



Impact of AI on Employment in India

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Abstract: Artificial intelligence (AI) is revolutionizing various industries and transforming the job market. This paper explores the impact of AI on employment in India, examining both its positive and negative implications. AI adoption leads to job displacement but also creates new opportunities, emphasizing the need for reskilling and upskilling initiatives. The study delves into the challenges posed by AI integration, such as skills mismatches and ethical considerations. Furthermore, it discusses emerging skills required in the age of AI and highlights the importance of lifelong learning. Despite concerns, AI has the potential to augment the workforce and enhance productivity, provided individuals adapt and acquire relevant skills. Through a comprehensive analysis, this paper underscores the transformative power of AI and the importance of proactive strategies to navigate the evolving job market landscape.

Keywords: Artificial intelligence, jobs, reskilling, upskilling, blue collar, white collar, lifelong learning

Introduction

Artificial intelligence, or AI, is technology that makes computers and machines to mimic human intelligence and problem-solving abilities and make them think like humans. These processes include learning, reasoning, problem-solving, perception, and decision-making. AI makes human life easier by automating mundane tasks which are repetitive and does not require continuous human attention. These machines are able to perform human tasks faster and efficiently.

In the year 1950, Alan Turing published “Computer Machinery and Intelligence” which proposed a test of machine intelligence called *The Imitation Game*. In 1955 John McCarthy held a workshop at Dartmouth on “artificial intelligence” which is the first use of the word, and how it came into popular usage. Alan Turing was the first person to conduct substantial research in the field that he called machine intelligence. Artificial intelligence was founded as an academic discipline in the 1956

Artificial intelligence has the potential to transform the society in many aspects that will also affect the job sector as the automation eliminates labour intensive tasks. For example, the industrial revolution of 18th and 19th century introduced new machinery and engines that revolutionised the agriculture and transport sector. Similarly, these new technologies like machine learning and robotics will replace the labour in the routine and repetitive tasks that are performed by humans. Industries like manufacturing, retail, customer service, logistics, healthcare etc. are affected by the adaption of AI technologies. While AI is eliminating traditional jobs it is also creating some more new jobs roles.

Artificial intelligence has become the centre of discussion because it is viewed by many to contribute to the socio-economic development of the world. With the economic and technological changes job roles will be affected. AI also has some bad impacts like job displacement, absence of creativity, loss of certain jobs, Lack of transparency, Biased results etc. So, we need to understand how human should collaborate with AI to utilize its potential to

the fullest. The skill-biased nature of AI-driven automation has increased the gap between high-skilled and low-skilled workers, because only the skilled workers can work with these technical skills. Without access to quality education, training, and reskilling programs, workers jobs are at risk, and they may face barriers to transitioning into new job sectors, higher-paying occupations that leverage AI technologies. Organizations should enhance a culture that promotes human-AI collaboration, allowing employees to focus on higher-value tasks while leveraging AI for data analysis and decision support.

There are some Policies that aimed to support the displaced workers due to their inexperience in a field which are crucial for alleviating the socio-economic impact of AI-driven job displacement. This may include robust unemployment insurance programs that provide financial assistance, employment subsidies and job training opportunities for displaced workers during their transition period. Additionally, reemployment services, career counselling, portable benefits and job placement assistance that can help workers to find new work opportunities in some different field after the training and head toward the job market effectively.

This research delves into the impact of AI on the employment sector. It explores questions regarding how AI will reshape the job landscape in the coming years, the advantages and disadvantages of AI adoption in workplaces, and the potential link between AI-induced job displacement and sustainable development goals. The researchers are also interested in identifying the skills that will hold value in the age of AI and how individuals can acquire them. Ultimately, the central question revolves around AI's role in the job market: will it act as a job killer, a job creator, or simply automate repetitive tasks, transforming the nature of work? We will try to incorporate and encompass the above questions and try to include them in our future paper.

