The Role and Impact of Robotics Integration in Precision Machining and Manufacturing: A Comprehensive Review

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Abstract The role of robotics in precision machining and manufacturing has undergone significant evolution over time, as technological advancements have empowered robots to execute a diverse array of tasks with remarkable accuracy and uniformity. This comprehensive review provides an overview of the historical progression of robotics in the specified field, evaluates its present status, analyzes practical case studies of its applications, and investigates potential future avenues for development. Despite the notable progressions in the domain of robotics, there persist certain deficiencies and inadequacies. Several factors need to be considered in relation to the adoption of robotics technology, namely the significant financial investment required, the potential for job displacement resulting from automation, and the necessity of skilled personnel to effectively operate and maintain these machines. In order to bridge these gaps, it is imperative to undertake more research and development endeavors. Future research efforts may focus on developing economically feasible robotics solutions, specifically designed to meet the requirements of small and medium-sized organizations. Moreover, it is crucial to investigate approaches aimed at mitigating the adverse consequences of employment relocation. Furthermore, it is imperative to emphasize the need of establishing training programs that focus on providing workers with the necessary skills and knowledge to proficiently operate and maintain robots systems. This paper provides a thorough analysis of the application of robots in precision machining and manufacturing, with a focus on the

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