

Post AI Workforce Design and Analysis: Preparing for Future Guranteed Carriers in Era of AI

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Abstract: *The rapid growth of Artificial Intelligence (AI) is transforming jobs and skills across all industries. As machines take over routine tasks, people need to focus on creativity, problem-solving, and emotional intelligence. This research paper studies how the workforce can adapt to these changes and prepare for secure, future-ready careers. It examines how AI affects job roles, skill needs, and workplace design while suggesting ways for individuals and organizations to work effectively with AI. The goal is to help build a flexible, skilled, and adaptive workforce for the AI-driven future.*

Keywords: Freelancing, Mentorship, Machine Learning, Recommendation System, Web Application, Personalized Learning, Secure Payment.

I. INTRODUCTION

Artificial Intelligence (AI) is quickly transforming how people work, learn, and build their careers. As machines handle repetitive and routine tasks, humans must now focus on creativity, critical thinking, and emotional intelligence—skills that AI cannot replace. This research paper studies how the modern workforce can adjust to these changes and prepare for a future where humans and AI work together. It looks at which types of jobs will grow, what new skills will be needed, and how education systems and organizations must adapt to support future careers. By examining current trends and AI's impact across industries, this study emphasizes the need for a workforce that is adaptable, technologically skilled, and ready for lifelong learning in the age of AI. [?], [?].

II. LITERATURE REVIEW

A. Tech Trajectory: AI-Enhanced Career Guidance System

The paper “Tech Trajectory: AI-Enhanced Career Guidance System” uses AI to suggest career paths based on users’ skills and interests. It helps in basic career planning but has some limitations, such as using a small dataset, limited personal-ization, and no real-time job market updates. It also lacks predictive learning and integration with multiple data sources, which reduces its accuracy and adaptability for different users.

B. Artificial Intelligence and the Future of Work: Job Shifting Not Job Loss

A. Shaji George (2024), explains that AI will change how people work by shifting job roles instead of completely removing them. It highlights how humans and AI can work together to improve productivity and create new types of jobs. However, the paper mainly provides general insights and does not include practical models or personalized solutions. It also lacks detailed data analysis and does not focus on specific strategies for reskilling or adapting to new job roles.



C. Navigating the Era of Generative AI

S. K. Patel et al. (2024) The paper “Navigating the Era of Generative AI” discusses how generative AI is changing computer science education and career paths for new graduates. It focuses on developing AI literacy and preparing students for future technologies. However, the study mainly centers on education and lacks real-world career mapping or placement analysis. It does not connect skills learned with actual job opportunities, making it less effective for guiding students toward specific AI-related careers

D. Artificial Intelligence for Career Guidance

S. Westman (2021) discusses how AI can help people choose suitable careers by analyzing their skills, interests, and goals. It focuses on using AI tools to make career planning easier and more accurate. However, the paper is mostly theoretical and lacks real-world testing or predictive models. It does not include detailed data analysis or personalized recommendations, which limits its effectiveness for individual users.

E. The Future of Employment: How Susceptible Are Jobs to Computerisation

C. B. Frey and M. A. Osborne (2013), It studies how automation and computer technologies may affect different types of jobs. It predicts which occupations are most at risk of being replaced by machines and highlights the growing role of technology in the workplace. However, the paper mainly focuses on the risk of job loss rather than how jobs can evolve with AI. It also lacks real-world career adaptation strategies and does not address how education and training can prepare workers for these changes.

F. AI and Jobs: The Role of Demand

James E. Bessen (2018) in The paper “AI and Jobs: The Role of Demand” studies how Artificial Intelligence affects employment by focusing on how demand for new products and services can create more jobs. It explains that while AI automates some tasks, it also increases demand in other areas, leading to job growth. However, the paper mainly looks at the economy as a whole and lacks a personalized view of how individuals can adapt. It also does not include real-time data or predictive tools to show which specific skills or roles will be most in demand in the future

G. Limitations of Existing Systems

Although many career guidance and job platforms provide useful services, they mainly focus on job searching, online courses, or professional networking rather than intelligent career domain selection and future workforce analysis. Most existing systems do not provide personalized career recommendations based on technical interests, personality analysis, and AI impact evaluation within a single platform.

