2023 International Mechatronics Conference and Exposition

SENSOR FUSION IN AUTONOMOUS SYSTEMS

2-3 hour session

Intended audience

students and entry-level engineers

The past two decades have witnessed great success in deploying autonomous systems for scientific, commercial, civil, and military applications. At the core of an autonomous system lies its navigation and perception module consisting of multiple sensors. Such a module fuses sensor information to localize the system relative to its operating environment. In this tutorial, I will introduce typical sensors used in autonomous systems and their mathematical models, present basic principles (such as Kalman filter) to fuse information from the sensors, discuss examples and applications of sensor fusion in autonomous systems, and review recent advances. The audience will gain fundamental insights in how sensor fusion facilitates navigation of autonomous systems.

Instructor

He Bai received his B.S. degree from the Department of Automation at the University of Science and Technology of China, Hefei, China, in 2005, and the M.S. and Ph.D. degrees in Electrical Engineering from Rensselaer Polytechnic Institute in 2007 and 2009, respectively. From 2009 to 2010, he was a Post-doctoral Researcher at the Northwestern University, Evanston, IL. From 2010 to 2015, he was a Senior Research and Development Scientist at UtopiaCompression Corporation. In 2015, he joined the Mechanical and Aerospace Engineering Department at Oklahoma State University, where he is currently an associate professor. His research interests include nonlinear estimation, robotics, autonomous systems, and multi-agent control.

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