Archives available at journals.mriindia.com

International Journal on Advanced Computer Theory and Engineering

ISSN: 2319-2526
Volume 14 Issue 01, 2025

The Impact of Artificial Intelligence on Job Market

Harshada Murme[1], Vaishnavi Dakhare[2], Vaishnavi Bisane[3], Sapana Rao[4], Sakshi Wankhede[5]

[1-5]MCA Department Suryodaya College of Engineering & Technology, Nagpur. [1]harshadamurme@gmail.com,[2]vaishnavidakhare12@gmail.com,[3]bisanevaishnavi762@gmail.com,[4]sapna2000rao@gmail.com, [5]sakwan132000@gmail.com

Peer Review Information

Submission: 11 Feb 2025
Revision: 20 Mar 2025
Acceptance: 22 April 2025

Keywords

Artificial Intelligence
CRM
Transformation

Abstract

AI can automate existing tasks and contribute to inequality and discrimination; it also has the power to transform employment opportunities worldwide. Repetitive jobs are likely to diminish with the implementation of AI, but high-skilled jobs are expected to remain in the future. This paper examines the influence of AI machines on employment across sectors, highlighting the opportunities and challenges that will shape the working environment. The study draws on scholarly research, industry reports, and reputable blogs to explore the effects of AI on employment. By providing a comprehensive overview, the research paper sheds light on the impact of AI on jobs in India, considering the rapidly changing landscape of the Indian economy driven by global challenges. The technology sector in India has witnessed remarkable growth, contributing to advancements that have improved the lives of people in numerous ways. With a constant pursuit of change and development, this sector has become a driving force in creating impactful jobs, fostering skill development, and transforming the country's economy. The research paper examines the impact of AI on Employability in India and addresses several key points. Firstly, it highlights the emergence of new job roles and industries resulting from AI adoption, offering opportunities for job seekers and the importance of upskilling programs. Secondly, it explores the transformation of existing job roles through AI, emphasizing the need for reskilling to adapt to AI-driven workplaces. Thirdly, it discusses the concept of human-AI collaboration, enhancing productivity and efficiency. Additionally, it analyses the socioeconomic impact of AI, including its potential to bridge the skills gap and foster economic growth. Lastly, ethical considerations are discussed, emphasizing the need for fairness, transparency, and regulations to protect workers' rights.

Introduction

The social media has Recent empirical data elucidates the profound impact of AI on employment within India. As per a comprehensive report by the World Economic Forum, it is estimated that by the year 2025, around 5.1 million jobs in India will be displaced due to the pervasive influence of automation and AI technologies. The sectors projected to endure the greatest impact encompass manufacturing, retail, and transportation. Paradoxically, the report also highlights that AI implementation has

the potential to generate 2.3 million new jobs in India, predominantly within sectors such as healthcare, energy, and advanced manufacturing. Moreover, an insightful study conducted by the National Association of Software and Service Companies (NASSCOM) delves into the AI landscape prevalent in India. The study posits that the AI market in India is poised to reach a substantial valuation of $25 billion by 2025, with a robust compound annual growth rate of 30%. This impressive growth trajectory is propelled by the heightened adoption of AI in key sectors including banking, healthcare, and e-commerce. Furthermore, the study emphasizes the capacity of AI to augment productivity within these sectors, with a projected surge of 15-20% through effective AI implementation.

However, India grapples with persistent challenges that hinder the full realization of AI's potential. A noteworthy impediment lies in the scarcity of skilled professionals proficient in AI technologies. A study by Analytics India Magazine reveals a substantial deficit of approximately 200,000 AI professionals in India, underscoring the criticality of investing in educational initiatives and upskilling programs. Such endeavours are pivotal in nurturing a skilled workforce capable of driving AI innovation and seamless implementation.

The impact of AI on employment in India presents a nuanced scenario. While certain sectors may witness job displacement, AI simultaneously unveils new avenues for job creation and economic growth. India's imperative lies in bridging the existing skill gap and cultivating a robust AI ecosystem through substantial investments. By doing so, the nation can harness the transformative potential of AI, propelling itself into a promising future.