Additionally, current platforms lack features such as AI-driven career survivability analysis, future workforce prediction, and personalized roadmap generation. Many systems also fail to guide students in identifying suitable domains before specialization, which often leads to confusion in career decision-making.

To address these limitations, the proposed Post-AI Workforce Design and Career Recommendation System integrates resume analysis, technical and personality assessment, Machine Learning-based career recommendation, AI impact analysis, AI tools recommendation, and LLM-based roadmap generation into a unified platform. This integrated approach improves career guidance, future preparedness, and workforce adaptability for students preparing to enter AI-driven industries.

III. METHODOLOGY

The proposed system, titled Post-AI Workforce Design and Analysis: Preparing for Future Guaranteed Careers in the Era of AI, is developed as a web-based intelligent career guidance platform that assists students in identifying sustainable career opportunities in a rapidly evolving technological landscape. Unlike conventional career recommendation systems that primarily focus on employment matching, the proposed framework evaluates future



career relevance, AI disruption risks, skill requirements, and professional growth pathways. The system integrates machine learning techniques, large language models, assessment analytics, and workforce intelligence to support informed career planning and long-term employability.

A. User Registration and Secure Access

The workflow begins with a secure account creation mechanism. New users provide their email credentials and complete a verification procedure through a dynamically generated One-Time Password (OTP). Successful verification grants access to the platform's services while preventing unauthorized usage. To maintain confidentiality, user profiles, uploaded documents, and assessment records are securely stored using protected database mechanisms and encrypted storage practices.

B. Intelligent Profile Extraction from Resumes

Users who possess a resume can upload the document through the platform interface. The uploaded content is analyzed using a Large Language Model-based processing engine that interprets both structured and unstructured information contained within the resume. The extraction process identifies educational qualifications, technical competencies, software knowledge, certifications, project experience, and professional interests. The resulting profile serves as an input for subsequent recommendation and career analysis modules, enabling more personalized outcomes.

C. Interest and Personality Evaluation Framework

To support users who do not have a formal resume, the platform offers an alternative assessment mechanism. Rather than evaluating domain-specific expertise, the questionnaire focuses on identifying individual interests, behavioral tendencies, learning preferences, and cognitive strengths. The assessment examines factors such as logical reasoning inclination, programming exposure, mathematical comfort, analytical mindset, creativity, and career aspirations. The collected responses are transformed into a user profile that reflects both technical orientation and personality characteristics, forming a foundation for career prediction.

D. Machine Learning-Based Career Prediction

Career recommendations are generated through predictive models trained on a workforce dataset containing approximately 5,000 career-related records collected from multiple employment platforms. The recommendation engine utilizes supervised learning techniques, including Decision Tree and Regression Tree algorithms, to identify career domains that align with the user's profile. By considering educational background, technical competencies, interests, and personality indicators, the system ranks and presents the three most suitable career options with the highest relevance scores.

E. Future Workforce and AI Risk Assessment

A distinguishing feature of the proposed framework is its ability to evaluate career sustainability in the context of advancing Artificial Intelligence technologies. Once a career path is selected, the system performs an AI impact assessment to estimate the likelihood of automation, augmentation, or long-term stability within that profession. The analysis examines task characteristics, industry trends, and the extent of human involvement required in the selected role. The resulting insights help users understand potential workforce shifts and make strategic career decisions that remain relevant in the future.

F. AI Technology and Productivity Tool Suggestions

To bridge the gap between academic learning and industry expectations, the platform recommends AI-powered tools associated with the chosen career domain. Recommendations are generated through LLM-driven contextual analysis that identifies technologies currently influencing professional workflows. These suggestions may include automation



platforms, data analytics tools, software development assistants, content generation systems, or domain-specific AI applications. Exposure to such technologies enables users to develop practical familiarity with modern workplace environments.

G. Customized Career Development Roadmap

The final stage of the methodology involves generating an individualized learning roadmap designed specifically for the selected career objective. Leveraging Large Language Models, the system constructs a structured three-month development plan consisting of progressive learning milestones, recommended resources, skill acquisition targets, project activities, and career preparation guidance. The roadmap is organized into monthly phases to provide a clear and achievable path toward professional readiness. Through continuous skill enhancement and guided learning, users can systematically prepare themselves for emerging opportunities in the AI-driven economy.

