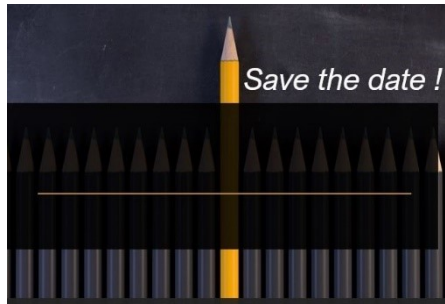


A new automatic method for demoulding plastic parts using an intelligent robotic system

This paper presents a new intelligent robotic system capable of performing the demoulding task of the entire toy manufacturing process by carrying out the most labour-intensive part of the process. Therefore, this approach directly reduces the stress and potential injuries to operators who can perform other dexterous and human-based tasks.

This system is composed by the usual machinery of the toy manufacturing process (rotomoulding oven, air cooler, moulds, etc.), external devices such as RGB-D cameras, pneumatic actuators, emergency buttons, and safety laser scanners, and a UR10e collaborative robot arm. The intelligent robotic system with the integrated camera detects the pieces in the mould using a developed vision-based algorithm and extracts them by means of a custom gripper located at the end of the robot. All mentioned devices and machinery have been integrated at INDUSTRIA AUXILIAR JUEMA S.L., an actual doll manufacturing company. This automatic method has been successfully implemented in a real toy factory providing a novel approach in this traditional manufacturing process. The paper describes the robotic system performance using different forces and velocities, obtaining a success rate of more than 90% in the experimental results.

<https://link.springer.com/article/10.1007/s00170-023-12466-y>



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