what is a robot? The definition of a robot according to Merriam-Webster is “a machine that resembles a living creature in being capable of moving independently (as by walking or rolling on wheels) and performing complex actions (such as grasping and moving objects)”¹. This is a very broad definition and a correct one. Robots have enormous varieties and their adaptability to different environments and tasks is their most appealing characteristic. Their adaptability enables industries to use them in scenarios that humans would under perform. But if they are so adaptable, why is their usage in various industries so controversial?

The usage of robots in the workforce has been a topic of discussion for almost the last hundred years² and there is always some support and some opposition to the new inventions in the robotics field. With the recent releases of incredibly capable artificial intelligence models such as ChatGPT-4, MidJourney, and Tang Yu by NetDragon Websoft³, scientists and society are questioning what should be our stance towards such powerful tools. It is suspected that similar strong AI models will start getting implemented into robots soon to achieve tasks we never realistically imagined robots could even two decades ago such as art creation, emergency response through risk analysis, and learning and implementing complicated physical and logical tasks. Since AIs and potentially smarter robots are such a strong tool and relatively alien to the general population, mainstream media is filled with articles and news about robotics in recent years. This creates a chaotic sea of opinions and arguments among experts and non-experts alike.

There are many arguments against and for the use of the new smart robots. Arguably the most prominent one, especially among non-experts, is the fear that robots will steal the jobs of humans and will bring poverty to the majority of us⁴. There are also some arguments in support of the use of robots while trying to estimate their effects on our society. Some people think that the addition of advanced robots to the workforce is just another step in our technological

¹ “Robot.” Merriam-Webster.com Dictionary, Merriam-Webster, <https://www.merriam-webster.com/dictionary/robot>.

² Robotnik. “History of Robots and Robotics: Origins of Robots.” *Robotnik*, 15 June 2022, <https://robotnik.eu/history-of-robots-and-robotics/>.

³ Cuthbertson, Anthony. “Company That Made an AI Its Chief Executive Sees Stocks Climb.” *The Independent*, Independent Digital News and Media, 16 Mar. 2023, <https://www.independent.co.uk/tech/ai-ceo-artificial-intelligence-b2302091.html>.

⁴ Duke, Phil La. “Robots Are Stealing Our Jobs.” *Entrepreneur*, Entrepreneur, 23 Apr. 2019, <https://www.entrepreneur.com/science-technology/robots-are-stealing-our-jobs/332468#:~:text=A%20recently%20released%20report%20conducted,you%20pump%20your%20own%20gas%3F>.

advancement⁵ and will have effects similar to the effect of adding tractors into the workforce. Others think that introducing more robots to the workforce will reshape the social class structure in a new way where robots replace some parts of the working class and create a new sub-class for humans who just work to maintain and oversee robots⁶.

In this paper, we will analyze the potential benefits of replacing some human workers with advanced robots as well as the potential drawbacks and how to mitigate them. We will explore three major areas: how robots can replace humans that work in inhumane conditions, how robots can help the economy, and how they can have net positive environmental impact.

- **Potential to Save Humans From Inhumane Conditions**

The implementation of robots in the workforce has raised concerns among the public, leaving some fearing that these machines will take over jobs traditionally held by humans⁷. However, it is important to consider the potential benefits of robots in the workforce, particularly in industries where workers face inhumane conditions.

Each year, millions of workers suffer from occupational accidents and work-related diseases. According to UN estimates, 2.78 million workers die from foreseeable causes while an additional 374 million suffer from non-fatal occupational accidents globally. This means that approximately 7,500 people die from unsafe and unhealthy working conditions every day⁸. These numbers are alarming and highlight the need for better working conditions with less lethal risks and more safety measures.

The dangers of certain jobs are undeniable. Workers in industries such as mining and oil drilling are exposed to environments that are hazardous to human health such as lethal falls, traumas, explosions and vehicle collisions⁹. Even with the best safety measures in place, accidents can and do happen, putting workers' lives at risk. In these cases, robots can be used to perform the majority of the necessary mundane physical tasks without putting human lives in

⁵ Nunes, Ashley. "Automation Doesn't Just Create or Destroy Jobs - It Transforms Them." *Harvard Business Review*, 2 Nov. 2021, <https://hbr.org/2021/11/automation-doesnt-just-create-or-destroy-jobs-it-transforms-them>.