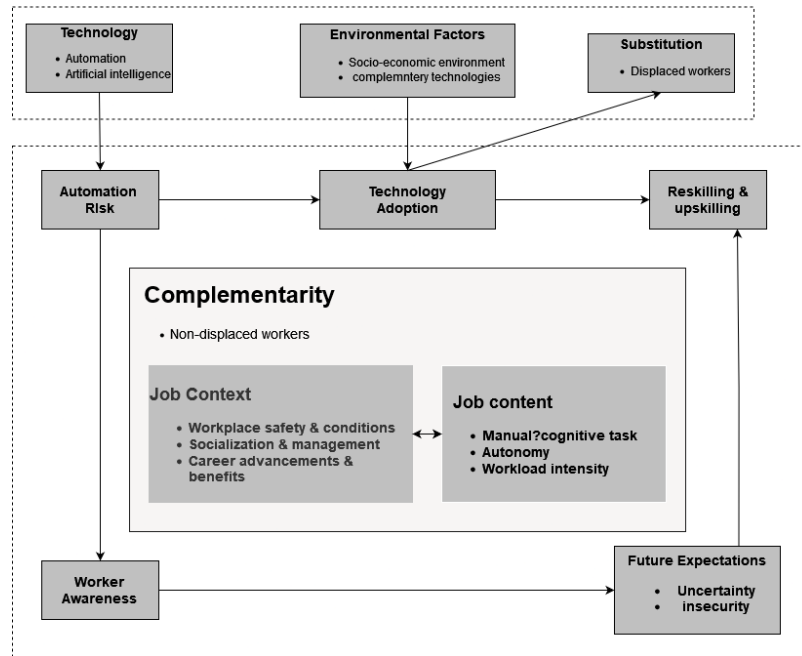
Literature Review

AI is a technology that makes computers and machines to mimic human intelligence and problem-solving abilities and make them think like humans. These processes include learning, reasoning, problem-solving, perception, and decision-making. The relationship between technology and employment has been evolving during the past century and last decades showing its complex and multifaceted nature. The pandemic has fostered the rapid adoption of new technologies at work, as physical distancing became the norm. The impact on labor markets is expected to be considerable, in terms of job destruction such as robotics, automation and AI making several types of jobs redundant and several types of job tasks irrelevant [1]

According to data from leading international research organizations, using AI than human agents, companies can deliver 27% better customer service. As a result, 48% of experts think that both white-collar and blue-collar employees will be replaced by robots and digital agents. Scientists expects that 9% of new US jobs will be created by robots and automation, in addition AI will grow into a \$118.6 billion industry by 2025 According to a survey, 65% of respondents believe that their work will be replaced by a robot or an intelligent algorithm within 50 years

In the forthcoming decade an automation is going to have a drastic change at both the level macro-level and in actual (types of) sectors. Thus get a comprehensive framework of how

displacement of labor in sectors of application is compensated by intra- and intersectoral countervailing effects and notably mopped up by newly created, labour-intensive sectors. Its reveals how potential job loss due to automation in “applying” sectors is counterbalanced by job creation in “making” sectors as well in complementary and quaternary, spillover sectors [2].



In a comprehensive analysis of the impact of AI on employment in India, recent developments in AI, robotics, and IoT have been noted to significantly influence employment opportunities. While these advancements have created employment opportunities in certain sectors, they have also led to job displacement, particularly in artisanal and agricultural labor sectors. AI, with its machine learning (ML) and deep learning components, enables tasks to be completed more efficiently, often requiring only one-time learning. Consequently, AI has the capability to perform tasks traditionally carried out by individuals, both complementing and replacing human labor in various tasks.

Understanding the aftermath of AI on life and job sectors in India is crucial. While earlier technological advancements led to the creation of new jobs through entrepreneurship and improved productivity, recent reports from NASSCOM suggest a shift. The fear of job loss has escalated due to the disproportionate number of job displacements compared to new job creations. For instance, the Indian IT industry is anticipated to generate approximately 1.35 to 1.48 million new jobs between 2021 and 2023. However, the adoption of AI during this period is also expected to result in around 25 million job losses.

