The opportunities and risks of employment under the impact of artificial intelligence

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Abstract. This paper studies the complex relationship between artificial intelligence and employment, exploring both opportunities and challenges presented by this rapidly evolving technology. As artificial intelligence continues to advance at an unprecedented pace, it is reshaping industries and raising significant concerns about its impact on jobs. The research investigates how artificial intelligence is capable of not only transforming existing roles but also potentially eliminating certain positions entirely. The study analyzes potential challenges posed by artificial intelligence integration in the workforce and proposes possible solutions to prepare for upcoming shifts in the job market. The importance of proactive measures to address challenges and harness opportunities in the evolving landscape of work is emphasized.

1 Introduction

The rapid advancement of artificial intelligence (AI) has brought about transformative changes across numerous sectors of human society. While AI is not a new concept, recent breakthroughs in algorithmic design, computational power, and data aggregation have significantly expanded its potential applications. These developments have enabled AI to exert an increasing influence in fields such as manufacturing, healthcare, and beyond, raising critical ethical questions about its broader implications. The ongoing evolution of AI presents a complex challenge: while its continuous improvement is essential for technological progress, it also has the potential to fundamentally and irreversibly reshape the global job market. As AI systems become more sophisticated, they are increasingly capable of automating tasks that were once thought to require human intelligence, thereby threatening to displace workers across various industries [1].

This transformation necessitates a comprehensive examination of AI's impact on employment structures, workforce dynamics, and the broader socioeconomic landscape. On one hand, integrating AI into different sectors promises enhanced efficiency and productivity; on the other hand, it poses significant challenges such as job displacement, skill obsolescence, and widening economic inequality. The stability of the job market is crucial for individuals to plan their futures and build their lives around their professions. However,

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this stability is now under threat as AI and other advanced technologies continue to replace roles traditionally held by humans. While new jobs may emerge in response to technological innovation, the pace at which existing jobs are being displaced often exceeds the rate at which new opportunities are created.

The consequences of this shift extend beyond employment itself. Economic disparities may widen as certain professions become obsolete, and ethical concerns arise regarding the loss of purpose and identity for displaced workers, potentially leading to mental health challenges. Despite these risks, the capabilities of AI often outweigh its drawbacks when applied effectively. Nevertheless, solutions are urgently needed to manage this transition and enable coexistence between humans and AI in the workplace.

Historically, technological advancements have always influenced employment patterns by displacing certain jobs while creating others. However, the rapid development of modern technologies - particularly AI - has accelerated this process dramatically. Many repetitive or routine tasks in industries such as manufacturing, data analysis, and content creation are now being automated. For example, automated vehicles reduce the need for drivers, while AI-powered tools replace roles in grammar correction, translation, copywriting, and even creative fields like art and design. Generative AI tools capable of producing images, videos, and audio are also threatening jobs in the creative industries [2,3].

AI's unique strength lies in its ability to mimic human cognitive abilities when combined with vast amounts of data and other technologies. Although currently in its early stages of development - often described as below human-level intelligence - AI already demonstrates capabilities that surpass human performance in specific areas. Its potential is vast and continues to grow with each iteration. As a result, professions across various sectors are increasingly at risk of being replaced by AI-driven systems.

This paper explores the profound impact of artificial intelligence on the workforce by analyzing how it displaces certain professions while also creating new opportunities. It examines both the advantages and disadvantages of this technological shift and discusses potential strategies for mitigating its negative effects. By understanding AI's current capabilities and future trajectory, this work aims to provide insights into how society can adapt to these challenges while maximizing the benefits that AI offers for human progress.

2 Materials and methods

The job market has been unstable in recent years, not solely due to artificial intelligence but as a result of a changing world. Overpopulation, global warming, land erosion, an unstable climate, clean water shortages, and technological progress threaten to impact the job market on a greater scale. However, with advancements in the algorithmic field, the influence has skyrocketed. Its capability to automate any system is unimaginable, with countless applications. Each day brings new technology, approaches, or ideas that utilize artificial intelligence. No sector can avoid artificial intelligence if it wants to survive in the game of adaptation and transformation [4].

