The Effects of Artificial Intelligence on the Job Market

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Abstract

Artificial Intelligence (AI) has become prevalent in many aspects of society. With the capability to complete both basic and complex tasks, it has the potential to transform a large number of jobs. There have been many studies on the capabilities of AI showing that AI can evolve to solve complex problems and tasks. There have also been studies showing that AI can help doctors diagnose diseases in patients. Moreover, AIs like Chat-GPT are free for the public and can write essays, compose music, and create art. But how will this new surge of AI change how people work or use AI in a work environment, are there some things that AI can never do, and if so what are they? By analyzing the effects of AI on multiple fields, the answer to these questions may become clearer. Then synthesizing these together we can get a general outlook on the future of the workplace as AI becomes prevalent. The general trend has been that in the short term, AI will cause a job deficit and in the long run it will increase productivity and job opportunities.

Keywords: AI, Job Market, Unions

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1. Introduction

AI is being implemented into the workplace, and it is becoming ever more important to understand how this will affect workers. In order to do so, it is necessary to break down the problem and see how previous generations have dealt with new technological innovations. Then, looking into the general statistics will provide a strong basis before analyzing how specific career paths will be affected. Finally, by looking at how unions will fit into all this, the conclusion of how the introduction of AI will lead to short-term job losses at the cost of increased productivity. In the long run, however, effective implementation of AI will lead to financial benefits in the form of more and higher-skill jobs, increased productivity, and more diversification.

I. History Review

Technology has transformed labor markets for centuries. In 1800s England, there was a group called the Luddites who were strongly opposed to increased mechanization in textile factories, as they were afraid that it would cause the owners to lay off thousands of workers. This led to some of the first riots and protests for job security.

However, the future that the Luddites feared never came to fruition because machines "could only replace a limited number of human activities. At the same time, technological change increased the demand for other types of labor that were complementary to the capital goods embodied in the new technologies"(Mokyr 2015), which led to a boom in industry and did not cause significant unemployment. This debate persisted as new technologies continued to threaten job security. The question was most prevalent during the Great Depression; however, many economists rejected the theories of people like Edna Lonigan, an economist in the US Department of Labor, who stated " 'Our present unemployment has little to do with machines,' and argued that there is no connection between innovation and unemployment. Instead 'it is in the failure of the price system . . . to permit the creation of new employment, that the source of the worker's growing insecurity is to be found.' "(Mokyr 2015)

2. General Job Outlook

I. Substitution and Augmentation Hypotheses

The Luddites' thoughts were in line with the Substitution Hypothesis, which says that technology can destroy jobs by automating tasks (Grover 2023). A few examples would be the invention of calculators and computers, which eliminated the need for the computer occupation, whose sole purpose was to crunch numbers to return to scientists and mathematicians. Many former calculators were relegated to the side-lines, such as libraries, retailers, and mail carriers, because of the newfound ease that came with a digital world. Now that AI is becoming more prevalent, it can replace jobs. AI's ability to work with large data sets is impressive. This is a significant asset for large corporations, which can optimize factory output with data about consumer usage of supplies and improve the already optimized just-in-time model many companies use when creating and shipping goods (Crawford 2016).

However, climbing the skill ladder may lead to slightly different results, where instead of the substitution hypothesis, the augmentation hypothesis may come into play. The augmentation hypothesis discusses how AI will not replace jobs, but rather act as a conduit to make jobs more efficient while also providing more jobs in the process due to the increase in its usage (Grover 2023). For example, automobiles helped with faster delivery times, increased

mobility for citizens, and decreased employee commute times. It also created millions of new jobs in industries such as manufacturing, engineering, and fossil fuel. AI is in a similar position to cars as AI can provide a lot of assistance with the vast amount of knowledge it has available to it, which can be used in a wide variety of careers, which is similar to how cars provide substantial assistance with mobility, allowing people to get where they need to faster. AI also requires people who can create, fix, and manage it, thereby creating more jobs for AI experts, computer scientists, and engineers because of the influx of people using it.

