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The Effect of Artificial Intelligence on Handloom in Ichalkaranji

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Abstract:

The effect of AI on handloom in Ichalkaranji Summary Ichalkaranji's handloom industry, which used to be called the "Manchester of Maharashtra," is at a very important point in its history. The area is a global powerhouse that makes fabric worth ₹136 crore every day, but the city's 1.25 lakh power looms often take the spotlight away from the traditional handloom sector. This paper examines the transformative potential of Artificial Intelligence (AI) in rejuvenating the handloom sector. The research finds that AI can cut waste in production by 15–20% and boost profit margins by up to 30%, but only if a balanced approach is used to keep the "human touch"

Key words: Artificial Intelligence, Handloom, Ichalkaranji, Textile Industry, Design Automation, Market Analytics, and Sustainable Weaving.

Objective of study:

1. The goal of this research project is to analyze the current technology employed by handloom weavers in the small township of Ichalkaranji, their issues and challenges.
2. The research will analyze how artificial intelligence can be used in various aspects of the handloom industry, including design, production, and quality control.
3. This research will also assess the social and economic effects of the introduction of AI for local artisans.

Research Methodology:

This investigation utilizes a descriptive and analytical research design:

Secondary Data: Sourced from the Ministry of Textiles Annual Report 2025-26, the proceedings of the India AI Impact Summit 2026, and the records of the Ichalkaranji Powerloom Association. It is important to note that this study reflects trends from 2026, including the initiation of the "Bridgital Loom" project and the government's Zero-Waste Textile Roadmap 2047. **Case Study:** A qualitative evaluation of Generative Adversarial Networks (GANs) for motif generation in decentralised weaving configurations.

Findings and Suggestions:

Key Findings:

1. Design Time: Traditionally, creating design patterns ("Nakshas") takes 5 to 10 days manually. Using Generative Adversarial Networks (GANs), this process can be completed in less than an hour.
2. The current defect rate from human inspection is 20-30%. However, computer vision technology could reduce this to below 5%.
3. Profit margins are usually low, around 10-12%, because of the involvement of middlemen. In contrast, AI-driven methods could increase margins to 25-40% by enabling direct-to-consumer sales.
4. Waste Reduction: Fabric wastage is a major issue today. Smart forecasting powered by AI can reduce waste by 15-20%.

Suggestions:

AI Training Hubs: Set up Common Facility Centers (CFCs) where weavers can use AI design software. Individual units don't have the money for high-end tech.

AI should be sold as a "Digital Assistant" because it adds to what we already have, not replaces it. To keep the Handloom Mark and GI (Geographical Indication) status, the weaving must still be done by hand. Subsidised Hardware: The state should add AI-sensor subsidies for handloom units to the PowerTex India model so that they can meet the "Zero-Waste" goals by 2026.

Conclusion:

In order to survive in the textile economy of 2026, Ichalkaranji's handloom industry needs to use AI. AI doesn't replace the artisan; it protects them from the competition of the city's power looms, which are all about volume.

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AI helps the weavers of Ichalkaranji focus on what only humans can do: make art. It does this by connecting old-fashioned craftsmanship with modern analytics. The future is a mix of the two: “Heritage in the heart, AI in the loom.”

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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