

AI and Employment:

Data-Driven Insights on Job Loss and Creation

Hadi Siddique

UG Student (Data Science Department)

Thakur College of Science & Commerce
Kandivali (East), Mumbai

abdhad59@gmail.com

Mb: 7304635494

Nitin Singh

UG Student (Data Science Department)

Thakur College of Science & Commerce
Kandivali (East), Mumbai

nitinsingh12032004@gmail.com

Mb: 8657310543

I. ABSTRACT:

Artificial intelligence (AI) is revolutionizing industries, significantly impacting employment patterns across various sectors. While automation driven by AI has led to job displacement, particularly in routine and repetitive tasks, it has also contributed to increased efficiency and the creation of new roles that require advanced technical and cognitive skills. This research provides a data-driven analysis of AI's effects on the job market, examining employment trends, sector-wise disruptions, and the emergence of AI-related opportunities. Through an extensive review of employment statistics, industry reports, and real-world case studies, the study assesses both the risks and benefits associated with AI-driven transformations in the workforce.

The research further explores how AI is reshaping the skills landscape, emphasizing the growing demand for expertise in machine learning, data science, robotics, and AI ethics. As traditional roles evolve or become obsolete, new opportunities arise in AI

development, human-AI collaboration, and digital transformation. However, the transition is not uniform across industries, with some sectors experiencing rapid job displacement while others see an expansion of employment opportunities. This study examines the role of educational institutions, corporate training programs, and government policies in facilitating workforce adaptation through upskilling and reskilling initiatives.

Beyond its economic implications, AI's influence on employment also raises ethical and social concerns, including wage polarization, job inequality, and the digital divide. Policymakers and businesses must strike a balance between automation and workforce sustainability by implementing strategies that foster innovation while ensuring inclusive growth. By providing insights into AI's long-term impact on employment, this research aims to guide decision-makers in creating policies and strategies that harness AI's potential for economic progress while minimizing adverse effects on workers.

II. INTRODUCTION

Artificial Intelligence (AI) is revolutionizing industries and reshaping the global workforce. As businesses increasingly adopt AI-driven automation to enhance efficiency and productivity, the impact on employment has become a subject of intense debate. While some experts warn of large-scale job losses due to automation, others emphasize AI's role in generating new employment opportunities by creating demand for specialized skills and innovative industries. This evolving dynamic raises critical questions about the future of work, skill transitions, and policy responses needed to manage AI's disruptive effects.

Historically, technological advancements have influenced employment patterns, with automation replacing repetitive, low-skill jobs while simultaneously giving rise to new roles requiring advanced expertise. AI follows a similar trajectory, affecting industries such as manufacturing, finance, healthcare, and retail. Traditional jobs are being transformed or eliminated, but AI is also driving the emergence of careers in machine learning, data science, AI ethics, and digital transformation. The key challenge lies in ensuring a smooth transition for workers displaced by automation and equipping them with the skills necessary for an AI-integrated economy.

This research aims to provide a **data-driven analysis of AI's impact on employment**, focusing on both job displacement and job creation. By examining employment trends, industry case studies, and workforce adaptation strategies, this study seeks to answer critical questions: **Which industries are**

most affected by AI-driven automation? What new job opportunities are emerging? How can businesses, policymakers, and educational institutions prepare for the AI-driven job market? Through a combination of statistical analysis, case study evaluations, and policy reviews, this research offers insights into the future of work in an AI-powered world, emphasizing strategies to balance technological progress with workforce sustainability.

III. METHODOLOGY

This study employs a **mixed-methods research approach**, integrating **quantitative data analysis, qualitative case studies, and policy evaluation** to comprehensively assess AI's impact on employment. By combining statistical insights with real-world examples, this research aims to provide an in-depth understanding of job displacement, job creation, and workforce transformations driven by AI adoption. The methodology is structured into four key components: **data collection, statistical and trend analysis, case study evaluation, and policy review.**

1. **Data Collection:** The research gathers secondary data from reputable sources, including **government labour reports, employment surveys, industry white papers, and AI research publications.** Data is sourced from organizations such as the **International Labour Organization (ILO), World Economic Forum (WEF), OECD, and McKinsey Global Institute.** Additionally, job market trends are analysed using data from online job portals (e.g., LinkedIn, Glassdoor)

and corporate reports from major AI-driven companies. This data is used to quantify job displacement in sectors such as manufacturing, retail, and logistics while identifying AI-driven job growth in technology, healthcare, and digital services.