The past decade, from 2010 to 2020, witnessed significant transformations in the employment sector due to AI technologies, machine learning, and deep learning. The integration of AI has increased across various industries such as manufacturing, retail, healthcare, and finance, with further advancements expected in the coming years. Studies by Frey and Osborne predict that 47% of jobs in the USA are at risk of displacement within the next 10 to 15 years due to automation. Similarly, McKinsey found that one-third of activities in 60% of jobs are automatable. These findings suggest challenging times ahead for job seekers as automation continues to reshape the job market.

The impact of AI-driven technologies on the job sector is influenced by several factors, including economic structure, industry composition, technological readiness, policy environment, regional disparities, and socio-economic factors. These factors collectively shape the future landscape of employment in the wake of advancing AI technologies.

A study by EY and NASCCOM found that by 2022, around 46% of the workforce will be engaged in entirely new jobs that do not exist today, or will be deployed in jobs that have radically changed skillsets [3]

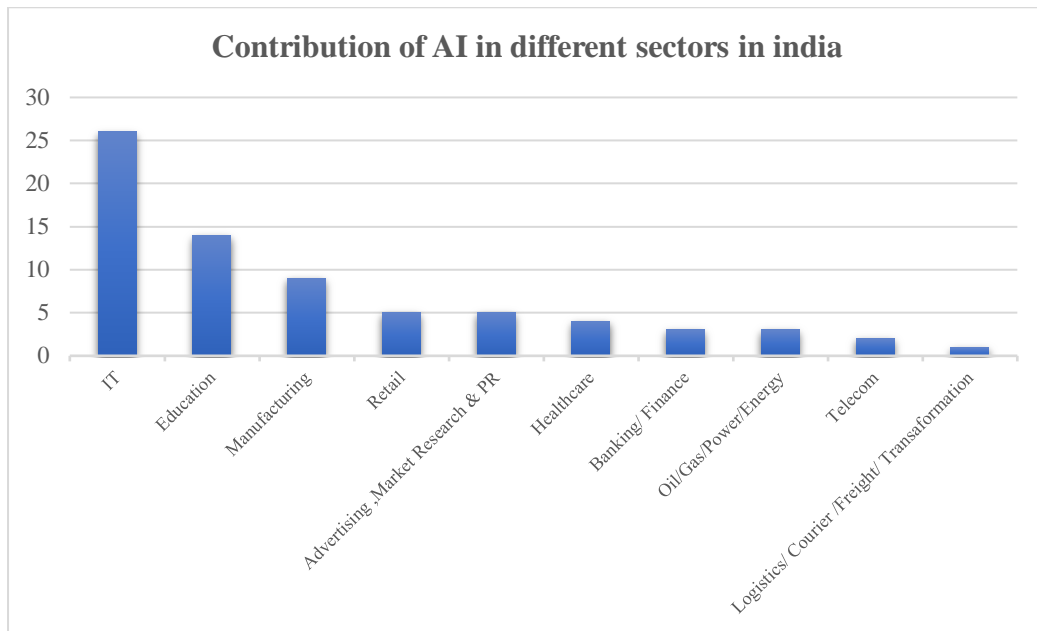
Some other sources estimate that demand for AI and machine learning specialists in India is expected to see a 60% rise by 2018.[3]

Methodology

Frey and Osborne estimated the probability of computerisation for 702 detailed occupations using a Gaussian process classifier that leveraged the features of 70 occupations for which they were most certain to predict the automatability of the remaining 632 occupations. The algorithm learned trends and patterns from bulk data to correct potentially mistaken labels. By providing a smoothly varying probabilistic assessment of automatability as a function of variables, the algorithm adapted flexibly to non-linear patterns inherent in the training data. This approach allowed for complex interactions between variables, enabling a more nuanced understanding of the potential for computerisation across occupations [4].