This research aims to investigate the influence of AI on job prospects and the associated opportunities and challenges that arise as a result. By analysing the multifaceted impact of AI on employment, this study seeks to provide insights into the changing landscape of the Indian workforce. withinside the cloud makes it tough to carry out auditing on information control even though the threat of privateness leakage is significantly reduced. This unique difficulty pursuits to convey collectively researchers and practitioners to talk

Overview Of Artificial Intelligence

Definition of AI and its key components:

In this section, the research paper will provide a clear definition of artificial intelligence (AI) and explain its key components. AI refers to the development of intelligent machines that can perform tasks that typically require human intelligence. The paper will discuss the concept of machine intelligence, including the ability to learn from data, reason, perceive the environment, and make decisions or take actions. It will highlight the distinction between narrow AI, which is focused on specific tasks, and general AI, which aims to exhibit human-like intelligence across a wide range of tasks. The key components of AI will be elucidated, including machine learning, robotics, natural language processing (NLP), and computer vision. Machine learning involves training algorithms to learn patterns from data and make predictions or take actions without being explicitly programmed. Robotics encompasses the design and development of physical machines that can interact with the physical world. NLP focuses on enabling machines to understand, generate, and respond to human language. Computer vision involves teaching machines to interpret and understand visual information from images or videos. This research aims to investigate the influence of AI on job prospects and the associated opportunities and challenges that arise as a result. By analysing the multifaceted impact of AI on employment, this study seeks to provide insights into the changing landscape of the Indian workforce.

Types of AI technologies (machine learning, robotics, natural language processing, etc.):

This subsection will provide an overview of the different types of AI technologies. The paper will delve into machine learning, which is a dominant AI technique that enables machines to improve performance on specific tasks through experience and data. It will discuss supervised learning, unsupervised learning, and reinforcement learning as key approaches within machine learning.

Additionally, the paper will explore robotics as a crucial aspect of AI, highlighting advancements in hardware and the integration of AI algorithms to enable robots to perform complex tasks. It will discuss the applications of robotics in industries such as manufacturing, logistics, and healthcare.

Furthermore, the paper will examine natural language processing (NLP) and its relevance in AI. NLP focuses on enabling machines to understand, process, and generate human language. It will discuss techniques such as sentiment analysis, speech recognition, and machine translation.

The paper will also touch upon other types of AI technologies, such as computer vision, which enables machines to interpret visual information, and expert systems, which utilize knowledge bases and inference engines to emulate human expertise in specific domains.

Objectives

1. To examine the impact of Artificial Intelligence (AI) on employment potential in India.
2. To identify the factors attributed to AI that contribute to job opportunities and challenges in the country.
3. To foster awareness regarding the intricacies of Artificial Intelligence (AI).
4. To scrutinize the profound impact of AI on employment potential across diverse sectors in India.
5. To discern and comprehend the challenges posed by AI on jobs with varying skill requirements, ranging from low to high, in different sectors.
6. To explore the plethora of job opportunities that arise as a consequence of AI adoption in India.

RESEARCH METHODOLOGY

The research methodology employed in this study encompasses the systematic collection and analysis of secondary data. The researcher conducted an extensive review of a multitude of articles, reports, and published papers relevant to the research topic. From a pool of 50 papers scrutinized, a rigorous selection process was undertaken, resulting in the inclusion of 20 papers that directly align with the research objectives. To ensure an exhaustive analysis, this research embraces a comprehensive approach by assimilating diverse sources of information.

These sources encompass scholarly research articles, industry reports, and reputable surveys. By drawing upon a multifaceted array of perspectives and data, a holistic understanding of the implications of AI on employment in India can be ascertained. The employed methodology encompasses both qualitative and quantitative analysis techniques, enabling an in-depth examination of the subject matter.

