The Role of AI in Personalizing Work Experiences for Textile Gig Workers

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ARTICLE DETAILS	ABSTRACT
	This study aims to investigate the transformative role of Artificial Intelligence (AI) in personalizing work experiences for gig workers within the textile industry. It investigates how AI technologies can be utilised to deal with the multifaceted issues faced by textile gig workers, like job insecurity, skill stagnation, and limited access to occupational health resources while enhancing overall productivity and well-being. The study aims to critically assess how AI-driven technologies can be leveraged to address the unique difficulties faced by gig workers, including task mismatch, lack of skill development, and absence of occupational health support while also improving productivity, job satisfaction, and economic inclusion within the textile sector. The research adopts a qualitative, conceptual methodology, drawing upon an extensive review of interdisciplinary literature from fields including management studies, artificial intelligence, labour economics, and digital work. Case-based illustrations are utilized to examine current and potential applications of AI in the context of task matching, personalized training, performance monitoring, and health support. The study also critically analyses ethical concerns and structural barriers associated with AI integration in informal labour markets. AI has significant potential to improve the personalization of

work in the textile gig economy by enabling intelligent task allocation, adaptive learning environments, real-time performance feedback, and health monitoring tools. These capabilities can improve worker satisfaction, reduce inefficiencies, and promote skill development. However, the study also highlights major ethical and implementation challenges, including problems related to job displacement risks, data privacy and algorithmic bias. Successful integration of AI in this sector requires a human-centric, inclusive design approach supported by clear policy frameworks and worker participation.

1. INTRODUCTION:

The emergence of the gig economy represents a paradigmatic change in the organization of workers, marked by the proliferation of short-term, task-based employment arrangements often facilitated through digital platforms. Within this evolving employment landscape, the textile industry—a historically labour-intensive sector—has increasingly adopted gig-based models to navigate the complexities of seasonal demand, cost constraints, and globalized production cycles. This transition, while offering firms enhanced flexibility and scalability, has engendered significant vulnerabilities for the workforce, particularly in developing economies where textile gig work constitutes a vital source of livelihood for millions.

Textile gig workers frequently operate within informal and unregulated frameworks, encountering precarious employment conditions, inconsistent income streams, and a near-total absence of social protections. The inherent fluidity of gig work further exacerbates barriers to skill development, career progression, and occupational health monitoring. These systemic limitations underscore an urgent need for innovative mechanisms capable of improving the organisation productivity and well-being of gig workers without compromising the operational efficiencies that make the model attractive to employers.

Recent advancements in Artificial Intelligence (AI) offer compelling opportunities to address these challenges. AI technologies including machine learning, computer vision and natural language processing enable the analysis of vast datasets to generate adaptive, predictive, and personalized outcomes. Within the relation of the textile gig economy, AI holds the potential to revolutionize work

experiences through intelligent task allocation, individualized skill enhancement pathways, real-time performance feedback, and health and safety monitoring. By aligning work processes with individual worker profiles encompassing skills, preferences, and health indicators AI systems can contribute to a more equitable and sustainable employment ecosystem.

This study seeks to critically examine the role of AI in personalizing work experiences for textile gig workers. It interrogates the technological, socio-economic, and ethical dimensions of AI implementation in this sector, with a view to identifying both the revolutionary potential and the latent hazards linked with its integration. Through this exploration, the research intends to contribute to the broader discussion on digital labour and algorithmic management, offering empirically grounded and theoretically informed insights for scholars, policymakers, and practitioners engaged in the future of work.

2. OBJECTIVE OF THE STUDY:

- To analyse the current landscape of gig work in the textile industry, with particular emphasis on employment patterns, worker vulnerabilities, and organizational dynamics in developing economies.
- To examine the potential of AI technologies such as machine learning, computer vision and natural language processing in delivering personalized solutions for gig workers.
- To investigate the application of AI in key functional areas, including task assignment, skills assessment, performance feedback, and health monitoring, within textile gig work environments.
- To evaluate the potential of AI to enhance worker autonomy, wellbeing, and professional development, while addressing the structural inequities inherent in gig work models.
- To identify and analyse the ethical, technical, and policy-related challenges associated with the deployment of AI in informal and semi-formal labour settings.
- To propose a framework for the equitable and inclusive integration of AI into the textile gig economy, with actionable recommendations for policymakers, platform designers, and industry stakeholders.

