

Control and motion planning for aerial robotic systems

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Abstract

Aerial robotic systems, including unmanned aerial vehicles (UAVs), have wide use in fields ranging from agriculture and delivery services to telecommunications and first response. But despite recent advances in the design and development of such systems, precision motion control and autonomous operation, especially in cluttered and complex environments, remains a challenge. This talk will focus on model-based automatic collision avoidance, trajectory tracking that exploits the process of repetition, and particle-filter-based motion planning for source localization. To demonstrate the effectiveness of these approaches, simulation and experimental results will be presented. Applications of the work include tele-operated search and rescue and autonomous chemical/gas plume detection and source localization.

Biography

Kam K. Leang received the B.S. and M.S. degrees in Mechanical Engineering from the University of Utah in December 1997 and 1999, respectively, and the Ph.D. degree from the University of Washington in December 2004. He is an Associate Professor in the Mechanical Engineering Department at the University of Utah, where he joined in July 2014. He is also affiliated with the University of Utah Robotics Center. Between 2008 and 2014, Dr. Leang was at the University of Nevada, Reno. While at the University of Nevada, Reno, he received the 2014 Nevada Board of Regent's Rising Researcher Award. His research covers three main areas: (1) design and control of high-speed nan positioning systems, (2) control and manufacturing of electroactive polymer actuators for soft robotics, and (3) design, motion planning, and control of mobile robotic systems with application in environmental monitoring. His research has been supported by the National Science Foundation, U.S. Department of Defense, Dept. of Energy, NASA, and industry. He was the Technical Editor for IEEE/ASME Trans. on Mechatronics, and he currently serves as an Associate Editor for IEEE Control Systems Magazine, Mechatronics journal (Elsevier), the International Journal of Intelligent Robotics and Applications (IJIRA), and Frontiers in Mechanical Engineering (Nature Publishing). More details about his research can be found at <http://www.kam.k.leang.com/academics/>.