Analysis On The Problem

1. **Economic Analysis of the Changes in Labor Market:**

AI is like ChatGPT have many applications, such as language translation, computer code writing, and question-answering [12]. These are the corresponding abilities needed for certain jobs, such as translator, programmer, and teacher which means that AI can take over the jobs previously conducted by labour, known as the displacement effect of technology. Unlike other previous GPTs such as the steam engines, which affected the workers related to the production process, AI can have a greater impact on white-collar jobs in the tertiary sector such as accounting, consulting, and more due to its ability to understand and use natural languages. AI, in this case, a substitute for labor of much cheaper pay, could decrease the labour demand. This would result in shrinking wages and a lower level of employment at equilibrium in the classical model. However, according to the Keynesian model, wages are downwardly rigid due to the existence of trade unions, so the wage would remain sticky at the original level for a while. In conclusion, the displacement effect of AI and the "filter of workers without AI skills" are the reasons for the decrease in labour demand, and this would lead to different outcomes in the two models.

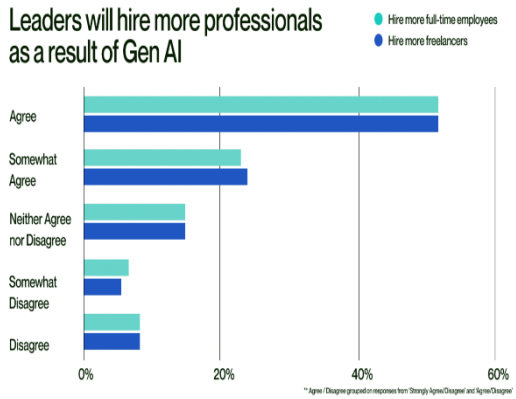

Figure 1 : Analysis of secondary data

AI could also increase labour demand as shown in the case described. First of all, AI created a whole series of new industries concerning AI-related research, development, and maintenance. In such industries, researchers or analysts need to innovate or reflect on the results from the models. For instance, careers like AI trainers and sustainers are created [3]. From the figure below, it can be witnessed that the market size of AI increased from 95,602.77 million U.S. dollars in 2021 to 142,319.8 million U.S. dollars just within a year and is projected to reach 1,847,495.6 million U.S. dollars by 2030 [13]. This is called the reinstatement effect, the opposite of the displacement effect mentioned above, which means new tasks and jobs being generated by certain technology (AI) in which labour has a comparative advantage which would increase labour demand [2]. AI, like other technologies, could also generate productivity effect in those non-automated tasks. AI can assist people in doing jobs like content creation (Jasper), grammar checking and paraphrasing (Grammarly), and even note-taking (Mem) [14]. These features could help workers work more efficiently and become more productive since employees can save their time doing menial tasks, thus allowing them to focus more on those value-adding task. A study done by the National Bureau of Economic Research used the data collected from 5,179 customer-supported agents

and found that with AI tools like ChatGPT, the productivity of workers increased by 14 percent on average [4]. The higher productivity will make labour more attractive, thus raising their demand. Furthermore, "higher productivity" could only be acquired when the specific worker has the skill set to use and apply AI tools. Hence, only those people could enjoy the growing demand from employers. In conclusion, the productivity effect and reinstatement effect would contribute to the increasing demand for labour, especially for those with AI-related skills, and in both classical and Keynesian models, equilibrium wage and employment are likely to increase.

2. AI And Job Market Dynamic:

Automation of Routine Tasks: This subsection will focus on the automation of routine tasks through AI technologies. It will discuss the impact of AI on jobs that involve repetitive and rule-based tasks, such as data entry, assembly line

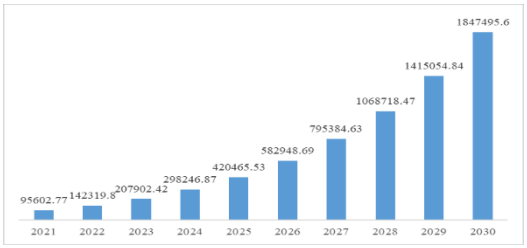

Figure 2: Artificial intelligence (AI) market size

work, and customer service. The paper will highlight how AI algorithms and robotics can perform these tasks more efficiently and accurately than humans. It will analyse the potential displacement of workers in certain occupations and industries due to the automation of these routine tasks, exploring the challenges faced by workers who may find their jobs obsolete or significantly altered by AI.