⁶ Holzer, Harry J. "Understanding the Impact of Automation on Workers, Jobs, and Wages." *Brookings*, Brookings, 9 Mar. 2022, <https://www.brookings.edu/blog/up-front/2022/01/19/understanding-the-impact-of-automation-on-workers-jobs-and-wages/>.

⁷ Duke, Phil La. "Robots Are Stealing Our Jobs." *Entrepreneur*, Entrepreneur, 23 Apr. 2019, <https://www.entrepreneur.com/science-technology/robots-are-stealing-our-jobs/332468#:~:text=A%20recently%20released%20report%20conducted,you%20pump%20your%20own%20gas%3F>.

⁸ "Occupational Safety and Health: UN Global Compact." *Occupational Safety and Health | UN Global Compact*, <https://unglobalcompact.org/take-action/safety-andhealth#:~:text=the%20new%20brief-,A%20Safe%20and%20Healthy%20Working%20Environment,working%20conditions%20every%20single%20day>.

⁹ "Department of Labor Logo United States Department of Labor." *Oil and Gas Extraction - Hazards | Occupational Safety and Health Administration*, <https://www.osha.gov/oil-and-gas-extraction/hazards>.

danger. By utilizing robots in risky industries, we could significantly reduce the number of workplace accidents and improve the safety of these jobs.

In addition to dangerous working conditions, some jobs are simply too inhumane¹⁰ for humans to perform. Repetitive or physically demanding tasks can cause injury and long-term health problems. Moreover, working in such conditions can lead to mental and emotional stress, as workers may feel unfulfilled and dissatisfied with their work¹¹. In industries that involve these types of jobs, robots could be used to perform repetitive tasks more efficiently and with less risk of injury to human workers¹². This would not only improve the safety of these jobs, but also improve the overall well-being of workers.

Even if a worker is fortunate enough to have a 40-hour workweek, they don't simply have the rest of the time for themselves. Many workers spend a significant amount of their time outside of work simply fulfilling basic human needs such as cooking and eating, commuting, and taking care of personal hygiene. That may not leave enough time and energy for people to feel satisfaction from their life through social life, family and hobbies, hence the work they do at their job must be satisfactory. Aristotle believed that "happiness is the meaning and purpose of life, the whole aim and end of human existence"¹³. Assuming that a human is busy with an unsatisfactory job that does not induce happiness, it is hard to argue that they are fulfilling their lives. So as a society, we must be able to provide enough free time for everyone to get satisfaction and happiness from life. If there are jobs that have to be done for society but not necessarily happiness inducing, we should let robots do it.

The lack of meaningful work is especially apparent in jobs that are often automated or performed by robots. While these machines can perform repetitive and physically demanding tasks more efficiently than humans, the jobs themselves offer little in the way of intellectual or emotional stimulation. Workers who are forced to perform these tasks for hours on end can experience significant physical and mental fatigue, leading to feelings of unhappiness and dissatisfaction with their lives¹⁴.

¹⁰ Burgard, Sarah A, and Katherine Y Lin. "Bad Jobs, Bad Health? How Work and Working Conditions Contribute to Health Disparities." *The American Behavioral Scientist*, U.S. National Library of Medicine, Aug. 2013, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3813007/>.

¹¹ Burgard, Sarah A, and Katherine Y Lin. "Bad Jobs, Bad Health? How Work and Working Conditions Contribute to Health Disparities." *The American Behavioral Scientist*, U.S. National Library of Medicine, Aug. 2013, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3813007/>.

¹² Gihleb, Rania, et al. "Industrial Robots, Workers' Safety, and Health." *Labour Economics*, North-Holland, 21 June 2022, <https://www.sciencedirect.com/science/article/abs/pii/S0927537122000963?via%3Dihub>.

¹³ Egbekpalu, P. E. "Aristotelian Concept of Happiness (Eudaimonia) and Its Conative Role in Human Existence: A Critical Evaluation". *Conatus - Journal of Philosophy*, vol. 6, no. 2, Dec. 2021, pp. 75-86, doi:10.12681/cjp.26924.