By examining the applications of artificial intelligence, one can see its power to influence the job market. This technology not only initiates minor or severe changes in sectors but also renders reliance on certain jobs futile. It is well-known that this technology revolutionized manufacturing processes, reducing the workforce to only a few operators, though even they can be removed due to advancements in full autonomy. However, due to safety concerns, some personnel are retained. It is essential to examine fields where artificial intelligence has removed protections that were once in demand. If this technology can bring such dramatic change in a short period, what will we face in the near future? Further examples illustrate only a small portion of the displacement of jobs.

The most vital sectors are under transformation due to advancements in artificial intelligence. Medicine, traditionally considered one of the most stable fields, is also seeing a reduction in personnel due to the integration of artificial intelligence. Medical diagnostics, for example, can now be completed with greater efficiency through artificial intelligence. Mechanical arms and other AI-powered mechanisms are used in surgeries. With further improvements in artificial intelligence and other components, the necessity for surgeons may come into question.

Language models like ChatGPT, Bard, Gemini, Llama, and similar tools have quickly displaced writers in producing articles, blog posts, marketing copy, and even technical writing [5,6]. These and similar professions have been impacted as the tools perform far better and, most importantly, in just seconds. Customer support, both text and audio, has been replaced by chatbots and artificial voices. Translation and transcription are widely available in most tools enhanced by artificial intelligence. Even teaching professions are at risk; for instance, if someone wants to learn a new language, they may only need a model like ChatGPT. It can adapt to a person's language level through a few prompts or direct interaction, providing corrections and adjustments as needed. Image and video generation represent another part of this technology's capabilities, as artificial intelligence can now mimic, adjust, or combine images based on simple prompts. Currently, image generation provides results that are difficult to distinguish from real photos, though video generation is still developing. Even music can be created from prompts or small samples. In other words, artificial intelligence has embedded itself into every conceivable area, automating processes where human labor is unnecessary [7,8].

It is unnecessary to list all the fields where artificial intelligence reduces human workforce to make a point. It is evident that this trend of job displacement will continue and expand its scope of influence daily. One thing is certain: there is likely no profession this technology will overlook.

3 Results and discussion

3.1 The impact of artificial intelligence on job market

Once, manufacturing was the main provider of various jobs for the population of our planet. Right now, it can be named as the main sector that replaces human workforce in countless rate. Almost all of the manufacturing processes are automated by the use of mechanical robotics and artificial intelligence. Figure 1 illustrates this sector and its vulnerability. These automated systems work without stop, require no payment, and reduce human errors from the process. however, there are still ongoing changes in this sector, and they are not for the workforce [9-10].

Other jobs that require less knowledge in production creation but more in administrative tasks are also influenced by the improvement of technologies. For instance, data entry, scheduling, invoicing, and document sorting are all in the circle of disappearance as novel technologies do it faster and with precision. There are dozens of different tools and software packages that are able to process massive data and provide outcomes that are similar to human work [11].