3. BACKGROUND OF THE STUDY:

3.1 The Textile Gig Economy: The textile industry, one of the oldest and most labour-intensive sectors, is undergoing a paradigm shift with the rise of gig-based employment. Traditionally dominated by

permanent and semi-permanent jobs, the sector is now increasingly reliant on a flexible labour force to meet seasonal and demand-driven production cycles. Gig work in textiles includes tasks such as stitching, dyeing, embroidery, fabric cutting, and quality control, often organized through digital platforms or informal networks.

This model offers flexibility and scalability for employers, while providing income opportunities for a large segment of the workforce, especially in developing countries. However, it also presents challenges such as income instability, lack of access to benefits, limited worker protections, and minimal opportunities for upskilling. Many textile gig workers operate under informal contracts, with little bargaining power or job security.

The incorporation of AI into this ecosystem holds potential for addressing these issues. By leveraging data analytics and machine learning, AI can support personalized task allocation, efficient training, and health monitoring, ultimately contributing to a more sustainable and equitable gig economy within the textile sector.

3.2 AI and Personalization Technologies: Artificial Intelligence includes a variety of technologies, including natural language processing (NLP), machine learning (ML), computer vision and deep learning, that can analyse large datasets and generate predictive or adaptive outputs. Personalization through AI involves customizing services, recommendations, and processes based on individual user data.

In relation to textile gig work, personalization can be achieved by:

- Matching workers to tasks based on skills, availability, and preferences.
- Creating adaptive learning environments for skill development.
- Providing real-time feedback to enhance worker performance.
- Monitoring health indicators to reduce workplace injuries.

As AI continues to evolve, its capacity to understand human behaviours and preferences will further enhance its ability to offer meaningful, context-specific interventions for textile gig workers.

4. APPLICATIONS OF AI IN PERSONALIZING TEXTILE GIG WORK:

4.1 Task Matching and Job Recommendations: AI-powered recommendation engines can use algorithms to analyse a worker's past performance, skills, location, and availability to suggest suitable

gigs. These systems enhance efficiency by reducing job search time and improve job satisfaction by aligning tasks with worker strengths and preferences. For employers, this results in higher productivity and reduced turnover. Platforms like Pyng, Upwork and GigSmart already use rudimentary forms of this; in textiles, specialized systems can match workers to production jobs based on technical skills like seam stitching or pattern making.

4.2 Skill Assessment and Personalized Training: AI can evaluate a worker's current skill level through quizzes, performance analytics, or computer vision analysis of completed tasks. Based on the assessment, workers can be directed to microlearning modules, videos, or simulations that cater to their specific needs. This kind of just-in-time learning is critical for gig workers who may lack formal training or the time to attend traditional courses. Personalized learning can increase quality assurance in textile production while empowering workers to expand their skillsets.

4.3 Performance Monitoring and Feedback: AI can continuously monitor worker output and provide real-time feedback on speed, quality, and consistency. For example, sensors embedded in sewing machines or quality scanners can track efficiency and highlight areas of improvement. Feedback can be delivered in the form of dashboards, visualizations, or alerts, allowing workers to make quick adjustments. Such systems not only improve performance but also motivate workers by recognizing achievements and milestones.

4.4 Health and Wellbeing Support: Wearable AI devices and mobile health apps can track vital signs, posture, and movement to detect early signs of fatigue or injury. AI algorithms can suggest rest breaks, recommend ergonomic adjustments, and even provide access to virtual counselling. For gig workers who often lack access to occupational health services, AI can serve as a vital support tool, promoting physical and mental well-being in a high-pressure work environment.

5. CHALLENGES AND ETHICAL CONSIDERATIONS:

5.1 Job Displacement Risks: While AI has the potential to enhance human capabilities, it also poses the risk of automating certain textile tasks, particularly those that are repetitive or physically intensive. This can lead to job displacement for low-skilled gig workers. To mitigate this, AI should be positioned as a tool for augmentation rather than replacement, accompanied by policies that support reskilling and job transition.