II. MIT Outlook

MIT Sloan has identified that many of the new jobs that will come from the creation and consistent use of AI would fall into one of three categories: trainers, explainers, and sustainers (Wilson 2017). Trainers will teach the AI to perform necessary tasks. Many people could fill this job because teaching AI requires a wide range of skill sets, such as cooking or something more complex like finding telltale signs of diseases. This would allow trainer jobs to be filled by anyone qualified enough to teach whatever the AI needs to learn. There is also the issue of transparency with AI, which would have to be a job within itself as understanding AI requires significant skill and training. This would be the role of the explainers. If there is an error in the AI's behavior, explainers would need to identify the source of the error, and then hand off the problem to the sustainers. While the explainers are like an MRI scan showing where the problem is located, the sustainers are the surgeons taking that information to help fix the problem. These two jobs would need more specialized personnel and may require new specialized training to obtain these types of positions (Wilson 2017). In addition, based on current knowledge bases, these jobs would only be widely available in advanced economies.

III. AI Now Outlook

Despite these new types of incoming jobs, there's one report from "Jason Furman, President Obama's Chief Economist, [in a report recorded by AI Now that] noted that 83% of jobs making less than $20 per hour in the US will face serious pressure from automation. For middle-income work that pays between $20 and $40 per hour, that number is still as high as 31%" (Crawford 2016). In that same report, Crawford and her team stated that the jobs lost would only be some meager jobs that would involve crunching data into things that AI could process, and they would be relegated to "Data Janitors." The report also went into detail about how it might affect the work environment for employees, stating automation may both empower and disenfranchise workers by either allowing them more freedom or by leading them to "chronic underemployment, financial instability, insufficient benefits and protections" as fewer employees are needed to do the same amount of work as before (Crawford 2016).

IV. McKinsey Global Outlook

However, AI's effects on the job market may also bring long-term gains. A 2017 report from McKinsey Global Institute extrapolated from previous records of workplace automation to create projections of the effect of AI in the workplace. They have projected anywhere between 10 to 800 million jobs disappearing with an average calculation of 400 million jobs lost worldwide. The 800 million comes from the estimated 30% of jobs that could be replaced by AI by 2030, and the ~50% of workplace activities that could be automated. While this looks bleak, it is not the whole story. The results differ from country to country based on how industrialized they are. In advanced economies, there is projected to be a drop in the labor, data analysis, and retail sectors. In countries with elderly populations, the already declining job market will decline further with the introduction of AI. An example is Japan, which has negative growth in every non-IT sector. Meanwhile developing countries like India and Mexico, where AI is not very

prevalent, are almost completely safe from its influences with the demand for jobs ever increasing. India for example has over a 200% increase in need for doctors/other caretakers by 2030, and Mexico with over 80% (Manyika 2017).

One trend regardless of the type of country is the increased need for technology professionals (computer scientists, software engineers, software developers, etc), as well as builders (architects, structural engineers, construction workers, etc) and caretakers (doctors, therapists, social workers, etc)(Manyika 2017). This will all culminate in an approximated value of 150-360 million new jobs because of AI. While 400 million jobs may be lost, a net positive in the amount of money earned by workers and companies may be possible (Manyika 2017).

3. Specific Job Developments

I. Developments in Customer Service

If a job is tedious and has lots of data to work from, it is often easily replaced by AI or some type of automation. The role of customer service representative (CSR) is just one of the few jobs that is saved from that fate. Working with humans is something that AI has a lot of trouble with, and when it comes to CSRs the whole job is to talk and help people with various tasks. However, AI can still help in this field. CSRs often have to quit due to mental burnout, and using AI as a tool to help navigate difficult customers is something that can help them tremendously. It will also lower training costs for call centers, which averages about $20,000 per new employee (Eastwood 2023).

When CSRs were given an AI assistant that had been trained on previously recorded calls, they were able to resolve about 13.8% more calls. This only increased, too. “within two months, they were resolving 2.5 chats per hour, compared with 1.7 for colleagues not using the model” an almost 1.5 times boost in efficiency. Despite these benefits, it is still unclear if the benefit is because the new CSRs are becoming more competent or are just using AI as a crutch. It is also uncertain how this will affect the job opportunities for CSRs because the increased efficiency could cause fewer people to be required however it could also cause a greater amount of people to use the line due to the better service (Eastwood 2023).