Customer services are also under threat of full elimination. Chatbots and virtual assistants are replacing real humans. In some cases, virtual assistants can be used to communicate with other virtual assistants as some companies use them as spam. Due to the improvement of natural language processing, many tools have occurred that can directly communicate with real humans as well as with alike [12].
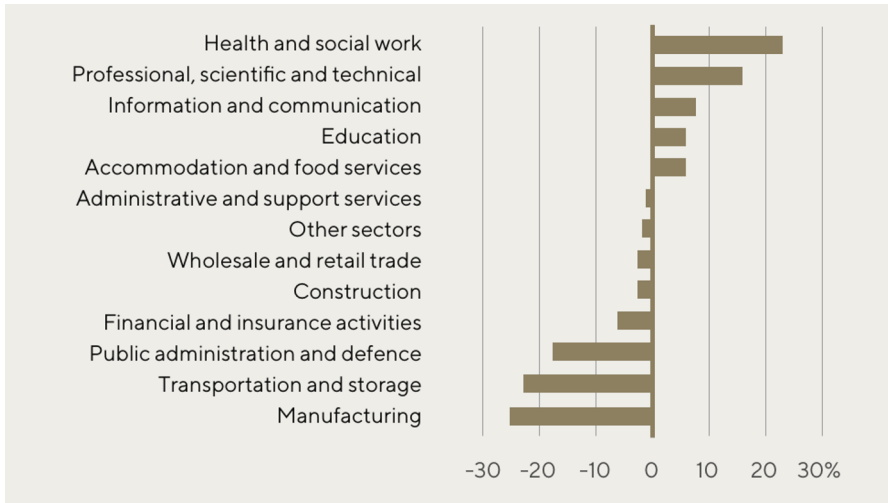
Fig. 1. Predicted net job creation by sectors (2017-2037).

Retail can be automated to a level that replacement of humans will be as inevitable as the technology regression. The integration of new self-checkouts is negatively influencing personnel as with each machine occurrence there is a possibility for the worker to be replaced. There are even some stores that have fully eliminated real personnel and introduced self-checkouts.

It is hard to imagine, but most of the vehicles in major industries such as agriculture and manufacturing are working with autonomy. The need for the driver in some cases is essential, but most of the time they can be replaced by the built-in hardware and algorithms. These vehicles work precisely and do not waste energy when not in use. They also can save all road paths, environment, and interactions, and the performed tasks.

Jobs such as paralegals and junior accountants are increasingly impacted by the technological impact, especially with the occurrence of artificial intelligence. Such jobs can be replaced as modern technologies provide a wide range of task-solving tools that are more efficient.

3.2 The danger of artificial intelligence

It was found in the context of job loss, artificial intelligence fuels instability, pushing the situation toward a dangerous state. Mass unemployment is one of the possible consequences of this technology, with projected improvements only increasing these numbers. Figure 2 illustrates how vulnerable most of the jobs are due to occurrence of artificial intelligence. This issue is exacerbated by overpopulation. The challenge with this technology is that its future state is unpredictable, making it difficult to prepare. Additionally, as the technology evolves, it may fill positions quicker than people can adjust to the new reality [5].

The main advantage of artificial intelligence lies in its capability to automate processes to unimaginable levels. However, within this lies its danger: reliance on a technology that has only been around for a few years. Some industries implement AI-powered tools without concern for how they might affect various fields. While artificial intelligence increases production and reduces labor, its future impact remains unknown and may prove surprisingly adverse. Some scientists provide data showing that AI reduces the environmental impact of manufacturing. Through focused analysis, one may note AI's positive effects on workforce efficiency, waste reduction, and energy consumption in the end product. However, a major

risk is that increased production could negate these benefits on a larger scale, emphasizing the need to measure AI's impact by considering multiple variables for accurate results [6,7].
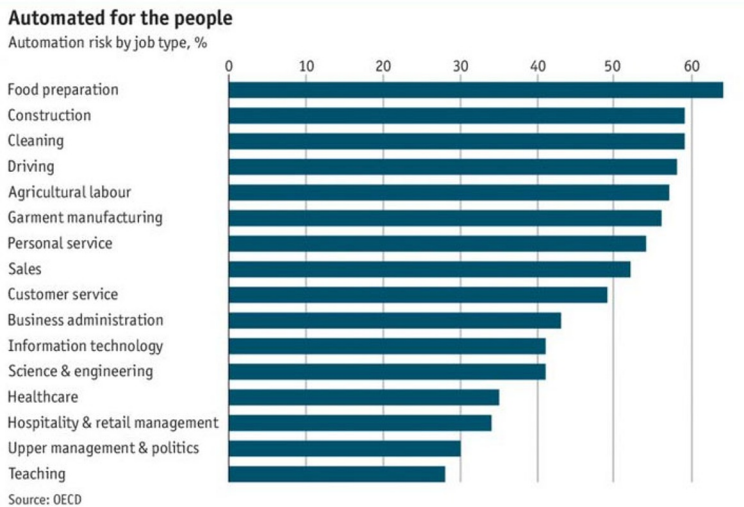
Automated for the people
Automation risk by job type, %