Augmentation of Human Capabilities: This subsection will delve into how AI can augment human capabilities in the workplace. It will emphasize the collaborative relationship between humans and AI systems, where AI technologies assist and enhance human productivity and efficiency. The paper will discuss examples of human-AI collaboration, such as AI-powered decision support systems, intelligent assistants, and machine learning algorithms that help professionals analyse complex data. It will also examine the emergence of new job roles and skills required in the AI era, emphasizing the importance of human adaptability and the need for continuous learning to leverage AI technologies effectively.

Shifts in Occupational Structure: This subsection will explore the shifts in occupational structure resulting from AI adoption. It will examine how AI technologies can change the demand for different types of jobs and skills. The paper will discuss the potential for job polarization, where there is a growing demand for high-skill jobs that involve creativity, problem-solving, and complex decision making, while low-skill jobs may face a decline in demand due to automation. It will analyse the potential consequences of job polarization, such as increased income inequality and the need for policies and programs to address skill gaps and promote equitable opportunities in the labour market. By addressing the automation of routine tasks, the augmentation of human capabilities, and the shifts in occupational structure, this section of the research paper will provide a comprehensive understanding of the dynamic relationship between AI and labour markets. It will highlight both the potential disruptions and the opportunities that arise from AI adoption, shedding light on the evolving nature of work and the skills required in the AI era.

3. Job Market and Adoption of Artificial Intelligence:

Job Creation and Destruction

- Analysis of the net impact of AI on overall employment levels: This subsection will analyse the overall impact of AI on employment levels. It will assess the extent to which AI adoption leads to job creation or destruction, considering factors such as the productivity gains from automation, the emergence of new industries and job roles, and the potential displacement of workers. The paper will examine empirical evidence and studies to provide insights into the net effect of AI on employment.
- Examining industries or occupations most affected by job loss or creation: This point will focus on specific industries or occupations that are most affected by job loss or creation due to AI adoption. The paper will explore industries where routine and repetitive tasks are more easily automated, such as manufacturing, transportation, and customer service. It will also identify industries experiencing job growth due to the increased demand for AI-related roles, such as data analysis, machine learning engineering, and AI ethics.

Skills Mismatch and Training Needs:

- Identification of skills that are in demand with the rise of AI: This subsection will analyse the skills that are in demand as AI adoption increases. It will identify the skills required to work effectively with AI technologies, such as data analysis, machine learning expertise, problem-solving, critical thinking, and creativity. The paper will discuss the importance of these skills in the

context of the changing labour market and provide insights into how workers can adapt and acquire these skills.

- Assessing the challenges of reskilling and upskilling the workforce: This point will address the challenges associated with reskilling and upskilling the workforce to meet the demands of the AI era. The paper will discuss the need for lifelong learning and continuous skill development. It will analyse potential barriers to reskilling, such as access to training programs, the cost of education, and the need for targeted initiatives to support workers in transitioning to new roles.

Income Inequality and Distributional Effects:

- Analysing the impact of AI on wage disparities and income distribution: This subsection will examine the impact of AI on wage disparities and income distribution. The paper will analyse whether AI adoption exacerbates income inequality by concentrating wealth and opportunities among a few individuals or whether it leads to more equitable outcomes. It will explore how AI affects wages across different occupations and skill levels, highlighting the potential challenges faced by low-skilled workers. Income Inequality and Distributional Effects
- Discussing potential policy measures to address inequality and ensure inclusive growth: This point will discuss potential policy measures to address the income inequality and distributional effects of AI adoption. The paper will explore policies aimed at enhancing workers' skills and employability, promoting social safety nets, and ensuring fair wages in the AI-driven economy. It will also discuss the role of government, businesses, and civil society in fostering inclusive growth and creating opportunities for all.
- By addressing job creation and destruction, skills mismatch and training needs, and income inequality and distributional effects, this section of the research paper will provide a comprehensive analysis of the labour market implications of AI adoption. It will offer insights into the transformative impact of AI on employment, skills requirements, and income disparities, as well as propose potential policy measures to ensure a just and inclusive transition in the AI era.

