

Title: Visual servoing of Robots in Unstructured Environments

Abstract:

Visual servoing is an important technique that uses visual information for the feedback control of robots. To implement a visual servo controller, an important step is to calibrate the intrinsic and extrinsic parameters of the camera. It is well known that the camera calibration is costly and tedious. The calibration accuracy of these parameters significantly affects the control errors. It is desirable to use uncalibrated visual signals directly in controller design. By directly incorporating visual feedback in the dynamic control loop, it is possible to enhance the system stability and the control performance. Dynamic visual servoing is to design the joint inputs of robot manipulators directly using visual feedback. In the design, the nonlinear dynamics of the robot manipulator is taken into account. In this talk, various visual servoing approaches will be presented to work in uncalibrated environments. These methods are also implemented in many robot systems such as manipulator, mobile robot, soft robot, quadrotor and so on.

Bio

Hesheng Wang received the B.Eng. degree in Electrical Engineering from the Harbin Institute of Technology, Harbin, China, in 2002, the M.Phil. and Ph.D. degrees in Automation & Computer-Aided Engineering from the Chinese University of Hong Kong, Hong Kong, in 2004 and 2007, respectively. From 2007 to 2009, he was a Postdoctoral Fellow and Researcher Assistant in the Department of Mechanical and Automation Engineering, The Chinese University of Hong Kong.

He has been with Shanghai Jiao Tong University, China, since 2009, where he is currently a Professor of Department of Automation. He worked as a visiting professor at University of Zurich in Switzerland. His research interests include visual servoing, service robot, robot control and computer vision. He is an associate editor of Robotics and Biomimetics, Assembly Automation, International Journal of Humanoid Robotics and IEEE Transactions on Robotics. He served as associate editor in Conference Editorial Board of IEEE Robotics and Automation Society from 2011 to 2015. Prof. Wang is actively involving in organization of international conferences. He was the general chair of the 2016 IEEE International Conference on Real-time Computing and Robotics and the program chair of the 2014 IEEE International Conference on Robotics and Biomimetics. He is the program chair of the 2019 IEEE/ASME International Conference on Advanced Intelligent Mechatronics. He was a recipient of Shanghai Rising Star Award in 2014 and The National Science Fund for Outstanding Young Scholars in 2017. He is a Senior Member of IEEE.