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on

Artificial Intelligence and Enabling Robot Autonomy

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This special issue is a follow-up to the “Enabling Robot Autonomy” special issue previously published in the journal as issue 25:2, 2018. In the not too distant future, artificial intelligence (AI) will permeate almost every aspect of our lives. One goal of AI is to allow machines to reason over knowledge in a similar way as humans. Traditionally, machines perform a preset task in a preset manor. With AI, the machines will be able to reason over their tasks and the environment in order to behave in a more human-like fashion. The affordability of sensors, increases in computing capabilities, and development of infrastructure such as the Internet of Things (IoT) has left industrial applications especially well poised to received many of the benefits that AI technologies promise.

This special issue focuses on both theoretical and practical ways in which AI has been applied to industrial applications and to techniques to verify that the systems are meeting their requirements. In this context, we refer to industrial applications in a broad sense, including design, planning, and production. Of particular interest is the application of AI to automated production, including innovative ways in which AI is applied to robotics. This includes robotic perception, planning/reasoning, control, and verification. Verification—compelling evidence that autonomous systems satisfy their requirements and behave safely—has become increasingly important. As technology progresses, and autonomous systems become more complex, with added intelligence and adaptive capabilities, the challenges of verification increase. We also refer to AI in a broad sense, not only limiting its scope to machine learning and neural networks, but also more traditional techniques such as knowledge representation, case-based reasoning, and rule-based reasoning, among others.

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