Special Issue on
Vision-Based Control and Its Applications

Call for Papers

Vision-based control has been an active research area in robotics since 1990s. Though many theoretical and practical results have been devoted to this area, other control aspects, solid mathematical analysis and proof, real-time issues, and hardware implementations of image processing algorithms still deserve to be further investigated for real robot systems.

Hence, besides the recent research outcomes in the theoretical aspects of vision-based control, new kinds of vision-based control methods and their successful applications for those nonlinear newly emerging robotic systems are welcome to be submitted to this special issue. With increasingly solid mathematical foundations, various methods and techniques have been studied and proposed for the control of nonlinear dynamic systems. We invite authors to submit original research and review articles on the exploration of new theories and methodologies in the field of vision-based control with solid mathematical contents, on the study of new framework for the design and analysis of vision-based control in the area of new emerging nonlinear dynamic robotic systems, and on the development of novel solutions and strategies to enhance the performance of existing methods and algorithms for vision-based control and its applications to real problems encountered in actual environments. Potential topics include, but are not limited to:

- Mathematical foundations and theories for visual serving
- Mathematical frameworks for visual-based controller design
- Mathematical models and algorithms for vision-based environmental perception
- Mathematical solutions for vision-based trajectory tracking
- Mathematical developments and analysis for vision-based navigation, localization, path planning, and trajectory optimization
- Mathematical theories for vision-based object grasping/manipulation
- Vision-based 2D/3D simultaneous mapping and localization
- Vision-based formation control/coordination control for multirobots

- Vision-based methods for nonlinear robot systems such as nonholonomic mobile robots, aerial robots, and underwater vehicles
- Computational geometry theories for vision-based geometric reconstruction
- Mathematical stability analysis for vision-based system
- Signal filtering techniques for vision-based estimation method
- Mathematical frameworks for system modeling and identification with vision

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