Certain job titles across white-collar and blue-collar occupations are at risk of automation due to advancements in AI and robotics. Among white-collar jobs, positions such as Order Clerks, Data Entry Keyers, Library Technicians, and Telemarketers face automation as AI technologies streamline administrative tasks and data processing [4]. Additionally, roles like Career/Technical Education Teachers, Middle School, and Medical Equipment Repairers are susceptible to automation as AI systems become more proficient in education delivery and equipment maintenance tasks. Even managerial positions such as First-Line Supervisors of Retail Sales Workers and Wholesale and Retail Buyers may see automation of certain responsibilities as AI optimizes inventory management and sales forecasting processes.

In the realm of blue-collar jobs, roles involving manual labor and industrial tasks are particularly vulnerable to automation. This includes occupations like construction workers, factory workers, plumbers, electricians, mechanics, and agricultural workers. AI and robotics are increasingly automating repetitive and physically demanding tasks in these industries, ranging from assembly line operations to equipment maintenance and field operations. As AI technologies continue to advance, these blue-collar occupations may undergo significant transformations, requiring workers to adapt by acquiring new skills and competencies to remain relevant in the evolving job market.



According to World Economic Forum (WEF) Over the next five years, AI and robotics are expected to add a net total of 58 million new jobs globally. Simultaneously, machines will perform more tasks than humans in the workplace by 2025 [5]. India houses a talent base of 416K AI professionals as of August 2023 as opposed to the current demand of approximately 629K, a figure expected to surge to 1 million by 2026, according to a report by Wheebox National Employability Test (WNET) [6].

A survey conducted by the leading job site Indeed found that Indian companies and employers hold a positive outlook on the impact of AI on jobs. As many as 85% of the Indian companies who participated in the survey believed that AI would impact the job scene positively in the next 5 years [7]

A recent report titled 'Future of the Skills Landscape 2024' by Hero Vired has highlighted significant concerns amongst working professionals about potential job loss due to emerging technologies. The study, which included 2 lakh individuals, including students, working professionals, and academicians, found that 82 percent of working professionals among the interviews expressed worry about the impact of evolving technologies on job security. However, despite the concern about job loss, around 78 percent of these respondents revealed recognising upskilling as a proactive strategy to navigate the rapidly changing work landscape [8]

Emerging skills in the age of AI

According to data from the Upwork Research Institute, the average number of weekly search queries related to generative AI increased 10 times from the fourth quarter of 2022 to the first quarter of 2023. The data also shows that in the same period, weekly job posts looking for generative AI skills increased by more than 600% [9].

According to MIT Sloan Review, to thrive in an AI-enabled workplace, employees need to adapt their skills and embrace lifelong learning. This includes developing skills in areas such as data analysis, problem-solving, and human-machine collaboration [19].

In the contemporary job market, proficiency in a diverse array of skills is increasingly imperative as artificial intelligence (AI) continues to reshape industries. The first cluster of essential skills encompasses data literacy and analytics, foundational for comprehending and interpreting data, thereby facilitating informed decision-making in diverse sectors leveraging AI technologies. Concurrently, proficiency in programming languages and computational thinking is emerging as a cornerstone for individuals to effectively engage with AI systems and contribute to the development of AI-driven solutions across various industries.

Complementing technical competencies, the second set of skills underscores the enduring significance of emotional intelligence and interpersonal aptitude. Despite the automation potential of AI, roles necessitating human interaction and collaboration demand skills such as empathy, effective communication, and emotional intelligence. These interpersonal competencies remain indispensable for fostering productive relationships and facilitating teamwork in AI-integrated work environments. Furthermore, adaptability and a commitment to lifelong learning represent overarching attributes crucial for navigating the dynamic landscape of the AI era. With AI technologies evolving rapidly, individuals must embrace adaptability and a proactive stance toward continuous learning to remain resilient and competitive amidst ongoing transformations in the job market.