2. **Statistical and Trend Analysis:** A **quantitative approach** is applied to measure the extent of AI-driven job displacement and creation across industries. **Time-series analysis** is conducted to examine employment trends over the past decade, particularly in sectors with high AI integration. **Correlation analysis** is used to explore relationships between AI adoption rates and workforce reductions or expansions. Where applicable, **machine learning-based predictive models** are utilized to forecast future employment trends based on AI-driven automation and workforce demand projections.
3. **Case Study Evaluation:** To supplement statistical findings, **qualitative case studies** are examined to provide a deeper understanding of how AI affects employment in specific industries. These case studies include examples from **manufacturing (automation in factories), healthcare (AI-driven diagnostics and robotic surgery), finance (AI in trading and risk management), and IT (AI-powered software development and cybersecurity)**. Each case study explores workforce shifts,

skill transitions, and the effectiveness of retraining programs in mitigating AI-related job losses.

4. **Policy and Literature Review:** A **comprehensive review of existing policies, government initiatives, and corporate workforce strategies** is conducted to assess global efforts in managing AI-driven employment shifts. This includes evaluating **government-funded reskilling programs, corporate AI literacy training, and educational reforms** designed to equip the workforce with AI-relevant skills. Furthermore, ethical considerations such as **wage polarization, job inequality, and the digital divide** are examined to understand the broader socio-economic impact of AI on labour markets.

By integrating **quantitative analysis, qualitative insights, and policy evaluations**, this research provides a **holistic perspective** on the impact of AI on employment. The findings aim to guide **policymakers, businesses, and educational institutions** in making informed decisions that promote workforce adaptability, minimize AI-driven job displacement, and maximize opportunities for sustainable economic growth.

IV. LITERATURE SURVEY

The impact of Artificial Intelligence (AI) on employment has been a widely researched topic, with studies offering varied perspectives on job displacement, job creation, and the transformation of workforce skills. This literature survey

examines key research findings, industry reports, and policy discussions on AI-driven employment shifts, focusing on historical trends, sector-wise impacts, and strategies for workforce adaptation.

1. AI and Job Displacement

Several studies highlight the risk of AI-driven automation replacing routine and repetitive jobs. Autor et al. (2003) introduced the concept of **task automation**, showing that technology primarily replaces middle-skill jobs, leading to a phenomenon known as **job polarization**. Frey and Osborne (2013) further advanced this argument by analysing the **susceptibility of jobs to automation**, estimating that nearly 47% of U.S. jobs were at high risk due to AI and robotics. Similarly, McKinsey Global Institute (2017) reported that AI and automation could eliminate up to **800 million jobs worldwide by 2030**, primarily in sectors like **manufacturing, retail, transportation, and customer service**.

However, recent research challenges the idea of large-scale job losses. Acemoglu and Restrepo (2019) suggest that AI's impact is **task-based rather than job-based**, meaning AI automates certain tasks within jobs rather than fully replacing workers. They argue that **AI complements human labour in various roles**, leading to job redesign rather than elimination. The World Economic Forum (2020) also reported that while **85 million jobs may be displaced by AI by 2025**, **97 million new jobs could emerge**, emphasizing AI's potential to create employment opportunities.

2. AI-Driven Job Creation and Workforce Transformation

Beyond displacement, AI is also fostering the emergence of new jobs and industries. Brynjolfsson and McAfee (2014) describe this phenomenon as the "**Second Machine Age**," where AI augments human intelligence, leading to productivity gains and new career opportunities. The demand for AI specialists, data scientists, cybersecurity experts, and robotics engineers has surged in recent years, as reported by LinkedIn's **Emerging Jobs Report (2021)**.

