The Age of Robotics:

Are robots taking our jobs?

Matthew Neighbour

Oakland University

Abstract

This paper synthesizes several peer-reviewed journals commenting on the use of technology in the workplace. The articles seem to agree for the most part that robots are not taking jobs, but differ in their findings of how to apply the technology and how the technology will affect the workplace. This paper will look at the effects of robotic systems in the workplace through a case study and basic principles of technology. Articles like “Industrial Robots for Smaller Firms” have Wilson, G arguing that robots should be adopted quickly at first and as more robots are added higher standards should be enforced. While James Albus in “Robotics: Challenges to present-day technology” points out the major pitfalls of robots that will need to be overcome before they replace human jobs. In “Cheese robots take over in Swiss dairy vaults” robots performing duties that humans used to carry out will be looked into, to see that robots help businesses. In Jeff Borland and Michael Coelli’s article “Are Robots Taking Our Jobs? “, the two looks at how robots affect employment. Just like the industrial revolution took strenuous jobs away, the robotic revolution will take away manual labor jobs and introduce more specialized jobs.

*Keywords*: Robots, Jobs, Economy

Robots are more prevalent in today, being used to augment and replace human labor. People are becoming fearful that robots and other computer-based technologies are going to take over their jobs, leaving them with no work for humans. This fear is reasonable as many businesses are turning to this new form of labor. But for this technology to fully replace humans in the workforce many problems need to be solved.

Wilson, G in his article “Industrial Robots for Smaller Firms” discusses what needs to be considered when deciding when to use robots in industry. Wilson uses scenarios to communicate these considerations. In this, he states that when considering using robots in your firm, “That an initial application should be subject to easier justification because of the technology learning factor.” (Wilson, G. 1991) meaning that robots would be adopted with lower standards than when adding more robots down the line. This will enable the firm to understand what is important to their company when adding robots, and will be able to make a more informed decision when adding robots.

James Albus points out the major pitfalls of robots that will need to be overcome before they replace human jobs. In his article “Robotics: Challenges to present-day technology”, He argues that the accuracy of the position of robots leaves somethings to be desired. Stating that the repeatability of most robots is about 0.050 inches (Albus, J. 1983). This becomes a problem for the programmers that need to guide the robot point to point many times. With an error that large, a robot will sometimes be a half inch away from it’s intended target. This problem can be solved says James. He says “Presumably, this accuracy problem could be solved through closer robot manufacturing tolerances, although not without cost.” (Albus, J. 1983). He explains the problem even more saying that there are no known ways to calibrate the machines through the computer terminal. Engineers have not yet created a way to accurately efficiently calibrate the machines. Until this problem can be solved, James says that small-batch assembly will not be economical.

James also discusses that another area that will require improvement is dynamic performance. Robots are large and cumbersome. He argues that robots are limited in speed and mobility because of their size, with the exception to processes like welding. One of which being the processes for arc welding and spot welding, since they are inherently time consuming because everything is regulated by the welding process. “Two possible exceptions to this are in arc welding where speed is governed by the welding process itself, and spot welding where the task corresponds to moving a heavy welding gun through a simple string of points in space” (Albus, J. 1983). Therefore, robots will need to have better control algorithms to alternate stiff and compliant movements.

In the article “Cheese robots take over in Swiss dairy vaults” Robots are used to perform tasks that humans could never do on their own. These swiss cheese bots carry large wheels of fresh cheese weighing in at about a ton every day, working for about 20 hours a day. “‘It would take four men to do the same job as one robot’, Nufer said during a tour of his plant” (Anonymous, 1995). These robots are capable working longer hours, and in larger capacities, which is enabling the cheese company to drive operation costs down.

In Jeff Borland and Michael Coelli’s article “Are Robots Taking Our Jobs? “, looks at how robots affect employment. They say there are a few ways of understanding the effects of robots in employment. One understanding is a tasked base approach, which looks at how machines can easily replicate routine tasks. In order to accomplish this, though; the task must be understood completely and then codified. These mundane types of tasks that humans perform are now being put unto the shoulders of robots. This type of shift has been seen before in history, with the industrial revolution allowing for machines to take the load of heavy lifting jobs and the like. Borland and Coelli say this is no cause for concern.