¹⁴ Rahman, M., and A. K. Sen. "Effect of Job Satisfaction on Stress, Performance and Health in Self-Paced Repetitive Work - International Archives of Occupational and Environmental Health." *SpringerLink*, Springer-Verlag, 1987, <https://link.springer.com/article/10.1007/BF00378489#citeas>.

Furthermore, these jobs are often seen as dehumanizing. They require workers to perform the same task over and over again, reducing them to little more than cogs in a machine¹⁵. Such jobs offer little opportunity for creativity or personal growth, and they can lead workers to feel trapped in their careers, with no opportunity for advancement or change.

In contrast, the introduction of robots into the workforce could free up humans to pursue more meaningful and fulfilling work. By taking over the dangerous and inhumane tasks that are currently performed by humans, robots could make it possible for people to work in safer, more fulfilling environments. This could provide workers with the opportunity to develop new skills and to take on more intellectually stimulating tasks, ultimately leading to greater job satisfaction and a greater sense of purpose in life.

- **Potential to Help the Economy**

Robots are an increasingly prevalent tool in the modern workforce, with the potential to revolutionize the way we approach work and production. As technology continues to advance, so too does the potential for robotics to help drive economic growth and development. From increased efficiency in manufacturing to the creation of new industries and job opportunities, robots offer a wide range of benefits that can help businesses thrive and contribute to a stronger, more robust economy.

Robots have the potential to significantly improve the efficiency of the manufacturing process. They can perform repetitive tasks faster and more accurately than humans, leading to a higher output of products in a shorter amount of time¹⁶. In addition, robots do not require breaks or rest periods, allowing for continuous operation almost all around the year except for maintenance times and malfunctions.

Furthermore, the lack of human error in robotic manufacturing can lead to higher precision and accuracy in the production process¹⁷. This can lead to a reduction in waste, as well as a decrease in product defects, which can result in savings for both the manufacturer and the consumer.

While some may argue that the increased use of robots in manufacturing will lead to job displacement, it is important to consider the potential for new job opportunities. As robots take over repetitive mechanical tasks, humans can be trained to operate and maintain these machines, as well as develop new technologies and products that require creativity and cognitive skills through arts, engineering, science and scholarly work. Roboticists from International Federation

¹⁵ Whitfield, Graeme. "Modern Workers 'like Cogs in a Machine Rather than Human Beings', Government Review Says." *ChronicleLive*, 11 July 2017, <https://www.chroniclelive.co.uk/business-news/modern-workers-like-cogs-machine-13312800>.

¹⁶ Shah, Avni. "Robots Are Optimized for Tedious, Repetitive Tasks. Can They Be Automated for More Complex Workspaces?" *USC Viterbi | School of Engineering*, 12 Nov. 2019, <https://viterbischool.usc.edu/news/2019/11/robots-are-optimized-for-tedious-repetitive-tasks-can-they-be-automated-for-more-complex-workspaces/>.

¹⁷ Javaid, Mohd, et al. "Substantial Capabilities of Robotics in Enhancing Industry 4.0 Implementation." *Cognitive Robotics*, Elsevier, 6 June 2021, <https://www.sciencedirect.com/science/article/pii/S2667241321000057>.

of Robotics¹⁸ and economists from Forbes¹⁹ argue that this can lead to the growth of new industries and the creation of new jobs that require higher levels of education and skills.

With the increasing use of robots in the workforce, there will be a decreased need for human workers to perform repetitive and mundane tasks. This could have a profound impact on society as it would free up more time for people to explore their creative side. People who were previously working in repetitive jobs can now pursue their interests in art, music, literature, and other creative endeavors. This could lead to a flourishing of the arts, resulting in more artists, storytellers, authors, and other cultural experts who can contribute to the betterment of society from a cultural perspective. Or it can free up people's time so they can spare more time for their families, friends and communities which would highly likely result in a better mental health overall.

Furthermore, the rise of creative industries could also have economic benefits. These industries can create jobs²⁰ that require higher-level cognitive skills, such as critical thinking, problem-solving, and creativity. The development of new industries would also require specialized skills such as programming and design, which would result in the creation of new jobs. The introduction of robots in the workforce could also lead to a shift in the education system towards training students in creative and technical skills that would be necessary in the new economy. This could lead to a more dynamic and diverse workforce, which would in turn drive innovation and growth in the economy.