H. System Limitations and Considerations

Although the proposed system provides intelligent career recommendations and AI-driven workforce analysis, certain limitations exist. The accuracy of recommendations depends on the quality of the training dataset and user-provided information. Additionally, AI-based predictions regarding future careers may evolve with changing technological and industrial trends. The roadmap and AI tool suggestions generated by LLMs may also vary depending on model responses and available data. Despite these limitations, the system provides a practical and future-oriented solution for career guidance in the AI era.

Overall, the proposed platform demonstrates how Machine Learning and Large Language Models can be integrated to support intelligent career planning, workforce adaptability, and future-ready skill development for students preparing to enter AI-driven industries.

IV. SYSTEM FLOW DIAGRAM

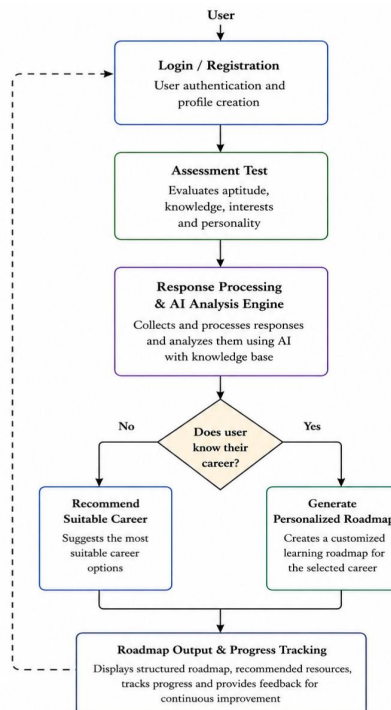


Fig. 1. System Flow Diagram
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V. SYSTEM ANALYSIS

A. Overview

The system analysis process focuses on examining the difficulties faced by students and early-career individuals when planning their professional future in a technology-driven environment. Rapid advancements in Artificial Intelligence have created uncertainty regarding job stability, skill relevance, and future employment opportunities. Therefore, there is a growing need for an intelligent framework that can evaluate individual capabilities, identify suitable career domains, and provide guidance aligned with future workforce requirements. The proposed system is designed to address these challenges through data-driven career assessment and AI-assisted decision support. .

B. Existing System Analysis

Current career guidance solutions generally rely on educational qualifications, user preferences, or predefined questionnaires to suggest career options. Although these systems provide basic recommendations, they often overlook several important factors related to future workforce transformation.

- Career suggestions are usually based on present conditions rather than future industry trends.
- Most platforms do not provide personalized skill-development strategies.
- Users receive recommendations without detailed insights into long-term career growth and stability. \end{itemize}

C. Proposed System Analysis

The proposed framework introduces an intelligent career planning approach that combines workforce analytics, machine learning techniques, and AI-based evaluation mechanisms. The system analyzes user profiles to identify career opportunities that are both suitable and sustainable in the future job market.

- Supports career profiling through resume analysis and interactive assessments.
- Assists users in making informed career decisions based on future workforce trends.
- Provides structured learning pathways to support skill enhancement.

VI. RESULT ANALYSIS

The proposed Post-AI Workforce Design and Analysis system generates a comprehensive career assessment report for users based on their resume data or assessment responses. The output is designed to assist students in selecting future-ready career paths and understanding the potential impact of Artificial Intelligence on their chosen profession.

A. Career Recommendation Results

Using Machine Learning models and profile analysis, the system predicts and displays the top three career domains that best match the user's skills, interests, educational background, and personality traits. These recommendations provide users with multiple career options aligned with their strengths and future industry requirements.

B. Future Survivability Score

For each recommended career, the system calculates a Future Survivability Score on a scale of 0 to 100. This score represents the estimated long-term sustainability of the profession in an AI-driven workforce. Higher scores indicate greater resistance to automation and stronger future demand in the job market.