Top ten job skills needed by 2030

Rank	Skill
1.	Adaptability and Learning Agility
2.	Digital Literacy
3.	Data Literacy and Analysis
4.	Artificial Intelligence and Machine Learning
5.	Critical Thinking and Problem-Solving
6.	Emotional Intelligence
7.	Data Literacy and Analysis
8.	Resilience and Adaptability
9.	Sustainability and Environmental Awareness
10.	Cultural Competence and Diversity Awareness

Challenges

The adoption of AI in the workplace presents a set of challenges that organizations must navigate. One significant concern is the potential for job displacement and the need for reskilling or upskilling of the workforce to adapt to evolving roles, which may lead to skills mismatches. As AI systems can replicate biases present in training data or algorithmic decision-making, raising concerns regarding fairness, transparency, and accountability. Moreover, the

introduction of AI introduces security and privacy risks, including data breaches and unauthorized access, necessitating robust security measures and privacy protections. Rapid advancements in AI pose regulatory and legal challenges related to data protection, intellectual property rights, liability and compliance with existing regulations and standards, requiring careful consideration and adherence to regulatory frameworks.

Job Displacement and Skills Mismatch

As AI technologies automate tasks and processes traditionally performed by humans, certain roles may become redundant, leading to job displacement. This displacement can result in unemployment or underemployment for individuals whose skills are no longer in demand.

Moreover, the skills required to work effectively with AI systems often differ from those needed for traditional roles, leading to a mismatch between the skills possessed by workers and those demanded by the evolving job market. This skill gap can hinder the ability of individuals to secure employment or may require extensive retraining and upskilling to transition into AI-related roles.

Reskilling and Upskilling

Reskilling refers to the process of learning new skills or acquiring additional training to perform a different job or take on new responsibilities within the same job role. It involves updating one's skill set to adapt to changes in technology, industry requirements, or job demands. Reskilling is essential in the context of Industry 4.0 and beyond, where rapid advancements in technology are reshaping the workforce and creating the need for employees to learn new competencies to remain relevant in their careers.

Upskilling involves enhancing or expanding existing skills to improve job performance, advance in one's career, or meet the evolving demands of the workplace. It focuses on acquiring new knowledge and capabilities related to one's current job role or industry to stay competitive and increase productivity. Upskilling is crucial in the era of Industry 4.0, where continuous learning and development are essential for individuals to adapt to technological changes and contribute effectively to their organizations.

Ethical considerations

Ethical considerations in employing AI within the workplace revolve around several key principles. These include ensuring transparency and accountability in AI decision-making processes, avoiding biases that could perpetuate discrimination, safeguarding data privacy and security, addressing potential job displacement concerns, and fostering equitable access to AI technologies. Moreover, it's imperative to establish clear guidelines for the responsible use of AI, promote ongoing education and awareness among employees, and prioritize ethical considerations in the development and deployment of AI systems. Balancing innovation with ethical standards is essential for creating a workplace environment that harnesses the benefits of AI while upholding ethical values and societal well-being.