Job type	Risk
Food preparation	
Construction	
Cleaning	
Driving	
Agricultural labour	
Garment manufacturing	
Personal service	
Sales	
Customer service	
Business administration	
Information technology	
Science & engineering	
Healthcare	
Hospitality & retail management	
Upper management & politics	
Teaching	

Source: OECD

Fig. 2. Jobs vulnerable to automation.

Autonomy in terms of job loss introduces other issues, such as skill deterioration and over-reliance on technology. We are only beginning to understand the issue, and it is challenging to predict its full impact. It seems clear that the future will involve extensive autonomy, potentially leaving people without the necessary skills to survive independently. Autonomy also raises other issues, such as system collapses, dependency on technology, security vulnerabilities, data breaches, and more [13].

It is understandable to maintain a high level of autonomy in sectors necessary for population sustainability. However, in essential areas like medicine, human lives depend on each decision, and reliance on AI raises concerns. Human error is inevitable in any field, yet technological errors are also a reality. While artificial intelligence excels in repetitive and specialized tasks, unexpected situations during processes, such as operations, could present challenges if solely managed by machines.

This technology by itself does not affect humans, but its use in specific situations raises red flags. Some of its issues may be resolved soon, but the overarching threat - human replacement - will remain.

3.3 Proposed solutions to address the impact of AI on employment

There are many potential solutions from both workforce and industry perspectives. From the workforce perspective, choosing future professions wisely is crucial. Analysing job trends can help identify which jobs are in demand and will likely remain so. However, even with the best forecasts, there is still the possibility of change. From an industry perspective, regulating workforce numbers depends on leadership discretion. The following suggestions provide some possible workforce solutions, excluding industries due to their predictable behavior of prioritizing their interests.

1. Reskilling and Upskilling: with a changing world, it is essential to prepare for upcoming challenges. Though radical, reskilling and upskilling allow individuals to shift careers and secure their jobs. Many courses are available online with flexible timing and formats [10].

2. Lifelong Learning: this approach enables the workforce to prepare for unpredictable situations. Ongoing education programs help workers regularly update their skills, making them more adaptable [11].

3. Plan B: in an unstable job market, having a backup plan is crucial. Even if a current profession is in demand, it may be replaced by new technologies or artificial intelligence. Developing secondary skills or knowledge in emerging fields provides an easy transition if needed.

4. AI as a Solution: artificial intelligence itself provides job opportunities. As AI was previously criticized for job loss, it also introduces new professions. This technology offers opportunities for those knowledgeable in AI, with new roles emerging as technology advances [12-13].
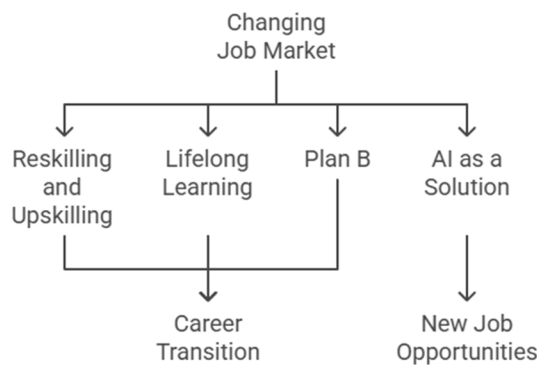

Fig. 3. Conceptual framework for addressing job market transformation in the age of AI.