II. Developments in Commercial Agriculture

AI has grown rapidly into many sectors, including the agricultural sector, as AI can work with large amounts of data to create the best models for food availability and production. By using these models, farmers will be able to get more information on the value of their produce and use their land efficiently. Agricultural AI uses a data structure called a Bayesian Network (BN), which takes in various data points, and then uses the data to come up with multiple probabilistic outcomes (How 2020). AI also has been used to assess the state of farmers’ fields by using surveying drones. The drones can collect data about the field and plant, including information ranging from weed locations to phenotypic information about the crops. This can help farmers breed better crops and increase the efficiency of pesticide and herbicide usage. The scalability of this technology may be an issue, for the drone and sensors use massive battery consumption. This could be solved in the future with innovations.

III. Developments in the Medical Workers

In the medical field, AI has performed well on medical licensing exams (James 2023) and has been shown to be able to diagnose various cancers (Trägårdh 2022). With the emergence of Med-PaLM, a large language model that specializes in medicine, the integration of AI in the medical sector has never been more salient. By implementing AI into the medical field, doctors

will become more efficient and focused more on the needs of their patients. Patient documentation is an extremely important part of the job, but writing notes can take up a significant amount of physician time inside and outside the hospital. This could be a possible area where AI can make improvements. On average it takes about 16 minutes for doctors to create or edit notes about a patient. Considering doctors spend about 18 - 22 minutes per patient, this extra time could be freed to help many more people (Finnegan 2020). This would not only help more patients but also help doctors maintain a better work-life balance, as it is reported that on average, 11% of patient notes done by doctors are written at home, which contributes to physician burnout.

However, introducing AI may be complicated by HIPAA (Health Insurance Portability & Accountability Act), which protects patients' medical information. Specialized AI like Med-PaLM are undergoing rigorous inspection to ensure they comply with keeping patient information secure (Alder 2022).

IV. Jobs Safe from AI

AI isn't acceptable in all workplaces, however. For example, in the artistic community, AI has raised lots of ethical questions when it comes to the pieces that it creates because it takes in millions of pieces of art and then spits something out, which is a large point of contention in the art community. This is because those essays, music, or art pieces were taken into the data pool without consent, and this causes lots of problems when it comes to how the AI actually creates material because the AI is built to mix in all those data points to provide a result and often the plagiarism from artists can be seen very clearly. Another place where AI would be ill-advised is in sectors that are highly unpredictable because AI relies upon past data to predict outcomes. When everything is unpredictable, AI will struggle to perform its expected duty. The final category of jobs that are ill-fitted for AI are jobs that deal with working with many groups of people or leadership roles because AI is not yet capable of directly interacting with humans with great ease, which will make it quite difficult to work with. All of these limitations on the capabilities of AI essentially restrict it so that many jobs will still persist in this new age of technology, and protect workers like artists, managers, stock brokers, construction, etc (Manyika 2017).

4. Role of Unions

Even still all jobs need a certain amount of protection no matter how close AI is to taking them. Unions are the solution to this. Unions are entities that safeguard workers' rights from unethical practices by employers. With the current AI revolution, they need to be more present than ever to ensure that as many workers can stay out of unemployment. In the past, unions have been quite passive, only reacting to developments. Now is not the time to be passive, and unions should try to anticipate what will happen to the labor market. They could achieve this by getting in touch with technology experts and other people who understand the capabilities of AI better. In addition, they should be able to help workers navigate a new world that will use AI to keep up with the increasing skill demand (Nissim 2021).

One example of a union that has done a good job in navigating this new territory would be the Culinary Workers Union (Local 226). They have fought for protections that will provide security to workers. They have demanded 6-month notification for any type of automation that will possibly replace jobs, and free job retraining by employers if new technology is introduced into the workplace, among other things that protect workers from not only AI but other sources

of automation too. This shows that these demands are possible and that if implemented more widely all workers can have more job security.

5. Conclusion

The introduction of AI to the workplace has been a huge event in human history because the way we work will never be the same anymore. AI joining the workplace will change the labor landscape and replace many jobs, but it has the potential to be a great tool that can be used in thousands of applications. With it, many avenues open up for optimizing the workplace, which can increase productivity tremendously. AI has the potential to create millions of jobs in the future, and it will help people increase their work productivity. With the right guidance from groups like unions, the workers will be able to gain a lot from this.

6. Limitations

The field of AI is still developing and its capabilities are ever-growing, which means that many of these observations are subject to change. For example, the jobs that are safe from AI currently can be at risk if AI develops skills like empathy, creativity, and risk-taking. In addition predictions many years into the future can be uncertain more often than not.

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