Security and Privacy Risks

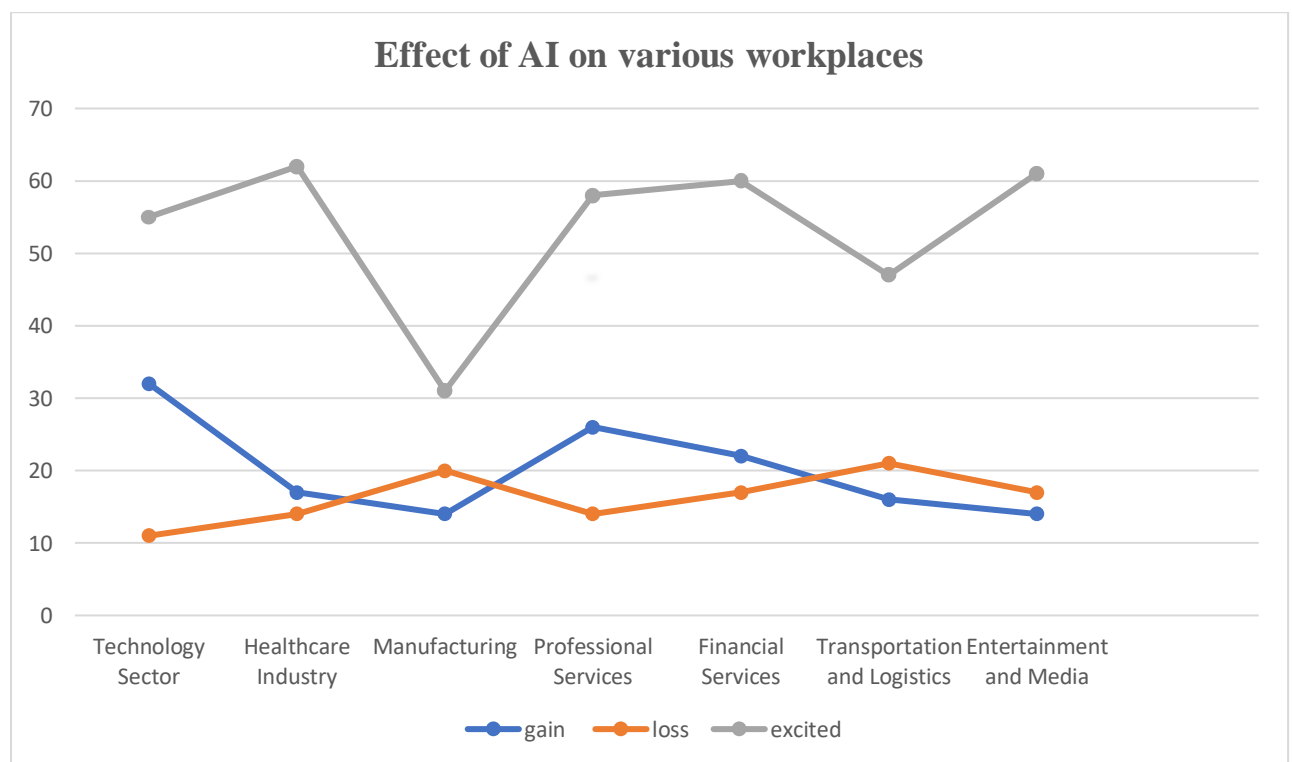
Integrating AI into the workplace presents various security and privacy risks. These include vulnerabilities in AI systems that could be exploited by malicious actors to manipulate or

bypass security measures, potentially leading to data breaches or unauthorized access to sensitive information. Moreover, AI algorithms may inadvertently expose personal or confidential data if not properly trained or if they incorporate biased or flawed data sets. Furthermore, there's a risk of AI systems being targeted by cyberattacks aimed at disrupting operations or manipulating outcomes. Mitigating these risks requires robust security protocols, rigorous data protection measures, ongoing monitoring and auditing of AI systems, and ensuring compliance with relevant privacy regulations.

AI as a Job Creator

The impact of AI on employment is multifaceted, with the potential to both create new jobs and displace existing ones. Organizational strategies play a crucial role in determining whether AI adoption leads to job creation or job loss. Alignment between corporate and IT strategies is essential to ensure the successful integration of AI tools and technologies [10].

A survey by the Pew Research Centre revealed that 19% of all U.S. working adults believe that AI will have a positive impact on their personal employment prospects over the next 20 years, while 17% express concerns about potential negative effects [11]. Similarly, a report by the National Association of Software and Service Companies (NASSCOM) and Ernst & Young estimated that AI and automation could potentially displace around 26% of existing jobs in India by 2022 [12]. However, it's worth noting that despite job displacement, India witnessed over 72,000 job openings in AI and Data Science in 2020, indicating the emergence of new opportunities in these sectors.



