



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Indulge in A.I. Life - Later Curse on Employees: Study on Future Jobs

*Ishita Jain

*¹Kumkum Chandel

*²Tejal Thakkar

Assistant Professor Monika Seth, Department of Humanities

*Student- Department of Electronics and Telecommunication, -¹²Department of Electronics Engineering

Shri Ramdeobaba College of Engineering and Management

Shri Rashtrasant Tukadoji Maharaj Nagpur University

April 07, 2021

The Impacts of Artificial Intelligence (AI) in the future of jobs: A Literature Review

Abstract

With the number of Artificial Intelligence increasing and gaining popularity due to the emerging era of innovation and technological advancement, it spurs the discussion of what are the impacts of AI in the future of jobs. This study aims to objectively review published scholarly articles and assess the literature on the use of AI and its impact on the future of jobs. We hypothesized whether AI usage will displace the future of jobs. The Google scholar database was used to explore relevant literature sources. AI utilization that will augment and create more jobs than replacing them would be more useful in the future. Further research focusing on AI prediction outcomes on the future of jobs need to be developed to provide a clear approach and direction for the future.

Keywords: Artificial Intelligence, Future of jobs, automation

1. Introduction

Globally, Artificial Intelligence (AI) is rapidly evolving and becoming a key aspect of technological advances, with high potential of impacting the future of jobs (Mitchell & Brynjolfsson, 2017; Frank et al, 2019). AI is not only, playing an important role in the field of computer science but also in nearly all sectors. According to Rutkin (2013), several predictions showed the possibilities of huge loss in jobs opportunity up to about 50% of the current job availability by 2025. More automation as a result of AI usage is exerting a significant proportion of work at risk (Olhede & Wolfe, 2020). The new trends in the “advances in technology pose huge challenges for jobs” (Mitchell & Brynjolfsson, 2017). This may be viewed in terms of how these technologies may displace manpower as they perform efficiently better in a highly labour-intensive industry than human (Boyd & Holton, 2018; Tuo et al., 2021). Besides, they provide a deeper involvement and interactive experiences (Tuo et al., 2021), as well as provision of “personalized and customized products and services for any industry based on developed designs” (Adami, 2015).

In the previous centuries, regular speculation and warnings on the impacts of new technologies forecast on the greater loss of job opportunities i.e it would consequently reduce the number of employment of middle-class group, (D. H. Autor, 2015; Manyika, et al. 2017; Ogbolu & Sukidjo, 2020). The majority of employment across various sectors are all generally threatened by the advancement of AI (Ogbolu & Sukidjo, 2020). AI has changed the way we conduct our day to day activities as contrasted to earlier years. New innovations facilitate performance of several tasks with minimal interaction with a human. Although it comes with benefits it is as well seen as a great future problematic concern in terms of the future of jobs (Manuel Au-Yong-Oliveira, 2020). This study addresses the rising concerns on the development of AI. The main specific research question is to objectively review published scholarly articles to compile a list of AI usage and its impact on the future of jobs. We hypothesized whether the use of AI will displace the future of jobs.

2. Background

AI has been in existence for quite a time. The emergence of AI dates back to 1956 when a conference on AI sessions was introduced at Dartmouth College (McCorduck et al. 1997). The majority of scientists and researchers have varied definitions for AI, “there is no widely accepted definition” (Wang, 2019). According to Wang (2006), AI is the creation of intelligence as displayed by the human mind. AI in the context of computer technology involves the use of computer program to enable perform or execute reasoning operations which are much linked to the intelligence of human beings (Wisskirchen et al. 2017; Bruun & Duka, 2018). It means “making machines fit for performing intelligent task undertakings like human beings” (Hussain, 2018). Other scholars are interested in the association between AI and human intelligence (Tuo et al. 2021). Furthermore, AI is categorized into three types which are, Weak AI- that can replace some elements of humans, Strong AI which has higher learning capabilities and super Intelligence which composed highest capabilities exceeding those of human (He, 2017; Tuo et al. 2021).

