Workshop « Soft Material Models »
Les 01 et 02 juin 2023 à l'Ecole Centrale Casablanca, Maroc

"The Use of artificial intelligence in the garment industry"

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Abstract

The application of artificial intelligence (AI) techniques in the garment industry has gained significant attention in recent years. This poster explores the use of AI in various aspects of the garment industry, including assembly line balancing. While automation has been implemented in the design, pattern-making, and cutting processes, the assembly portion of clothing production remains largely manual. The literature review reveals limited studies on AI-based balancing problems in the clothing industry. Experimental results indicate that optimal solutions can be achieved in an acceptable time frame for small and medium-sized problems.

Context

The garment industry has faced numerous challenges, such as high labor costs, quality control issues, and the need for efficient production processes. The context section provides an overview of these challenges and emphasizes the potential of AI to address them. It discusses how AI can automate and optimize design, pattern-making, production planning, inventory management, and customer demand forecasting tasks.

Methodology

The review is based on a thorough examination of existing literature and experimental studies related to AI-based assembly line balancing. The analysis includes different approaches, algorithms, and mathematical formulations employed in the clothing industry. Various AI techniques such as artificial neural networks, simulated annealing, branch-and-bound, ant colony optimization, genetic algorithms, and tabu search are explored.

Results

The review is based on a thorough examination of existing literature and experimental studies related to AI-based assembly line balancing. The analysis includes different approaches, algorithms, and mathematical formulations employed in the clothing industry. Various AI techniques such as artificial neural networks, simulated annealing, branch-and-bound, ant colony optimization, genetic algorithms, and tabu search are explored.

Conclusion and perspectives

The research concludes that while AI techniques have been extensively studied and implemented in assembly line balancing across various industries, their application in the clothing industry is still limited. Experimental results demonstrate the potential for optimizing production processes and reducing labor requirements. However, further research is needed to explore the scalability and effectiveness of AI techniques for large-scale assembly line balancing problems in the clothing industry. The integration of AI with other advanced technologies, such as Internet of Things (IoT) and robotics, holds promise for enhancing automation in the garment manufacturing sector. Additionally, exploring the use of AI in other aspects of clothing production, such as quality control and supply chain management, could further improve operational efficiency and competitiveness.

References

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