4. Policy And Societal Responses:

Policy Frameworks for AI and Job Market Adaptation:

- Government initiatives to support workforce transitions and skill development: This subsection will explore government initiatives aimed at supporting workforce transitions and facilitating skill development in the context of AI adoption. It will discuss policies such as retraining programs, educational reforms, and career counselling services that help workers adapt to changing job requirements. The paper will analyse the effectiveness of these initiatives and highlight examples of countries that have implemented successful programs.
- Labor market regulations and social protection in the AI era: This point will address the need for labour market regulations and social protection mechanisms in the AI era. The paper will discuss how existing labour laws and regulations may need to be updated to address the challenges posed by AI, such as ensuring fair employment practices, protecting workers' rights, and addressing issues related to algorithmic bias and discrimination. It will also examine the importance of social protection measures, such as unemployment benefits, income support, and retraining assistance, to provide a safety net for workers affected by AI-related disruptions.

Ethical Considerations and Ai Governance:

- Discussion of ethical challenges in AI deployment and labour market implications: This subsection will delve into the ethical challenges associated with AI deployment and their implications for the labour market. The paper will address issues such as privacy, data security, algorithmic bias, and the potential for AI to amplify existing societal inequalities. It will explore the ethical considerations that arise in decision-making processes, workforce surveillance, and the potential devaluation of certain types of labour. The paper will emphasize the need for responsible AI development that considers the impact on workers and promotes ethical practices.
- International collaboration and frameworks for responsible AI development: This point will discuss the importance of international collaboration and the development of frameworks for responsible AI deployment. The paper will examine initiatives at the global level aimed at establishing ethical guidelines, standards, and norms for AI development and usage. It will highlight the role of international organizations, governments, and industry stakeholders in fostering responsible AI practices that

prioritize societal well-being and address labour market implications. The paper will also analyse the challenges and opportunities of international collaboration in AI governance. By addressing policy frameworks for AI and labour market adaptation, as well as ethical considerations and AI governance, this section of the research paper will explore the policy responses and societal considerations necessary to navigate the challenge.

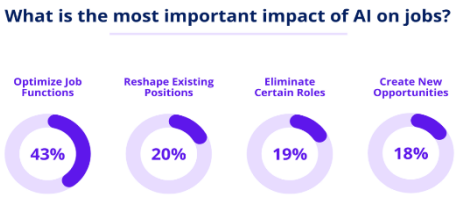

Figure 3: Impact of AI on Job

5. Suggestions:

- Policy Recommendations to Mitigate the Displacement Effects

The introduction of AI will lead to displacement effects which cause layoffs and thus active labour market policies should be introduced. Governments should provide some retraining schemes for those who become unemployed due to AI to help them rematch their skills. Training programs may include instructions on acquiring the new-demanded skills or AI-related skill sets to improve the productivity of such labour and help people to become reskilled. In addition, governments should encourage the growth of recruitment platforms, which can increase the mobility of labour and reduce the chance of frictional unemployment. This will therefore allow the employment caused by the AI transition to not be that long-lasting. Even more fundamentally than this, the authorities should continuously check the extent of impact on the labour market using indexes such as the unemployment rate, to see whether to encourage or restrict the development of AI. If in the long run, AI technology has become so accessible and cheap that it almost "takes over" the labour market then the resulting widespread unemployment will be transmitted through the economy and cause social unrest. It may be advisable for authorities to bring in an "Artificial Intelligence Tax". This tax could push up the cost of applying Artificial Intelligence, and employers will hesitate to make layoff decisions. Hence, widespread technological unemployment could be prevented, and fluctuations brought to the whole economy by this shock will be reduced. However, in nowadays cases, AI is not influencing the labour market to that extent, and governments should still encourage investments in this industry.

