AI-Powered Robotics: Opportunities, Challenges and Future Directions

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Abstract:

Artificial Intelligence (AI)-powered robotics is rising as one of the most transformative technologies of the twenty-first century, reshaping industries and redefining human–gadget collaboration, by integrating superior AI strategies with device mastering, deep learning, natural language processing, and pc imaginative. Present-day AI-driven robots show adaptability, self-reliant decision-making, situational consciousness, and interactive intelligence, enabling them to characteristic in complex and dynamic environments. Those advancements have created incredible opportunities in various domains, inclusive of healthcare, where surgical robots and assistive devices improve precision and patient care; production and logistics, where collaborative robots (cobots) and independent structures decorate productivity; agriculture, where AI-powered drones and robots optimize crop monitoring and yield prediction; and transportation, in which self-riding motors promise more secure and more green mobility. Despite those possibilities, tremendous challenges continue to be those that avert large-scale adoption. Ethical and societal issues, which include privacy violations, job displacement, and accountability in case of disasters, pose principal hurdles. Furthermore, the absence of frequent regulatory and criminal frameworks complicates the deployment of clever robotics on an international scale. Addressing those demanding situations requires multidisciplinary collaboration across pc technology, engineering, regulation, ethics, and social sciences. This paper presents a complete evaluation of the opportunities, demanding situations, and destiny guidelines of AI-powered robotics, emphasizing the need for responsible innovation and sustainable integration into everyday life.

Keywords:

AI-Powered Robotics, Robotics, Human–Robotic Interplay (HRI), Intelligent Machines.