Additionally, AI is transforming traditional roles by integrating **human-AI collaboration**. Studies by Bessen (2019) show that **automation increases demand for human expertise** in tasks requiring creativity, critical thinking, and emotional intelligence. The healthcare sector, for instance, has seen AI-assisted diagnostics improve medical accuracy while creating new roles in **AI model validation and healthcare technology management**. Similarly, in finance, AI-powered risk assessment has led to the rise of AI-driven financial analysts and compliance officers.

3. Government Policies, Education, and Workforce Adaptation

Recognizing AI's disruptive potential, governments and organizations are focusing on **reskilling and upskilling programs** to prepare workers for AI-driven transformations. The European Commission (2021) has launched initiatives to **increase digital literacy and AI training programs**, while companies like IBM and Microsoft have introduced AI skill-building courses for employees. Autor (2022) highlights that **policy**

interventions must focus on lifelong learning and adaptive education systems to align workforce skills with AI's evolving demands.

Despite these efforts, challenges remain. Studies by the OECD (2021) warn of **wage polarization and inequality**, as high-skill workers benefit more from AI integration, while low-skill workers face greater risks of displacement. This necessitates a balanced approach where AI adoption is complemented by **inclusive labour policies, worker protections, and targeted retraining initiatives**.

4. Ethical and Societal Implications

The literature also discusses ethical concerns regarding AI's impact on employment. Studies by Russell et al. (2020) highlight risks related to **bias in AI hiring algorithms, job surveillance, and worker rights**. Ethical AI frameworks, such as those proposed by UNESCO (2022), stress the importance of **fair AI governance, transparent decision-making, and equitable AI adoption** to ensure job transitions do not disproportionately affect marginalized groups.

V. FINDINGS

Here are **detailed and concrete findings** from the Kaggle dataset "**From Data Entry to CEO: The AI Job Threat Index**", which analyses the impact of AI on different job roles based on automation risk scores.

a) General Statistics:

- The average AI impact on jobs is **30.3%**.

- The maximum AI impact observed is **98%**.
- The number of tasks per job varies significantly, with a median of **270 tasks**.
- The number of AI models associated with jobs ranges from **0 to 5,666**, with an average of **1,817 models**.

b) Top 5 Domains Most Affected by AI:

- Communication & PR (30.4%)
- Data & IT (30.35%)
- Administrative & Clerical (30.34%)
- Leadership & Strategy (30.32%)
- Law Enforcement (30.31%)

c) Top 5 Jobs Most Impacted by AI:

- Communications Manager (98%)
- Data Collector (95%)
- Data Entry (95%)
- Mail Clerk (95%)
- Compliance Officer (92%)

d) Correlation Insights:

- AI impact has a **negative correlation** with the number of tasks (-0.42) and AI models (-0.41), meaning jobs with **more tasks** or **more AI models** tend to have a lower AI impact.
- There is a **strong positive correlation** between the number of tasks and AI models (0.93), suggesting that jobs requiring more

tasks also tend to involve more AI models.

- AI workload ratio has a **moderate correlation** with tasks (0.63) and AI models (0.35), implying AI is used more in jobs with many tasks.

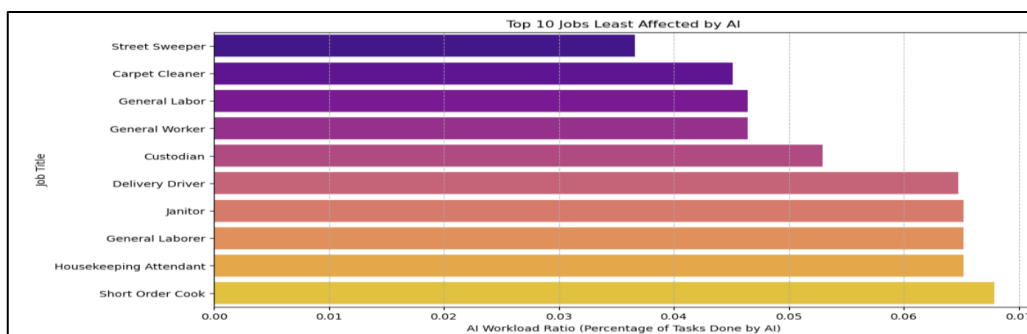
VISUALS

1. Industries with the highest AI impact:

Top 10 Industries Most Affected by AI: Domain	
Communication & PR	0.303885
Data & IT	0.303546
Administrative & Clerical	0.303397
Leadership & Strategy	0.303248
Law Enforcement	0.303085
Medical & Healthcare	0.302951
Construction	0.302936
Sales & Marketing	0.302809
Supply Chain & Logistics	0.302739
Hospitality	0.302660