- Policy Recommendations on Alleviating AI-related Societal Issues:

In order to alleviate the ethical problems caused by AI, regulations are also required. For example, with deepfakes, technology can be used to verify the authenticity of a real video using digital fingerprints. Using this kind of technology, people could verify whether a video is original or synthetic. Hence, authorities should encourage investment in "technology that detects deepfakes and other AI-related issues". Apart from technological resolution, laws should also be enhanced to restrict the widespread of fake content, claim responsibility, and guarantee victims' rights. Tuning next to the problem of biases and discrimination, several improvements could be implemented. For example, the bias often comes from the data that are used to build the algorithm, and selecting more representative training data can possibly make it fairer [18]. In addition, authorities should encourage more investments to let researchers give "feedback" to these AI models, it is likely that this interaction could indicate the factor that leads to the biases in decision-making and make it less partial.

Conclusion

AI technology will contribute to fluctuations in the labour market, through the displacement effect, productivity effect, and reinstatement effect. In addition, the pattern of employment will also change favouring workers with AI-related skill sets. Scholars looking for the effects of AI on the job market and policymakers who aim to understand the drawbacks of AI and introduce related legislation should focus on this research. This research is of significance as it explains the real-life changes in the labour market and gives readers a general idea of the underlying reasons. However, there are some limitations to this research. It has not been long since the launch of these AI technologies, and the amount of data released is relatively small so the conclusion derived may not be comprehensive. Also, this paper did not mention the long-term effects on the labour market nor compare the extent of these three effects due to the same reason. In the future, as more data on the labour market are released, and AI 's long-term effects can be observed, researchers can investigate and compare the long-term and short-term effects, and the extent of different effects on the labour market using quantitative measures. In conclusion, this article aimed to give scholars an overview of the impacts of AI on the labour market and its economic reasons, and to give authorities policy suggestions to minimize the adverse effects of AI in the context in which advanced AIs such as ChatGPT have been

launched. The essay investigates these by first introducing real-life cases in the labour market, and then analysing the reasons behind these changes. Subsequently, the author evaluates the possible deleterious effects aroused by the use of AI and proposes suggestions to mitigate these problems

References

Search Engine Journal, History of ChatGPT: A timeline of the meteoric rise of Generative AI Chatbots, https://www.searchenginejournal.com/history-of-chatgpt-timeline/488370/#close, last accessed 2023/9/8.

Acemoglu, D., & Restrepo, P. Automation and new tasks: How technology displaces and Reinstates Labor. Journal of Economic Perspectives, 2019, 33.

https://www.ris.org.in/sites/default/files/Publication/Policy%20brief-104_Amit%20Kumar.pdf https://www.researchgate.net/publication/376414530

OpenAI platform. OpenAI Platform. (n.d.). https://platform.openai.com/docs/guides/gpt, last accessed 2023/8/20. https://scholar.google.co.in/scholar?q=THE+IMPACT+OF+ARTIFICIAL+INTELLIGENCE+ON+LABOR+%0D%0AMARKETS&hl=en&as_sdt=0&as_vis=1&oi=scholart

Arntz, M., Gregory, T., & Zierahn, U. (2016). The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis. OECD Social, Employment and Migration Working Papers, No. 189, OECD Publishing, Paris.

Lane, M., & Saint-Martin, A. The impact of artificial intelligence on the labour market. OECD iLibrary, 2021, 256.

Brynjolfsson, E., Li, D., & Raymond, L. R. Generative AI at Work. National Bureau of Economic Research, Working Paper, 2023, 31161.

Rodrigues, R. Legal and human rights issues of AI: Gaps, challenges and vulnerabilities. Journal of Responsible Technology, 2020, 4

Bresnahan, T. F., & Trajtenberg, M. General Purpose Technologies "Engines of growth"? Journal of Econometrics, 1995, 65.

Automation.com, 2022 trends from Robots.jobs shows dramatic growth in robotics and Artificial Intelligence Career Opportunities, https://www.automation.com/en-us/articles/february-2022/2022trends-robots-jobs-growth-robotics-ai-career, last accessed 2023/8/27.

Governmentciomedia.com, Top 15 companies in the race to hire Ai Talent, https://governmentciomedia.com/top-15-companies-race-hire-ai-talent, last accessed 2023/8/20.

Statista, Artificial Intelligence Market Size 2030, https://www.statista.com/statistics/1365145/artificialintelligence-market-size/, last accessed 2023/9/8.