

## **Artificial Intelligence (AI) in sustainable textile processing chain: scopes, challenges, and opportunities.**

**Md. Faisal Mahmud<sup>1,2</sup>, Nadvi Mamun Pritha<sup>3</sup>, Md. Mazed Islam<sup>1</sup>, Abu Sadat Muhammad Sayem<sup>4</sup>**

*<sup>1</sup>Department of Materials, Faculty of Science & Engineering, University of Manchester, Manchester, M13 9PL, UK*

*<sup>2</sup>Department of Textile Engineering, Ahsanullah University of Science and Technology, Dhaka, Bangladesh*

*<sup>3</sup>Department of Textile Engineering, Prime Asia University, Dhaka, Bangladesh*

*<sup>4</sup>School of Fashion, Manchester Metropolitan University, Manchester, M15, 6BG, UK*

### **Abstract:**

The textile industry is continuously meeting the growing demand for textile and apparel products through the inclusion of fashion and innovation in their product design as well as manufacturing systems. To survive in the unforeseen competitive world textile industry is trying to optimise resource utilisation through improved design, manufacturing processes, and waste reduction. To become a customer-centric, environment-friendly, and sustainable manufacturing process, integration of artificial intelligence (AI) can be a game changer in the emerging digitalisation of the world. AI has gained enormous importance in global business by transforming many industries, like health and transportation, through its intellectual problem-solving capabilities. As the textile and apparel industry tries to transform towards sustainable growth, AI can alleviate this by changing commonly used conventional computational tools. This systematic review aims to provide a conceptual outline of the adaptation of AI in the textile processing chain and its future challenges and opportunities. A brief overview of the textile processing chain(input-output) will be introduced, along with their existing challenges and a way forward by incorporating AI. AI-based manufacturing approaches for best-quality products and performance improvement will be forecasted along with their prospects and challenges. This review will direct an intellectual road map on the areas of improvement and create a new research domain for academics and industrial researchers.

**Keywords:** Artificial Intelligence (AI), Sustainability, Quality improvement, Textile and apparel industry, Waste reduction.