Automation has been in use over the years since the period of a steam engine to now computers and the internets. At every step, progressive technological advances yield manpower replacement with the machine (McDonald et al.,2018). Schwab (2017) described the growth of AI advancement as the “fourth industrial revolution”. These innovations will drastically create an impact on society, as “job automation with AI is becoming the prevailing trend across different industries”(Su, 2018). The goal of AI is for computers to be able to implement a theory of intelligence and reproduce abilities to solve practical problems (Wang, 2006). Throughout the periods of industrialization, a lot of fears and doubt on massive unemployment resulting from automation and the use of AI was thought of, but it is yet to be realized. Some are of the views that innovation and automation would minimize the costs and ease the labour allowing more focus on the economic growth and thus would generate more new jobs than unexpected, this will offset the fear of job losses(Halal et al. 2016).

The trends of AI patent application worldwide shows an increasing pattern over the years (Figure 1). The application of AI has created a rapid shift of technological advancements that are likely to affect the global labour market (Ernst, 2019). The pattern depicts a scenario of more shift to AI technologies annually than other models (Fujii and Managi, 2019). This trend might grow exponentially over the next years resulting in an impact on unemployment.

Figure 1. Trends of AI patents worldwide



Source: Fujii and Managi (2018).

Several studies have been conducted in AI applications and its impacts on future jobs in a major domain (Smith & Anderson, 2014; Halal et al. 2016; Wisskirchen et al. 2017; Bessen, 2018; Bruun & Duka, 2018) but it still requires comprehensive literature reviews that further explore and gives an in-depth discussion on future jobs in the era of innovative technologies. This paper explores and discusses an in-depth literature review of AI Usage in the scenario of future jobs. Numerous researchers have varied views on the future impacts of AI on jobs. The majority are of the view that AI will greatly increase job opportunities while others believe that the usage of these technologies will pose a threat of huge job loss to many (Bessen, 2016).

3. Methodology

To get an insight into AI concerns on the future of jobs, the google scholar database was purposely utilized to explore relevant sources. Recent literature on the development of AI and its impacts on future jobs were searched for this purpose. Only academic journal articles or materials published were used due to their peer-review quality. The string search or keyword used for accessing these journals were “Artificial Intelligence” and “future of jobs”. The articles were thoroughly assessed by reading their abstract and the whole paper to facilitate proper synthesize of the results. The recent research articles published between 2014 up to date were purposely selected for this study, as this would provide recent findings in the development and advancement of AI and how it would have an effect on the future of jobs.

The result from the ‘keywords search’ that is “AI and future jobs” ended in obtaining 26 articles, out of this 9 articles were found to be relevant sources regarding the hypothesis of the study. The scope of this inquiry was to explore the significance of AI on the future of jobs. From the search of relevant literature, we distinguished two scenarios in regards to the impact of AI on the future of jobs. These scenarios include; future full employment and future unemployment crisis impacts. The majority of scholars are divided, approximately half of them are of the view that AI development would result in the generation of adequate employment opportunities in the future modern markets and compensate the lost ones (Anderson & Smith, 2014). While the other half do strongly believe that AI has the potential impact on the displacement of manpower across all sectors in the future.