5.2 Algorithmic Bias: The algorithms of AI systems are only as unbiased as the quality of the data they are trained on. In gig platforms, biased data can result in unfair task allocation, skewed performance evaluations, or discriminatory training suggestions. Addressing this requires rigorous auditing of AI systems, diverse training datasets, and inclusive design practices that involve gig workers in the development process.

5.3 Data Privacy and Consent: The implementation of Artificial Intelligence requires access to personal and work-related data. Ensuring that data collection is transparent, consensual, and compliant with data protection laws is crucial. Textile gig workers may not fully understand how their data is being used or may lack the power to withhold consent. Clear policies, opt-in mechanisms, and data anonymization practices are needed.

6. POLICY AND DESIGN RECOMMENDATIONS:

To create an equitable AI-driven gig ecosystem in the textile industry, the following steps are recommended:

- **Transparency:** AI systems must be explainable, with clear documentation of how decisions are made.
- **Worker Inclusion:** AI tools and solutions should be co-designed with the involvement of workers to ensure fairness and relevance.
- **Digital Literacy:** Training programs should be introduced to help gig workers understand and navigate AI tools.
- **Ethical Standards:** Industry-wide guidelines should be established for the ethical use of AI in gig work, including impact assessments and grievance mechanisms.
- **Public-Private Collaboration:** Partnerships between governments, NGOs, and tech companies can support infrastructure development and policy formulation.

7. CONCLUSION:

AI has the potential to humanize gig work in the textile industry by personalizing experiences and improving working conditions. However, its successful deployment hinges on ethical design, worker empowerment, and institutional support. Future research should explore longitudinal impacts of AI on gig worker wellbeing, investigate regional differences in AI implementation, and develop frameworks for participatory AI design. Collaboration across disciplines including computer science, labour studies,

and human-centred design will be essential to ensuring that AI is used in the textile gig economy as a tool for equity and inclusion.

Artificial Intelligence (AI) integration into the textile gig economy represents a critical juncture in the reconfiguration of labour relations within one of the world's most traditional and labour-intensive industries. As gig-based employment models become increasingly prevalent, particularly in developing economies, the imperative to safeguard worker well-being, autonomy, and professional growth becomes more urgent. This study has demonstrated that AI, when designed and implemented ethically, can serve as a powerful enabler of personalized, equitable, and sustainable work experiences for textile gig workers.

By leveraging capabilities such as intelligent task matching, adaptive skills training, performance analytics, and health monitoring, AI can address several systemic deficiencies inherent in gig work—namely, precarity, lack of support structures, and limited opportunities for advancement. These technologies have the potential not only to enhance productivity and reduce operational inefficiencies for employers but also to empower workers through greater autonomy, recognition, and access to meaningful skill development.

However, the deployment of AI in this context is not without significant ethical, technical, and policy-related challenges. Issues such as algorithmic bias, opaque decision-making, and inadequate data protection frameworks pose tangible risks to already vulnerable workers. As such, it is imperative that AI systems be developed through participatory, transparent, and inclusive processes that prioritize the needs and voices of gig workers themselves.

This research underscores the importance of interdisciplinary collaboration among technologists, policymakers, industry leaders, and worker organizations to ensure that AI functions as a tool for social and economic inclusion rather than deepening existing inequalities. Moving forward, empirical studies are needed to evaluate the real-world impacts of AI-enabled personalization in textile gig work and to refine frameworks for the responsible governance of digital labour technologies.

In conclusion, while AI holds immense promise in reshaping the landscape of textile gig work, its success will ultimately depend on the ethical foundations upon which it is built and the extent to which it aligns technological advancement with human dignity and labour justice.

8. LIMITATIONS

Although this study offers insightful information about how artificial intelligence (AI) may be used to tailor textile gig workers' job experiences, several limitations must be acknowledged. Firstly, the research adopts a conceptual and qualitative approach, which, although rich in theoretical depth, lacks empirical validation. The absence of primary data or field-based case studies limits the ability to generalize findings across different geographical regions and sub-sectors within the textile industry. Secondly, the study primarily focuses on the positive affordances of AI and personalization technologies, with less emphasis on the unintended consequences or failures of implementation in real-world settings. Lastly, due to the fact that, rapidly changing nature of AI technologies, this analysis is constrained by the present level of understanding and may not capture emerging tools or frameworks that could influence future applications.

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