Jeff Borland and Michael Coelli further explain that just because new technologies are taking jobs, doesn’t mean that all jobs will disappear. “New technologies may reduce the total amount of labour time needed to produce today’s consumption bundle, but the higher real incomes that result, together with non-satiation in consumption, cause an increase in demand for existing products, as well as demand for new products (some of which are created by new technologies). The increase in employment that results will be intensified where the extra spending is directed towards income-elastic services which are labour intensive (Baumol 1967)” Borland, J., & Coelli, M. (2017). Just like the industrial revolution, a robotic revolution will only create different jobs while taking old strenuous ones away.

Stuart W. Elliot researched the effects of robots in the workplace. He found that there were major limits that technology would face, and found that robots are fully capable of overcoming these hurdles. One problem for robots being language. Elliot referenced articles that studied robots that provided services from customer service to explaining high school chemistry. In Eliot’s articles, it was found that robotic systems were able to perform simple tasks like writing a paper, to engaging in an argument. He noted that a major difficulty in communicating with humans is adapting to their speech needs. Robots are able to understand what they have already said, and not repeat information. They are also capable of understanding and reasoning with emotion in language, and understanding imprecise words. These points all align with Elliot’s argument that robots are fully capable of replacing humans.

Elliot continues that robots have advanced their reasoning skills. Robots are currently used for making decisions related to auto insurance, and developing hypothesis about best ways to grow crystals. Robots are able to reason at very high levels - able to make underwriting decisions for small insurance claims, and capable of assisting in much more difficult decisions. The downside, however is that robots have been well known for making errors in common sense reasoning.

Atkinson comments on a paper called “Anticipating a Luddite Revival” in his article. In it he notes that the author of this paper drastically overstates the ability of robots and technology. Saying that although a robot can act like a human in small capacities, it is very far from fully replacing all human functions. Atkinson also points out the human element that these robots have a very hard time replicating. Replacing jobs like human resources will be very difficult as the role requires emotion and connection with others.

Though Atkinson says Eliot was very scholarly in his approach to his research, there are a few faults in Eliot’s assumptions. One assumption is that software programs cannot mimic human work functions. Humans are too complicated and unpredictable to replicate perfectly, and the jobs they perform are just as unpredictable at times as well. Although Atkinson was correct in many of his points, he has greatly underestimated the ability of human engineering. He says that robot fire trucks are not going to show up to your burning house anytime soon yet, some companies are able to deliver packages to your house. It will not be difficult to go from delivering packages to delivering water, or any fire retardant.

In order for robots to be economical, they must but used as efficiently as possible to lower operating costs and increase net profit. Wilson says that in order for robots to become economical, they must be used for 2 or more shifts. The Swiss cheese vaults that Anonymous wrote about seems to overwhelmingly agree with this, “When turnover at the warehouse is high, they can work 20 hours a day and at quiet times still put in at least 11 hours rather than a labourer's eight to nine hour shift” (Anonymous, 1995). The ability to determine a robots working hours is one of the things that makes robots beneficial to companies like the swiss cheese factory.

Many parallels exist between “Cheese robots take over in Swiss dairy vaults” and “Industrial Robots for Smaller Firms”. They both point out how robots are very useful and provide many benefits when implemented properly. Wilson argues that “Industrial robots are more economically justifiable when there is a two shift or three-shift operation” (Wilson G. 1991) while robots are enabling the swiss cheese factory to keep its door open using this exact principle. The cheese factories are using the robots to their fullest extent, working them for most of the day. Robots are helping keep the cheese factory open while also doing things that humans do not need to do. Humans are no longer needed to perform these time intensive tasks that would cost more in salary than it would operating costs of the robots.

