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# Guest editorial

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## Robotic control for industrial and service applications

This special issue titled by *Robotic Control for Industrial and Service Applications* is focused on advanced and intelligent robot control techniques which features at potentials in industrial and daily routine applications. This issue is with co-guest editors: Hesheng Wang (Shanghai Jiao Tong University), Hanlei Wang (Beijing Institute of Control Engineering), Long Cheng (Institute of Automation, Chinese Academy of Sciences) and Xuebo Zhang (Nankai University).

Robotics has blossomed in this decade, based on the advances in diverse robotic control technologies. Robots demonstrate superiority in efficiently completing repetitive and labor-costing tasks in structured industrial environments, such as assembling, welding, sorting, transportation and so forth. Despite the obvious manufacturing growth robots have brought to industry, continuous sustainment of this growth calls for evolution in robotic control technology to widen its applications. More concentrations are supposed to be exerted on flexible automation and precision machining tasks, which require a robot with high-level environmental adaptability, flexibility, interactive ability and performance accuracy. Scientists also dedicate to extend the robotic application into daily routine life, namely, as service robot applications. However, the complicated and dynamic environments arouse new challenges that may hamper the wider applications of this type of robots. A possible approach would be exploiting a robust sensorimotor control scheme combined with economic and precise sensing system. To enhance the applicability in high demanding machining tasks as well as in multi-scenario service applications, a robot is thought to be able to perform, if not better than, as well as its human being counterparts. That means, it should be capable of a wide variety of operational environments with unexpected disturbance and quickly rearrange operation strategies according to specific tasks, and meantime, maintaining its high accuracy of the operation. In short, to successfully apply robotic control into physical (industrial and service) applications, we need unify certain domain expertise such as knowledge of mechanism design, systematic modeling, advanced and intelligent control, sensing techniques and so forth. To this end, papers in this

special issue are carefully reviewed and selected to demonstrate the current progress in, but not limited to, aforementioned areas.

Although many papers were submitted, we are sorry that only a small subset of them (10 papers) are accepted and published in this special issue. To promote robotic applications in industrial and service tasks involves cross discipline cooperation. Therefore, we attempt to include a cross section of papers addressing various research fields.

We are appreciatory for impressive progress of robot control technology in industrial and service applications presented in aforementioned papers. Nevertheless, we are also fully aware of limitations in current robotic research. For example, traditional program-by-teaching method, which is commonly used in industrial robot control tasks, requires considerable time and labor to complete the training process and performs poorly if any changes happen in working environments. Accurate environmental perception ability is vital for both industrial and service robot while high economic cost of current sensing device increase the upfront cost of a robotic system. Other upfront requisites for physical applications such as environmental ability, interactive ability, precise operation, robust control with modeling uncertainties and environmental disturbance, though has achieved improvements in this decade, still have limitations that hindering the evolution of robotics into more intelligent level. This special issue aims to make a very first step in further exploration in robotic control related fields and provide a communicating platform for advanced technology. We hope this issue could, if not much, contribute our part to further expansion of the industrial and service robot application.

And last but not least, we would express our heartfelt appreciation to all authors who present their papers at this special issue, and to all editors for their contributions in proceedings of publication.

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