Field of Study: Textile Engineering and Sustainable Technology	

Title: **Revolutionizing Textiles with Robotics: A Glimpse into the Future**

Author(s): [1]ABTAHI ISLAM

Affiliation:
[1]American International University – Bangladesh, Dhaka 1229, Bangladesh
[2]Bangladesh University of Textiles, Dhaka 1208, Bangladesh

Presenting author & Email: ABTAHI ISLAM (23-50434-1@student.aiub.edu)

Corresponding author: Jannatul Fardus, American International University – Bangladesh. Email: jannatul@aiub.edu

Title: Revolutionizing Textiles with Robotics: A Glimpse into the Future

Abstract:

The textile industry in Bangladesh faces significant challenges related to worker safety, environmental sustainability, and efficiency. Automation can significantly enhance workplace safety by reducing human exposure to hazardous processes and minimizing workplace injuries. Robots can handle repetitive and dangerous tasks, ensuring a safer environment for workers. Additionally, automation can improve manufacturing precision, leading to less waste and more sustainable resource use. This paper investigates the role of automation in addressing these challenges, including high initial investment, lack of awareness, resistance to change, and technical challenges. Data were collected through a survey form on how automation can transform the textile industry. This dataset was analyzed using SPSS software, employing descriptive statistics, cross-tabulation, and Chi-Square tests to identify relationships between variables. The analysis revealed a strong positive correlation for younger generations, particularly those aged 18-25 and showed a higher likelihood of supporting automation ($P<0.000$) and are more familiar with the automation in the industry ($P<0.000$). It also indicates that the relationship between familiarity with the concept of robotics in the textile industry and opinions on its long-term sustainability is statistically significant ($P<0.000$). The findings suggest that automation can enhance workplace safety, reduce environmental impact, and improve overall productivity. By adopting these technologies, the textile industry in Bangladesh can set a positive example for other nations, promoting a more sustainable and economically beneficial future. This paper provides valuable insights into overcoming the mentioned challenges and highlights the potential benefits of automation, guiding the industry towards a safer, more efficient, and environmentally friendly future. Additionally, AI can optimize production processes, predict maintenance needs, and enhance decision-making, further boosting efficiency and sustainability in the textile industry.

Keywords: Robotics, Efficiency, Worker safety, Automation, Familiarity with automation, Long-term sustainability.