The articles “Anticipating a Ludite Revival” and “Are Robots Taking Our Jobs” discuss the problems faced with robotics as well as the problems solved with robots. Elliot argues that robots are very advanced, and are more than capable of replacing humans in the workplace. He says that they are capable of advanced reasoning. Jeff Borland and Michael Coelli in contrast discuss the effects of robots performing low level reasoning to accomplish tasks to replace human workers. These two articles although arguing for the opposite point show that robots are capable of both high reasoning intensive tasks as well as low reasoning intensive tasks. Robots are capable of a wide range of functions and are able to replace human functions almost completely. Humans are no longer needed to perform these time intensive tasks that would cost more in salary than it would operating costs of the robots.

“Anticipating a Ludite Revival” and “Are Robots Taking Our Jobs” clearly show that robots are capable of replacing many human functions. They can be made to perform incredible feats of strength that humans could never do, carrying 1 ton of cheese around and working for most of the day non-stop. In this way Robots don’t only replace humans, they exceed their potential. This does not however, mean that Robots are the go-to answer for all problems. Humans have the ability to be hired without the overhead of installation. Humans can be easily taught how to perform a different task, and are very capable of adapting to new environments. Robots need to be pre programmed to handle circumstances that cannot be predicted.

In conclusion, robots are not taking jobs from us – putting us out of work. Robots are freeing humans from mundane and laborious tasks so that we can apply our minds and skills to other tasks. We see from the cheese factory that because of robots, the factory is able to cut costs and stay open. Robots, being cost effective when used correctly according to Wilson’s article, are able to assist companies reach farther than they could with human helpers. Robots are not taking our jobs from us, they are causing new one to rise.

Atkinson, R. (2014). Robots aren't taking your job. *Issues in Science and Technology*, 30(4), 9-10. Retrieved from http://www.jstor.org/stable/43315200

This article discusses claims made that robots will take 80% of jobs. The article also argues robots’ shortcomings in replacing humans.

This paper will use this example of robots in the workplace to look further into their use. This article will be used to explain the short comings of robots in taking human jobs.

Borland, J., & Coelli, M. (2017). Are Robots Taking Our Jobs? *Australian Economic Review*, 50(4), 377–397. https://doi.org/10.1111/1467-8462.12245

This article expounds upon a specific case study in Australia where computer-based technologies were introduced into the workforce. The study found that there was little to no change.

This paper will use this example of robots in the workplace to look further into their use. This paper will use this case study to show the effect of robots being used in the workplace.

Wilson, G. (1991). Industrial Robots for Smaller Firms. *Production and Inventory Management Journal*, 32(1), 25. Retrieved from http://search.proquest.com/docview/199913152/

This article discusses the implementation of robots in small firms. The article also argues the factors that should be considered when deciding to use robots.

This paper will use this example of robots in the workplace to look further into their use. Specifically looking into the costs and considerations needed to be made when using robots

Anonymous. (1995). Cheese robots take over in Swiss dairy vaults. *The Industrial Robot*, 22(5), 6. Retrieved from http://search.proquest.com/docview/217018457/

This article explains how robots are used in a Swiss dairy vault. The robots take care of the cheese over the 3 to 9 months of ageing.

This paper will use this example of robots in the workplace to look further into their use. I will use this example to show the use for robots in the industry.

Albus, J. (1983). Robotics: Challenges to present-day technology. *IEEE Potentials*, 2(Fall), 24–27. https://doi.org/10.1109/MP.1983.6499635

This article talks about how robots are starting to take a greater role in industry. This article also talks about how humans are not being displaced by them.

My paper is talking about whether or not humans are being replaced by robots. This article will be used to argue that robots are not taking out jobs. As well as, that producing and using robots provides immense technical problems that need to be solved.

Elliott, S. (2014). Anticipating a Luddite Revival. *Issues in Science and Technology*, 30(3),

27–36.

This article the possible effects that technology will have on our understanding of how we will be working in the future.

My paper is talking about whether or not humans are being replaced by robots. This article will be used to argue that technology will have an impact on the future job market.