3.1 The full employment impact in the future

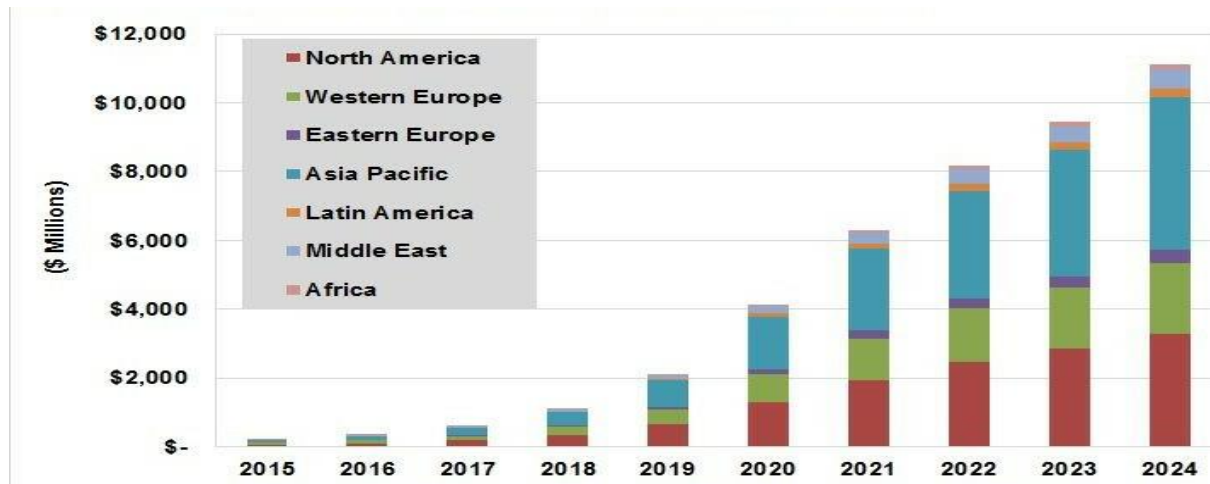
Smith and Anderson (2014) show huge connections across different industries such as transport and logistics, medical care, customer care, home maintenance just to mention a few. The key findings from their studies show that although the advances in technology would result in the displacement of certain types of jobs in the future, historically perspectives clearly show to have a net jobs creator. we will adjust to these innovations changes and invent new jobs types by taking advantages of these unique human capabilities. We will be able to free from day to day huge manual workload and focus on better types of work which would be positively and socially beneficial. Further, they concluded that “as a society” we “control our destiny through the choices we make”, hence we have a control to positively contribute towards our future outcomes.

According to Halal et al. (2017), their study aimed at forecasting AI and future jobs in 2030. The positive finding from their study shows approximate about 30% of the possibilities of shift into this era of innovations would create a phase of job creation growth as the “world is likely to muddle through the threat of massive unemployment”. Huge creative works would emerge as a result of ‘muddling in the threat’ generated from the use of AI will increase the creations of new jobs as well as new ventures start-up thus fostering sound growth.

Bughin, (2018) conducted a study on “why AI isn’t the death of jobs”. In this inquiry, Bughin ran a variety of scenarios from a pool of data and examined the impacts of AI on employment, revenue as well as profitability. The research findings predicted that AI won’t much lead to huge loss of jobs this is because the innovation-focused brought by the new advancement would tend to boost employment. Moreover, Global AI revenue by region world

markets 2015-2024 (Figure 2), shows the rapid growth of revenues with many nations investing more into AI research and development.

Figure 2. AI revenue by region, world markets 2015-2024



Source: Tractica; Faggella, (2018)

Fleming, (2019) focused on “why robots might not want to steal your job”. In this study based on the current rapid pace of advancement in computerization, jobs have not yet disappeared. He concluded that the impacts of AI may be significant, but massive unemployment may not be realized given the fact that AI and digitalization are much hindered by socio-economic and organizational forces which contribute towards their implementation. Moreover, automation may facilitate low-skilled jobs to flourish creating more jobs opportunities impacting positively on the future of jobs.

3.2 The future unemployment crisis effect

Smith and Anderson (2014) carried out an inquiry on “AI, Robotics, and the Future of Jobs”. In this investigation, the key reasons to be of concern from their findings were; the impacts of the coming wave of innovation advancement would threaten the majority of white-collar jobs, some highly-skilled workers may be displaced into lower-paying service or loss their job permanently. Moreover, their studies found that our current system of education, political and economic institutions are not sufficiently prepared and tailored towards adjustment to the future development of innovations and work, this would adversely have negative effects (Smith and Anderson, 2014).