C. AI Risk Level Assessment

The system categorizes each career into one of the following risk levels:

- Low Risk: Careers expected to remain highly relevant with minimal automation impact.
- Moderate Risk: Careers that may experience partial automation and evolving job responsibilities.
- High Risk: Careers that are more likely to be significantly affected by AI and automation technologies.

This analysis enables users to understand potential work-force challenges associated with each career option.



D. Overall Recommendation

Based on the combined evaluation of career suitability, survivability score, and AI risk analysis, the system provides an overall recommendation. The recommendation highlights the most future-secure career path and suggests focusing on skills and technologies that improve long-term employability. This guidance supports informed decision-making and helps users prepare for emerging opportunities in the evolving digital economy.

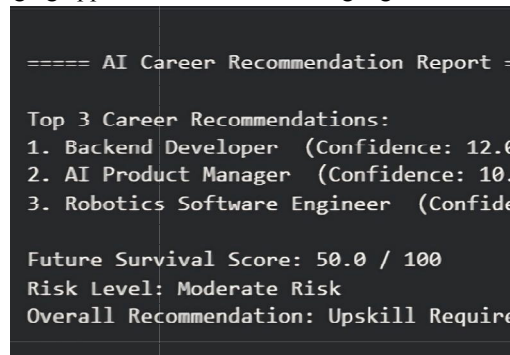


Fig. 2. Result Analysis

E. Feasibility Analysis

- 1) **Technical Feasibility:** The proposed system is technically viable as it utilizes established technologies such as Python, Machine Learning algorithms, Large Language Models (LLMs), web development frameworks, and database management systems. These technologies support intelligent career prediction, AI-based analysis, and personalized roadmap generation while ensuring efficient system performance.
- 2) **Economic Feasibility:** The development of the proposed platform is cost-effective because it primarily relies on open-source technologies, publicly available datasets, and cloud-based services. The overall implementation and maintenance expenses are relatively low, making the system suitable for deployment in educational institutions and career guidance environments.
- 3) **Operational Feasibility:** The platform is designed with a simple and interactive user interface that allows students to access career recommendations with minimal effort. Features such as resume-based analysis, assessment-driven profiling, and automated roadmap generation make the system practical and easy to use for individuals with varying levels of technical knowledge.

F. Requirement Analysis

- 1) **Functional Requirements:**
 - User registration, login, and authentication.
 - Resume upload and profile extraction.
 - Technical and personality-based assessment.
 - Career recommendation using Machine Learning models.
 - AI risk and career survivability analysis.
 - Personalized roadmap and AI tool recommendations.
- 2) **Non-Functional Requirements:**
 - High system reliability and accuracy.
 - Secure storage of user information and assessment data.
 - Fast response and efficient processing.
 - Scalability to support multiple users simultaneously.
 - User-friendly interface and accessibility.



G. Conclusion

The system analysis confirms the practicality of the pro-posed framework for future-oriented career planning. By combining workforce analytics, machine learning techniques, and AI-powered guidance, the platform offers a comprehensive solution for career recommendation and workforce preparedness. The system supports informed decision-making, continuous skill development, and improved adaptability in an increasingly AI-driven employment landscape. “

VII. FUTURE DIRECTIONS

The proposed Post-AI Workforce Design and Analysis framework establishes a strategic approach for examining career sustainability and workforce evolution in an increasingly AI-driven world. While the current system provides intelligent career recommendations, AI impact assessment, and personalized learning guidance, several opportunities exist for extending its capabilities and improving its effectiveness. Future developments can further strengthen the framework's ability to support workforce planning, career decision-making, and technological adaptation.