Concerns about job losses due to AI are prevalent, with 77% of respondents in a Forbes Advisor survey expressing apprehension about the impact of AI on employment [15]. McKinsey estimates that as AI continues to evolve, it could potentially displace up to 400 million workers

worldwide [16]. However, it's important to recognize that AI also has the potential to augment human capabilities and create new job roles.

According to a survey by ISC2, 56% of participants believe that AI will make certain activities within their jobs unnecessary, thereby freeing up time for higher-value tasks [17]. This suggests that while AI may automate certain tasks, it also has the potential to enhance productivity and enable employees to focus on more strategic and creative endeavours.

Joint Oxford Economics/Cognizant study predicts that Half of all jobs 52% are predicted to significantly change as generative AI is integrated to automate job tasks [18].

The COVID-19 pandemic has accelerated the adoption of AI and data analytics globally, as organizations seek to optimize operations, enhance customer experiences, and drive innovation. This has led to a heightened demand for skilled professionals who can leverage AI and data to solve complex problems and drive business outcomes.

Despite concerns about job displacement, India's employment landscape shows potential for growth. The country produces 0.18% extra jobs for every 1% growth in GDP, indicating the potential for AI to contribute to economic expansion [13]. However, realizing the full potential of AI as a job creator requires concerted efforts to educate and upskill the workforce across different sectors. Governments should implement policies and programs aimed at facilitating the adoption of AI technologies and automation, thereby enabling the creation of more skilled labor within the employment sector.

How is AI reshaping the job industry?

Most AI users reported that AI had assisted them with decision-making, which workers appeared to appreciate. 84% and 83% of workers in finance and manufacturing agreed that they liked that AI assisted with decision-making, compared to 4% and 3% who disagreed. Employers saw improved worker's performance and reduced staff costs [14].

This demand extends to legal matters, where 87% seek affordable legal advice. Regarding health and education, participants express a preference for human assistance over AI. Only 32% are open to using robotic smart kits for health assessments at home, while 30% consider chatbot assistants for lower-cost tuition fees in higher education. Additionally, 36% prefer AI assistants over human representatives in retail showrooms to aid in product selection.

Indian companies positive outlook	85% believe AI will positively impact jobs in 5 years
Working professionals concern level	82% worried about job loss due to evolving technologies
Recognition of upskilling importance	78% consider upskilling as proactive strategy

AI's influence is increasingly felt in people's lives, particularly in e-commerce and consumer goods. Its growing dominance in the transportation sector is fueled by a surge in demand for more accessible, convenient, and dependable taxi services.

Conclusion

This research provides a thorough examination of the multifaceted impact of AI on employment, encompassing both its positive and negative implications. Through meticulous analysis, it is evident that AI has the potential to serve as a valuable tool in the workplace, generating more job opportunities than it eliminates. By automating mundane tasks, AI enables employees to focus on higher-value activities, thereby enhancing productivity and job satisfaction. Furthermore, the study underscores the importance of upskilling and continuous learning for individuals to effectively leverage AI technologies and remain competitive in the evolving job market. As AI continues to integrate into various industries, the acquisition of relevant skills becomes imperative for maximizing job performance and ensuring career longevity.

Despite concerns about job displacement, particularly in sectors heavily impacted by AI, such as white-collar and blue-collar occupations, our analysis suggests that AI can act as a net job creator. By harnessing AI alongside strategic skills development initiatives, organizations and individuals can navigate the changing employment landscape and position themselves for success in the AI-driven future. In conclusion, while AI presents challenges and uncertainties, its transformative potential cannot be understated. With proactive strategies and a commitment to skill enhancement, AI has the capacity to augment the workforce, foster innovation, and drive economic growth. By embracing AI as a catalyst for positive change and investing in human capital development, we can ensure a prosperous future for the workforce in the AI-driven era.

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