The advancement of AI would rapidly increase the use of automation and thus leading to the widespread displacement of routine jobs (Halal et al. 2017), acceleration of automation would bring the crisis to millions of people as a result of the reduction of jobs since AI would eliminate complex skills. However, they concluded that surviving through this phase “would be a prudent way for humanity” to find its way safely. The future development in the advancement of innovations will see the huge displacement of manpower (Bruun & Duka, 2018), this would “make the existing relationship between economic agents in the society untenable” as the countries national budget will be exploded. Bruun and Duka (2018) in their studies seek the need for significant adjustment to the current economic system to survive the effect of future development of AI. However, their studies proposed the concept of “unconditional universal basic income (UUBI)“, this is a kind of voluntary redistribution of income from the

government to all citizen of a nation at regular intervals. This would aid in reducing the effects related to the displacement of job opportunities due to the use of automation of machines (AI).

A study was done by Omary, (2018) to examined the AI effects on employment in the future. The use of AI can execute a wider range of manual jobs, this will lead to a change like work environment across all the sectors of occupations. The findings indicate that “ about 42 per cent of the Canadian labour force at risk of being affected by automation”.

Au-Yong-Oliveira et al. (2019), explored the “role of AI and automation on the future of jobs and the opportunity to change society” Their finding perceived a high percentage of unemployment impact on people with education due to automation. Their explanations show that education classes of people will differently affect people differently, individual having either “high or low-level education” are less to be affected as opposed to those in the middle category of education. The plausible reasons behind this are that those low types of jobs do not require any specializations and thus are cheaper than the cost of using automation of machine.

According to Ogbolu and Sukidjo (2020), aimed to concurrently examine the “future of jobs amidst the rise of AI; How ready are Asian undergraduates?”. Through survey interviews with the sample respondents, they found that approximately 70 per cent of the respondents were having adaptability satisfactions with the effects of AI, though with mixed feeling in relations to forces AI in the future workplace.

4. Conclusion

AI and the use of advanced technologies have the potential to impact how the future of works would be carried out. There is considerable evidence that AI can generate more jobs as well as lead to a massive unemployment crisis. This paper was based on the hypothesis as to whether the use of AI would displace the future of jobs. Presently, some substantial manifestation of impacts of AI on employment are seen and they are perceived to generate a more important effect in the future of jobs. The use and development of AI that will augment and create more jobs in the future than replacing them would be more useful. Further investigation focusing on the prediction of AI outcomes on the future of jobs need to be developed to provide a clear approach and direction for the future.