The diagram in Figure 3 illustrates the key strategies and pathways for workforce adaptation in response to the changing job market, showing how different approaches like reskilling, lifelong learning, and having alternative plans (Plan B) converge into career transitions, while AI itself creates new job opportunities as a parallel solution.

3.4 Discussion

The future trajectory of artificial intelligence (AI) and its impact on the job market can be understood through three broad scenarios: realistic, possible, and unpredictable. In the realistic scenario, based on current data and trends, AI technology is expected to continue its exponential growth, expanding its influence across various sectors. This growth will likely lead to the elimination of more jobs, particularly those involving repetitive tasks or processes that can be easily automated. However, alongside this displacement, new roles are anticipated to emerge, although their creation may not keep pace with the rate of job elimination.

The possible scenario considers the three stages of AI development: below human intelligence, at par with human intelligence, and surpassing human intelligence. In this context, AI may evolve more rapidly than anticipated, rendering current predictions less reliable. Such accelerated progress could introduce unforeseen challenges and opportunities in the job market, potentially reshaping it in ways that are difficult to predict.

The unpredictable scenario includes outcomes that seem highly unlikely based on current trends. These might involve AI having no significant impact on the job market, the creation of new jobs outpacing job losses, or an increased demand for human workers. While these

outcomes appear improbable, they highlight the inherent uncertainty surrounding technological advancements.

Addressing these challenges requires solutions from both workforce and industry perspectives. From the workforce side, careful career selection is essential by analyzing job trends to identify stable and in-demand professions while remaining adaptable to change. Reskilling and upskilling are critical strategies for adapting to new career opportunities, with online courses offering flexible options for acquiring new skills. Lifelong learning also plays a key role by enabling individuals to regularly update their skills and increase adaptability in a dynamic job market. In addition, having a backup plan is vital in an uncertain employment environment; developing additional skills or expertise in emerging fields can facilitate smoother career transitions if primary professions become obsolete. Furthermore, AI itself presents new opportunities as it creates roles for those knowledgeable in its applications, with more opportunities emerging as the technology evolves.

From an industry perspective, workforce management must balance technological advancement with considerations for employees, though industries often prioritize their own interests. Ethical considerations are crucial in implementing AI responsibly to mitigate the societal impact of job displacement. Collaboration with educational institutions is another important step to ensure that workforce skills align with evolving industry needs.

While AI poses significant challenges to the job market through displacement and restructuring, it also offers opportunities for adaptation and growth. Proactive skill development, adaptability, and engagement with emerging technologies will be essential for navigating this transformation. By addressing these challenges collaboratively from both workforce and industry perspectives, society can work toward a future where humans and AI coexist productively in the workplace.

4 Conclusion

Artificial intelligence has emerged as a major driver of innovation across various industries, including manufacturing, medicine, and finance. However, it also poses a significant threat to employment in these sectors. As highlighted in this study, stable employment that provides both mental and financial support is crucial for individuals. Yet, the increasing adoption of AI technologies is eroding job security for many workers.

Our research indicates that the scope of job displacement due to AI is likely to expand in the coming years. This work aimed to illustrate the substantial threat that AI and related technologies pose to the job market. However, we have also presented several strategies that can be implemented to mitigate the negative effects of this technological shift.

Key recommendations to address the impact of AI on employment include proactive measures for workforce adaptation. Reskilling and upskilling programs are essential to help workers adapt to new roles in the changing job market. Embracing lifelong learning is crucial for remaining adaptable as industries evolve. Developing backup career plans provides alternatives if primary professions become obsolete due to technological advancements. Additionally, exploring new opportunities created by AI itself is important, as the technology generates demand for new skills and roles.

While AI presents significant challenges through job displacement and market restructuring, it also offers opportunities for adaptation and growth. Proactive skill development, adaptability, and engagement with emerging technologies will be essential for navigating this transformation. By addressing these challenges collaboratively from both workforce and industry perspectives, society can work toward a future where humans and AI coexist productively in the workplace.

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