

Special Session

Code: 5ivec

Title

Intelligent Perception of Environment for Human-Robot Confluence

Proposer / Main Organizer

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IEEE Member or SMC Society Member

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Category

Human-Machine Systems

Number of Expected Paper Submissions:

6 or more

Keywords

- Deep Learning
- Machine Vision
- Human Factors
- Evolutionary Computation
- Human-centered Learning
- Virtual and Augmented Reality Systems
- Human-Machine Cooperation and Systems

Brief Description and Justification (200-250 words):

Human-Robot Confluence (HRC) aims at close collaboration, natural interaction, and actively learning for human and robots working together in the same natural environment. It is a basic element towards the era of “Industry 4.0”. To efficiently achieve HRC, it requires advantage technologies for accurately environment perception in the domain of artificial intelligence and human factors, such as semantically understanding, human tracking and behavior recognition, self-localization and mapping, human-robot interaction, to name a few. Being an active research domain in both academic and industry, various intelligent perception methods have been proposed leveraging state-of-the-art technologies, such as deep

learning, machine vision and VR/AR. On the other hand, human as the center of the HRC system plays a key role in environmental perception. Despite the uncertainty in the field, expertise from human operators, especially their responses to environmental changes, will provide situation-specific ways to enhance HRC. Human factor in such a context becomes a key factor when developing HRC systems. Although various techniques including human-centered learning and evolutionary computing have been applied to HRC, we are still facing great challenges such as low efficiency, non-natural, high cognitive burden when robots collaborating and interacting with, and learning from human, as the real working environment becomes more and more complex and dynamic. To further improve the HRC, we propose this special session and focus on the discussion and insights into latest advancements and technologies on intelligent perception of the environment for HRC.