In conclusion, the use of robots in the manufacturing process can lead to increased efficiency, precision, and accuracy, as well as the potential for new job opportunities and industrial growth. While there may be concerns about job displacement, it is important to consider the potential benefits that robots can bring to the economy and society as a whole.

- **Potential to Be More Sustainable**

In addition to the cost savings and increased efficiency, the use of robots in manufacturing also has significant environmental benefits. One major advantage of robots over human workers is that they do not produce biological waste, such as food scraps and bodily fluids. This eliminates the need for regular cleaning and the disposal of hazardous waste, which can be expensive and harmful to the environment.

Furthermore, robots do not require lighting, heating, or water for their basic needs, which significantly reduces the facility costs for companies. This also means that factories can be optimized to take up less space, resulting in a smaller carbon footprint. The reduced energy

¹⁸ Bieller, Susanne. "International Federation of Robotics." *IFR International Federation of Robotics*, <https://ifr.org/robots-create-jobs>.

¹⁹ Gaskell, Adi. "Does Automation Result in More Jobs Being Created?" *Forbes*, Forbes Magazine, 12 Oct. 2022, <https://www.forbes.com/sites/adigaskell/2021/09/02/does-automation-result-in-more-jobs-being-created/?sh=35e3560a63d0>.

²⁰ Bieller, Susanne. "International Federation of Robotics." *IFR International Federation of Robotics*, <https://ifr.org/robots-create-jobs>.

consumption and waste from smaller factories is another significant environmental benefit of using robots in manufacturing as it is argued by senior engineers from Amazon Robotics²¹.

Moreover, the cost savings from using robots can be redirected towards important areas such as research and development for renewable energy solutions. As we continue to face the challenges of climate change, investing in sustainable technologies such as solar and wind power can help reduce our reliance on fossil fuels and reduce carbon emissions.

In addition to the cost-saving benefits of using robots in manufacturing, their use can also contribute to creating a more sustainable future. With climate change becoming a pressing issue, reducing carbon emissions is crucial. Clean energy is a solution to this problem, and the increasing use of robots in manufacturing is aligned with this objective. As robots require electricity to function, the growth of the clean energy industry means that the electricity used to power robots is becoming cleaner. Solar panels and wind turbines are already being implemented in many places, and as the technology becomes more affordable, clean energy will become increasingly widespread.

It can seem counterintuitive for robots to be sustainable but there are various ongoing research on whether the carbon print of robotic materials outweigh the energy savings and waste management the robots can have.²² It is a new research area as robot usage on a massive scale has not been deeply analyzed but as the companies from developing countries implement robots into their workforce, the researchers collect more data.

The trend towards clean energy is particularly beneficial for factories using robots, as they are inherently more sustainable than those relying on human labor. With fewer people commuting to and from factories in remote areas, there is a reduction in emissions from transportation. Furthermore, ongoing research on nuclear fusion energy production may even lead to 100% clean energy production in the future, making it possible to achieve a fully sustainable manufacturing process. Therefore, embracing the use of robots in manufacturing is not only cost-effective but also environmentally responsible.

- **Potential problems and how to solve them**

As mentioned in the introduction paragraphs, introducing robots into the workforce on a mass scale obviously has some problems with it. The following section will be about two major counterarguments for usage of robots and opinions on how those counterarguments should affect our decision making.

- **Lack of human creativity**

One of the counterarguments against the use of robots in the workforce is the belief that they lack human creativity. While robots are designed to perform specific tasks efficiently, they lack the ability to innovate, problem-solve, and come up with creative solutions, at least as we

²¹ These arguments are from in person discussions that I had during my works with Amazon Robotics for Olin College Senior Capstone Program in Engineering.

²² Bugmann, Guido, et al. "A Role for Robotics in Sustainable Development? | IEEE Conference ..."
Ieeexplore, Institute of Electrical and Electronics Engineers, 2019,
<https://ieeexplore.ieee.org/abstract/document/6072154/>.

know them right now. Humans have the ability to think creatively, learn and adapt to new situations, and create new ideas. Researchers and inventors are still not sure how much AI can expand its capabilities to mimic these human behaviors. But even in their current state, it is important to note that robots can still be useful in performing repetitive and mundane tasks, allowing humans to focus on more creative and strategic work.