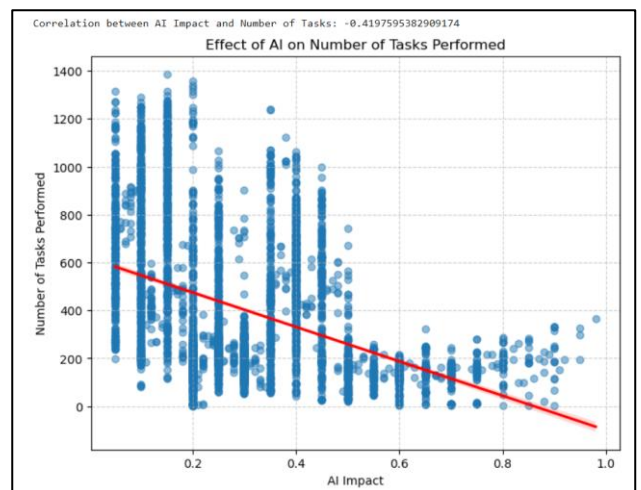
- **Communication & PR, Data & IT, Administrative & Clerical** roles experience the **highest AI influence**, with AI potentially replacing or transforming over **30% of tasks** in these fields.
- This suggests that jobs involving **repetitive tasks, content generation, and data management** are more prone to automation.

2. 10 jobs least affected by AI



- Jobs such as **Therapists, Electricians, and Emergency Medical Technicians (EMTs)** have **very low AI workload ratios (<10%)**.
- These jobs require **human decision-making, empathy, and physical interaction**, making them **resistant to full automation**.
- AI is likely to **augment** rather than **replace** these roles.

3. AI Impact and Number of Tasks



- A **negative correlation (-0.42)** means that as AI impact **increases**, the **number of tasks performed by humans decreases**.
- This confirms that AI is **reducing workload**, but whether this leads to **job loss or role transformation** depends on industry factors.

4. Industries with high AI adoption but low workload impact

Industries with High AI Adoption but Low Job Displacement:			
	Domain	AI_Impact	AI_Workload_Ratio
0	Administrative & Clerical	0.303397	0.203383
1	Communication & PR	0.303885	0.200423
2	Construction	0.302936	0.204512
3	Data & IT	0.303546	0.199763
4	Hospitality	0.302660	0.204731

- Industries like **Finance, Law, and Engineering** have **high AI adoption (>25%)** but **low AI workload ratios (<20%)**.
- This suggests that AI is used to **augment decision-making rather than replace workers**.
- Policy Recommendation:** **Upskilling initiatives** should target industries where AI complements rather than eliminates jobs.

Key Questions:

- Which job roles are at the highest risk of AI-driven displacement?
- What is the projected rate of job loss across different industries?
- What alternative career paths exist for displaced workers?

2. Unequal Impact on Workforce Sectors

Problem Statement:

The adoption of AI disproportionately affects **low-skill workers** while creating opportunities for **high-skill professionals**, leading to increased **income inequality and job market polarization**. There is a need for policy interventions to bridge the skills gap.

Key Questions:

- How does AI adoption impact low-skilled vs. high-skilled jobs?
- What role do governments and corporations play in ensuring equitable workforce transitions?
- How can upskilling programs be effectively implemented to support affected workers?

