Special Issue

Intelligent and Advanced Control for Human-Centric Robotic Actuation and Interaction

Message from the Guest Editor

Actuators invites original contributions for a forthcoming Special Issue "Intelligent and Advanced Control for Human-Centric Robotic Actuation and Interaction". As robotic systems move from autonomous tools to collaborative partners, the role of control theory becomes increasingly vital in ensuring safe, adaptable, and high-performance operation in human-in-the-loop environments. This Special Issue invites contributions that explore advanced control strategies—ranging from adaptive and nonlinear methods to optimal and passivity-based approaches—for embodied, actuated systems in dynamic, interactive settings. We welcome both theoretical contributions and application-driven studies validated through experiments or deployment in human-facing systems. Topics include (but are not limited to) the following:

- Nonlinear/adaptive control in physical human–robot systems;
- Disturbance observers, state estimation, and hybrid control;
- Impedance/admittance frameworks for compliant interaction;
- Optimal control with task-specific or user-specific constraints
- Wearable actuators, exoskeletons, and co-manipulative platforms.

Guest Editor

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About the Journal

Message from the Editorial Board

We are just entering the Next Wave of Technology (NWT) where actuators will play the same role as the computer chip did for computers/social media approximately four decades ago. Just in the U.S., production of $1 trillion year of electromechanical systems (vehicles, orthotics, manufacturing cells, freight trains, aircraft, etc.) will be impacted by the NWT, all driven by actuators. Five key trends can be found for the future perspectives: “Performance to Reliability”, “Hard to Soft”, “Macro to Nano”, “Homo to Hetero” and “Single to Multi functional”. We invite papers that primarily impact these economic sectors; those illustrating basic scientific principles are also welcome.

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