- 1) Advanced Workforce Transformation Modeling : Future research can focus on constructing sophisticated predictive models that analyze how Artificial Intelligence influences employment structures across different sectors. Such models could identify occupations likely to undergo significant transformation, reveal emerging job categories, and estimate long-term workforce shifts resulting from technological advancement.
- 2) Dynamic Labor Market Monitoring : The integration of continuously updated employment information can enhance the responsiveness of the system. By utilizing real-time job market trends, recruitment patterns, and industry demand indicators, future versions can provide more accurate assessments of career opportunities and workforce requirements.
- 3) Intelligent Future-Career Prediction Engine : An enhanced recommendation framework can be developed to identify career paths that demonstrate long-term growth potential and resistance to automation. By analyzing educational qualifications, technical proficiency, personal interests, and learning adaptability, the system can generate highly personalized career suggestions aligned with future industry needs.
- 4) Automated Skill Deficiency Detection : Future enhancements may include mechanisms for identifying discrepancies between an individual's current competencies and the skills expected by evolving industries. Based on these findings, the platform can automatically recommend targeted learning activities, certification programs, and professional development strategies.
- 5) Human-AI Productivity Optimization : As work-places increasingly adopt intelligent technologies, future studies can investigate effective collaboration strategies between humans and AI systems. Research in this area can contribute to the development of work models where technology enhances human performance, creativity, and decision-making rather than acting solely as a replacement mechanism.
- 6) Expansion Toward Emerging Technologies : The framework can be broadened to evaluate the influence of next-generation technologies beyond Artificial Intelligence. Areas such as Generative AI, intelligent robotics, distributed ledger technologies, cloud-based ecosystems, edge computing, and Internet of Things (IoT) applications can be incorporated to provide a more comprehensive view of future employment landscapes.
- 7) Cross-National Workforce Evaluation : Future investigations may compare workforce adaptation patterns across different countries, industries, and economic environments. Such comparative studies can reveal variations in technological readiness, digital transformation strategies, and employment resilience, offering valuable insights for policymakers and educational institutions.
- 8) Responsible and Inclusive Workforce Development: Further research should examine the broader societal implications of AI adoption. Topics such as employment displacement, fairness in automated decision-making, digital accessibility, workforce inclusivity, and economic sustainability require continuous evaluation to ensure that technological progress benefits diverse populations.



VIII. CONCLUSION

The proposed Post-AI Workforce Design and Analysis System provides an intelligent platform that helps students identify future-ready careers through resume analysis, person-ality assessment, machine learning, and AI-based guidance. The system not only recommends suitable career paths but also evaluates AI impact, suggests relevant tools, and generates per-sonalized learning roadmaps. By supporting informed career decisions and continuous skill development, the framework helps individuals prepare for a rapidly evolving AI-driven workforce. Future enhancements may include real-time job market analysis, advanced prediction models, and adaptive lifelong-learning support to further improve career planning accuracy and effectiveness.

REFERENCES

- [1] A. Kumar and S. Singh, "Tech Trajectory: AI-Enhanced Career Guid-ance System," International Journal of Artificial Intelligence and Data Science, vol. 9, no. 2, pp. 45–52, 2025.
- [2] A. Shaji George, "Artificial Intelligence and the Future of Work: Job Shifting Not Job Loss," Journal of Emerging Technologies and Innovation, vol. 11, no. 3, pp. 67–73, 2024.
- [3] S. Westman, "Artificial Intelligence for Career Guidance," International Journal of Educational Technology and AI, vol. 7, no. 2, pp. 88–95, 2021.
- [4] [1] C. B. Frey and M. A. Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?" Oxford Martin School, University of Oxford, pp. 1–72, 2013
- [5] J. E. Bessen, "AI and Jobs: The Role of Demand," National Bureau of Economic Research (NBER) Working Paper No. 24235, 2018. .
- [6] [1] Centre for Management Studies, Jain University, "The Impact of Artifi-cial Intelligence in the Workplace and Its Effect on Digital Wellbeing," Journal of Management and Technology Studies, vol. 6, no. 1, pp. 20–28, 2024. .
- [7] [1] C. Peppiatt, "AI and the Future of Work," ArXiv Preprint, pp. 1–10, 2024..
- [8] [1] S. S. Sengar, P. Kumar, and R. Mehta, "Generative Artificial Intelli-gence: A Systematic Review and Applications," International Journal of Computer Science and AI, vol. 9, no. 4, pp. 50–60, 2024.
- [9] T. Chakraborty, R. Mehta, and S. Banerjee, "The Shifting Paradigm in AI: Why Generative AI is the New Economic Variable," International Journal of AI Research and Applications, vol. 8, no. 4, pp. 102–109, 2024