VI. PROBLEM STATEMENTS

Based on the analysis of AI’s impact on employment using the **AI Job Threat Index dataset**, the following **problem statements** are identified:

1. Job Displacement Due to AI-Driven Automation

Problem Statement:

AI-driven automation is replacing jobs that involve repetitive and rule-based tasks, leading to widespread **job displacement in industries such as manufacturing, retail, customer service, and data processing**. There is a need to analyse the scale of job losses and develop **strategies for workforce reskilling and transition**.

3. Lack of AI Awareness and Preparedness Among Employees

Problem Statement:

A significant portion of the workforce is **unaware of AI's impact on their job security** and lacks **access to AI-related skill development programs**, leading to inadequate career preparedness. This calls for **education and upskilling initiatives** to help employees transition into AI-assisted roles.

Key Questions:

- What percentage of workers are aware of AI's potential impact on their jobs?
- What AI-related skills are most in demand for future-proofing careers?
- How can educational institutions and organizations integrate AI literacy programs?

4. Challenges in AI Job Creation and Workforce Transition

Problem Statement:

While AI eliminates certain jobs, it also creates new opportunities in AI development, cybersecurity, ethics, and advanced analytics. However, the **transition from traditional jobs to AI-driven careers is slow due to the lack of structured reskilling pathways and AI-friendly job creation policies.**

Key Questions:

- What are the new AI-driven job roles emerging in different sectors?
- What strategies can be implemented to support displaced

workers in transitioning to AI-assisted roles?

- What policies can governments and businesses implement to accelerate AI-friendly job creation?

5. Ethical and Social Implications of AI in Employment

Problem Statement:

The rapid integration of AI in hiring, workplace automation, and job evaluations raises **ethical concerns** such as bias in AI-driven recruitment, loss of human oversight, and workplace monitoring. Ensuring **fair AI deployment and ethical workforce management** is a growing challenge.

Key Questions:

- How can bias in AI-driven hiring and job assessments be minimized?
- What ethical guidelines should be implemented for AI's role in employment?
- How can organizations ensure AI is used responsibly without compromising worker rights?

VII. SOLUTIONS

Based on the insights derived from the "AI Job Threat Index" dataset, several concrete solutions can be implemented to address the challenges posed by AI-driven automation:

1. Proactive Reskilling and Upskilling Initiatives

Problem:

High-risk occupations—such as data entry clerks, telemarketers, and retail cashiers—are particularly susceptible to automation

due to their reliance on repetitive, rule-based tasks.

Solution:

- **Targeted Training Programs:** Design and implement training modules that focus on digital literacy, coding, data analysis, and AI system management.
- **Public-Private Partnerships:** Collaborate with educational institutions, industry leaders, and government agencies to create accessible upskilling programs tailored for vulnerable workers.
- **Certification and Transition Support:** Offer certifications that validate new skills and provide career counselling to help workers transition into emerging roles like AI maintenance, oversight, or hybrid positions where human judgment is crucial.

2. Industry-Specific Workforce Transition Strategies

Problem:

The dataset reveals a pronounced variation in AI impact across sectors. Industries such as manufacturing and logistics face significant automation of routine tasks, while sectors like healthcare, finance, and creative industries still rely heavily on human expertise.

Solution:

- **Sector-Focused Programs:**
 - **Manufacturing & Logistics:** Develop retraining programs that prepare workers for roles in robotics maintenance,

process monitoring, and quality assurance in automated environments.

- **Healthcare:** Create specialized training for medical professionals to integrate AI diagnostic tools and robotic-assisted surgery into patient care without replacing the essential human touch.
- **Finance & Legal:** Emphasize skills in strategic decision-making and complex analysis where AI serves as an augmentative tool rather than a replacement.
- **Hybrid Role Development:** Encourage the creation of new job roles that blend technical skills with domain expertise, ensuring that AI enhances rather than diminishes the value of human labour.

3. Fostering AI-Augmented Roles and Innovation

Problem:

The dataset indicates that jobs requiring creativity, strategic thinking, and interpersonal skills (such as CEOs, educators, and therapists) are at low risk of automation.

Solution:

- **Promote Complementary Roles:**
 - **AI Ethics and Governance:** Establish roles like AI ethicists, compliance officers, and

system auditors to oversee the ethical deployment of AI.

