

# Interactive solution approach for loop layout problem using virtual reality technology

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**Abstract** Development of the manufacturing sector has sparked a wide interest in the study of facility layout problem since the past century. The traditional methods of solving facility layout planning are mainly numerical- and analytical-based simulation which might not reveal the actual situation of a manufacturing system. This paper proposed an interactive solution approach using virtual reality technology for loop layout planning to reduce the gap between numerical results and the real situation through enhanced human-machine interface. In this proposed approach, a virtual loop layout model has been developed as an intuitive and interactive platform for loop layout planning and evaluation in real-time control. This platform allows the user to modify the layout through direct interaction and evaluate the performance of the designed layout for multiple times to obtain the optimal layout design. A case study with the allocation of a shortcut conveyor in a loop layout in different locations conducted within the virtual

platform has proven that this platform is an effective alternative solution tool for loop layout decision. The case study shows that the allocation of shortcut conveyor can improve the loop layout performance as it can reduce the traffic congestion of a part and reduce its travel distance by 18.77 %.

**Keywords** Virtual manufacturing · Virtual reality · Loop layout problem · Layout simulation · Real time

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