Reference

- Adami C (2015) Artificial intelligence: robots with instincts. *Nature* 521(7553):426–427
- Au-Yong-Oliveira, M., Canastro, D., Oliveira, J., Tomás, J., Amorim, S., & Moreira, F. (2019). The Role of AI and Automation on the Future of Jobs and the Opportunity to Change Society. In *World Conference on Information Systems and Technologies* (pp. 348-357). Springer, Cham.
- Bessen, J. (2018). *AI and Jobs: The role of demand* (No. w24235). National Bureau of Economic Research.
- Bessen, J.E. (2016): How computer automation affects occupations: technology, jobs, and skills. Boston University School of Law, Law & Economics Working Paper No. 15–49 (2016)
- Boyd R, Holton RJ (2018) Technology, innovation, employment and power: does robotics and artificial intelligence really mean social transformation? *J Sociol* 54(3):331–345
- Bruun, E. P., & Duka, A. (2018). Artificial intelligence, jobs and the future of work: Racing with the machines. *Basic Income Studies*, 13(2).
- Bughin, J. (2018). Why AI isn't the death of jobs. *MIT Sloan Management Review*, 59(4), 42-46.
- D. H. Autor, 2015. "Why Are There Still So Many Jobs? The History and Future of Workplace Automation," *Journal of Economic Perspectives*, vol. 29, no. 3, pp 3-30, doi: 10.1257/jep.29.3.3.
- Faggella, D. (2018). Valuing the artificial intelligence market, graphs and predictions. *Tech Emergence*, 12.
- Fleming P (2019) Robots and organization studies: why robots might not want to steal your job. *Organ Stud* 40(1):23–37
- Frank, M. R., Autor, D., Bessen, J. E., Brynjolfsson, E., Cebrian, M., Deming, D. J., ... & Rahwan, I. (2019). Toward understanding the impact of artificial intelligence on labor. *Proceedings of the National Academy of Sciences*, 116(14), 6531-6539.
- Fujii, H, and S Managi (2017), "Trends and Priority Shifts in Artificial Intelligence Technology Invention: A global patent analysis," RIETI Discussion Paper Series 17-E-066
- Halal, W., Kolber, J., Davies, O., & Global, T. (2017). Forecasts of AI and future jobs in 2030: Muddling through likely, with two alternative scenarios. *Journal of Futures Studies*, 21(2), 83-96.
- He, Z. (2017). Social transformation and administrative ethics in the era of artificial intelligence: can machines manage people? *Electron Gov* 11:2–10
- Hussain, K. (2018). Artificial Intelligence and its Applications goal. *Artificial Intelligence*, 5(01).
- J. Manyika, et al. (2017). "Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation," McKinsey Glob. Inst.
- McCorduck, P., Minsky, M., Selfridge, O. G., & Simon, H. A. (1977). History of artificial intelligence. In *IJCAI* (pp. 951-954).
- McDonald, P., Cathcart, A., Grant-Smith, D., Laundon, M., Mayes, R., Moore, K., & Williams, P. (2018). Submission to the Select Committee on the Future of Work and Workers. *Submission to the Select Committee on the Future of Work and Workers*.

- McKinsey Global Institute, (2017) “Jobs lost, jobs gained: What the future of work will mean for jobs, skills, and wages,” 2017. Accessed: May 1, 2020. [Online]. Available: <https://www.mckinsey.com/featured-insights/future-ofwork/jobs-lost-jobs-gained-what-the-future-of-work-willmean-for-jobs-skills-and-wages>.
- Mitchell, T., & Brynjolfsson, E. (2017). Track how technology is transforming work. *Nature News*, 544(7650), 290.
- Ogbolu, A. N., & Sukidjo, S. (2020). Artificial Intelligence Vs My Future Job: Perceptions of Asian Undergraduates. *Journal of Robotics and Control (JRC)*, 1(6), 208-212.
- Omary, J. (2018). Jobs and University Skills: Artificial Intelligence Effects on Employment in the Future.
- Rutkin, A. H. (2013). Report suggests nearly half of U.S. jobs are vulnerable to computerization. MIT Technology Review. Retrieved April 02 2021, from <https://www.technologyreview.com/2013/09/12/176475/report-suggests-nearly-half-of-us-jobs-are-vulnerable-to-computerization/>
- Schwab, K. (2017). *The fourth industrial revolution*. Currency.
- Smith, A., & Anderson, J. (2014). AI, Robotics, and the Future of Jobs. *Pew Research Center*, 6, 51.
- Smith, A., & Anderson, J. (2014). AI, Robotics, and the Future of Jobs. *Pew Research Center*, 6, 51.
- Su, G. (2018). Unemployment in the AI Age. *AI Matters*, 3(4), 35-43.
- Tuo, Y., Ning, L., & Zhu, A. (2021). How Artificial Intelligence Will Change the Future of Tourism Industry: The Practice in China. In *Information and Communication Technologies in Tourism 2021* (pp. 83-94). Springer, Cham.
- Wang, P. (2006). The Goal of Artificial Intelligence. *Rigid Flexibility: The Logic of Intelligence*, 3-27.
- Wang, P. (2019). On defining artificial intelligence. *Journal of Artificial General Intelligence*, 10(2), 1-37.
- Wisskirchen, G., Biacabe, B. T., Bormann, U., Muntz, A., Niehaus, G., Soler, G. J., & von Brauchitsch, B. (2017). Artificial intelligence and robotics and their impact on the workplace. *IBA Global Employment Institute*, 11(5), 49-67.