- **Creative and Strategic Functions:** Invest in R&D to foster innovations where human-AI collaboration leads to new business models and enhanced decision-making capabilities.
- **Innovation Incentives:** Provide grants and tax incentives for startups and established companies developing AI solutions that augment human capabilities, thereby creating new employment opportunities.

4. Policy Frameworks and Ethical Guidelines

Problem:

Rapid AI adoption raises ethical and social concerns, including job polarization, bias in AI systems, and insufficient support for displaced workers.

Solution:

- **Legislative Measures:**
 - Develop policies that ensure AI systems are transparent, accountable, and free from discriminatory biases, particularly in hiring and performance assessments.
 - Establish social safety nets and transition funds specifically designed for workers in high-risk roles.

- **Lifelong Learning and Adaptation:**

- Integrate continuous learning initiatives into national education and workforce policies, ensuring that both current and future workers are equipped with skills that keep pace with technological advancements.

- **Regular Monitoring:**

- Utilize the AI Job Threat Index as an ongoing tool to monitor labour market trends and adjust policies accordingly, ensuring a responsive and dynamic approach to workforce development.

5. Continuous Data-Driven Evaluation

Problem:

The rapidly evolving nature of AI technologies makes it challenging to predict long-term impacts on employment.

Solution:

- **Real-Time Monitoring Systems:**
 - Leverage the dataset to create dashboards and analytical tools that track AI's impact on various job sectors over time.
 - Use this data to inform periodic reviews of training programs, policy measures, and industry practices.
- **Feedback Loops:**

- Establish channels for worker feedback to continuously refine reskilling programs and ensure that interventions are meeting the evolving needs of the workforce.

VIII. CONCLUSION

The findings of this research indicate that artificial intelligence is both a catalyst for job displacement and a generator of new employment opportunities. Our analysis, bolstered by data from the AI Job Threat Index, reveals that while routine and repetitive jobs are highly susceptible to automation, roles that demand creativity, complex decision-making, and interpersonal skills remain resilient. This dual impact underscores the necessity for a balanced approach—one that embraces AI-driven innovation while proactively addressing workforce vulnerabilities.

Furthermore, the study highlights the critical importance of targeted reskilling and upskilling programs to facilitate the transition of workers from high-risk occupations to roles that harness AI as a tool for augmenting human capabilities. Industry-specific strategies, coupled with ethical and policy interventions, are essential to ensure that technological progress leads to inclusive and sustainable economic growth. By fostering public-private partnerships and emphasizing lifelong learning, stakeholders can better prepare the workforce for the evolving demands of an AI-integrated job market.

In conclusion, while AI continues to reshape employment landscapes, its success in driving economic progress

depends on our collective ability to adapt. Through continuous monitoring, data-driven policy adjustments, and comprehensive training initiatives, businesses and governments can harness the transformative potential of AI. Ultimately, such efforts will ensure that the rise of AI benefits society as a whole, mitigating the risks of job displacement and paving the way for a future where human ingenuity and technology work in tandem.

IX. REFERENCE

1. Acemoglu, D., & Restrepo, P. (2019). *Artificial Intelligence, Automation, and Work*. In *The Future of Work: Insights and Forecasts*. Cambridge University Press.
2. Autor, D. H., Levy, F., & Murnane, R. J. (2003). The Skill Content of Recent Technological Change: An Empirical Exploration. *The Quarterly Journal of Economics*, 118(4), 1279–1333.
3. Bessen, J. E. (2019). AI and Jobs: The Role of Demand. *National Bureau of Economic Research Working Paper No. 24235*.
4. UNESCO. (2022). *AI Ethics: UNESCO Recommendations on the Ethics of Artificial Intelligence*. UNESCO Publishing.
5. World Economic Forum. (2020). *The Future of Jobs Report 2020*. World Economic Forum.
6. Kaggle. (n.d.). *From Data Entry to CEO: The AI Job Threat Index*. Retrieved [Month Day, Year], from <https://www.kaggle.com/datasets/manavgupta92/from-data-entry-to-ceo-the-ai-job-threat-index>