There is no denying the importance of creative jobs in our society, as they allow us to express ourselves and communicate important messages through various mediums. While technology has certainly advanced and robots can now perform tasks that were once considered exclusive to humans, it is essential to understand that machines cannot replace the creative touch and unique perspectives that come with human creativity. Designers, artists, authors, storytellers, and other creative professionals bring a level of individuality and personality to their work that cannot be replicated by machines.

Furthermore, it is important to recognize that creativity is not just about producing something aesthetically pleasing or entertaining. It also involves critical thinking, problem-solving, and emotional intelligence, all of which are deeply rooted in human experiences and interactions. While robots may be able to produce content based on algorithms and data analysis, they lack the ability to empathize, connect with their audience, and evoke emotions in the same way that humans can. Therefore, the use of robots in creative fields should be limited to assisting humans and not replacing them, as it is the human touch that adds value to these professions and sets them apart from mere machines.

- **Job displacement**

Another significant counterargument against the use of robots in the workforce is the fear that they will displace human workers and lead to unemployment. While it is true that robots can replace humans in certain jobs, it is important to note that they also create new jobs in areas such as maintenance, programming, and supervision. However, it is unclear if the creation of new jobs will be enough to offset the loss of jobs that robots will cause. Additionally, robots can only perform tasks that they are programmed to do, whereas humans are capable of adapting to new situations and learning new skills. But still, the fear of job displacement is not unfounded and should be taken seriously.

There are several counterarguments to the job displacement argument against the use of robots in the workforce. One of the most prominent is that robots can be used to enhance human labor rather than replace it entirely. By using robots as assistants, humans can work alongside them and utilize their unique capabilities to increase productivity and efficiency. For example, a factory worker can use a robot to help with heavy lifting or precision work, freeing them up to focus on other tasks. This way, robots and humans can work together to achieve better results and create a more dynamic and efficient workforce.

Another counterargument is the importance of having effective unemployment programs in place. While the fear of job displacement is valid, it is important to note that it is not a new phenomenon. Throughout history, technological advancements have led to job losses in certain industries, but they have also created new opportunities and shifted the job market in new

directions. Countries can prepare for these shifts by having robust unemployment programs that support workers during times of transition and help them to find new, meaningful careers.²³

- **Conclusion**

In conclusion, the implementation of robots in the workforce offers a range of benefits for both workers and the economy. In industries where workers face hazardous and inhumane conditions, robots can perform the necessary tasks more efficiently and safely, reducing the number of workplace accidents and improving workers' well-being. By freeing humans from dangerous and repetitive tasks, robots also offer the potential for greater job satisfaction and the pursuit of more fulfilling work. In addition to these benefits, robots offer the potential for increased efficiency and precision in manufacturing, leading to increased profits and economic growth. While concerns about job displacement are valid, the implementation of robots also offers the potential for new job opportunities and the growth of new industries.

As we continue to advance technologically, it is important that we consider the potential benefits of robots in the workforce, while also acknowledging and addressing concerns about job displacement and the ethical implications of these machines. By using robots in a responsible and thoughtful manner, we can create a more efficient, safe, and fulfilling work environment, while also contributing to a stronger and more prosperous economy.

Ultimately, the implementation of robots in the workforce is not about replacing humans with machines, but rather about creating a partnership between humans and technology. By using robots to perform tasks that are dangerous, inhumane, or repetitive, we can free up humans to pursue more meaningful and fulfilling work, while also increasing efficiency and productivity in the workplace. By embracing this partnership, we can create a future where technology and humans work together to create a better world for all.

²³ Boyd, Ross, and Robert J. Holton. "Technology, Innovation, Employment and Power: Does Robotics and Artificial Intelligence Really Mean Social Transformation?" *Journal of Sociology*, vol. 54, no. 3, 2017, pp. 331–345., <https://doi.org/10.1177/1440783317726591>.

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<https://www.entrepreneur.com/science-technology/robots-are-stealing-our-jobs/332468#:~:text=A%20recently%20released%20report%20conducted,you%20pump%20your%20own%20gas%3F>.

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