Hui Xiao

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SUMMARY

I'm a PhD Student (research assistant) proficient in digital system processing, digital signal control and C++/Python programming, with project experiences in estimation/target tracking, sensor fusion, deep learning and vision-based robot control. I'm a quick learner passionate about the robot and automation technology.

EDUCATION

Aug 2015 – (May 2020) **Mechanical Engineering | University of Connecticut** Storrs, CT, USA
Doctor of Philosophy (Ph.D.), areas of concentration: **System and Control** GPA: 4.0/4.0

Sep 2011 – July 2015 **Mechanical Engineering | Tsinghua University** Beijing, China
Bachelor of Science (B.S.) GPA: 88.9/100

EXPERIENCE

2015 – present **Research Assistant |** Machine, Automation and Control System Laboratory CT, USA

- Conduct state-of-art research in signal processing and system control; developed a novel sensor fusion algorithm that enables control of fast-moving robot under sensors with slow sampling speed.
- Supervise three undergraduate projects including force control of universal robot (UR3), collision avoidance and motion planning of a quad-leg spider robot and a KUKA mobile robot.

2015-2018 **Teaching Assistant |** Mechanical Engineering, University of Connecticut CT, USA

- Undergraduate courses: ENGR 1166 - Foundations of Engineering; ME 3221-Manufacturing Automation.
- Graduate courses: ME 5507 - Engineering Analysis; ME 5420 – Mechanical Vibrations.

2012-2014 **Undergraduate Researcher |** Mechanical Engineering, Tsinghua University Beijing, China

- Designed an Electronically Coupled and Self-adaptive finger (E-COSA).
- Led a team of four to design and build a robotic upper limb consisting of a humanoid arm and a smart adaptive hand.

COURSE PROJECTS

2018 Fall **Automated Rubik's Cube Robot Solver** CT, USA

- Coded a dual-arm robot (with ROS and OpenCV) so that it can automatically inspect and solve a random scrambled Rubik's cube. (Keywords: **Color Detection**, **Robot trajectory planning**)

2018 Summer **Vision-based Control of Universal Robot (UR3) for Target Tracking** CT, USA

- Implemented an image-based visual servo algorithm and coded the UR3 robot to adaptively follow a moving target in 3-D space. (Keywords: **Marker Detection**, **Robot velocity control**)

2018 Spring **IMM Estimator for Air Traffic Control** CT, USA

- On-line estimation of the position, velocity, and course of an airplane from radar measurements using the interacting multiple model (IMM) and Extended Kalman Filter (EKF). (Keywords: **Estimation**, **Tracking**)

2017 Fall **Semantic Image Segmentation for Airplanes Using Convolutional Neural Network** CT, USA

- Trained a convolutional neural network (27 layers) that can segment airplanes in an image. (Keywords: **Deep learning**, **Image processing**)

Senior Design **Pose Estimation for Human Upper Limb and Control of Robotic Arm and Hand** Beijing, China

- Designed an upper arm posture estimation algorithm by fusion measurements from three wearable IMUs and five resistive flex sensors.
- Developed an algorithm to control a robotic arm and hand to follow the estimated human upper arm posture in real time.

RELEATED COURSES

ECE-6439 **Estimation Theory and Computational Algorithms**	Instructor: **Yaakov Bar-Shalom**	Grade: **A**
ECE-6122 **Digital Signal Processing**	Instructor: **Peter Willett**	Grade: **A**
ECE-6171 **Mobile Robotics**	Instructor: **Ashwin Dani**	Grade: **A**
ME-5160 **Theory and Design of Automatic Control**	Instructor: **Nejat Olgac**	Grade: **A+**
ME-5895 **Adaptive and Optimal Controls**	Instructor: **Xu Chen**	Grade: **A**
Deep Learning Specialization on Coursera	Instructor: **deeplearning.ai**	Grade: **99/100**

RECOGNITIONS

Best Student Paper on Mechatronics Award, ASME Dynamic System and Control Division	2018
First Prize Award, The "Challenge Cup" Student Research & Technology Competition, Tsinghua University	2014
Second Prize Award, Mechanical Innovation Competition, Tsinghua University	2012
Science and Technology Innovation Fellowship, Tsinghua University	2013&2014
First Prize Award, Excellent Student Research Project, Tsinghua University	2013
Undergraduate Laboratory Contribution Award, Tsinghua University	2014

COLLEDGE ACTIVITIES

July 2013 - July 2014	**Vice President,** Student Association for Science and Technology, Department of Mechanical Engineering, Tsinghua University
Feb 2013 - July 2013	**Vice Minister**, Student Union, Department of Mechanical Engineering, Tsinghua University

PUBLICATIONS

[1] Hui Xiao, Yaakov Bar-Shalom, Xu Chen. "A Collaborative Sensing and Model-Based Real-time Recovery of Fast Data Flows from Sparse Measurements." **IEEE Transactions on Industrial Electronics**. Under review.

[2] Hui Xiao, Yaakov Bar-Shalom, Xu Chen. "Model-based Sparse Information Recovery by a Collaborative Sensor Management." **In Proceedings of ASME 2018 Dynamic System and Control Conference**, Sep 30, Atlanta, Georgia, USA, 2018.

[3] Hui Xiao, Tianyu Jiang, Xu Chen. "Rejecting fast narrow-band disturbances with slow sensor feedback for quality beam steering in selective laser sintering." **Mechatronics** 56 (2018): 166-174.

[4] Hui Xiao, Ioan D. Landau, and Xu Chen. "A robust optimal design for strictly positive realness in recursive parameter adaptation." **International Journal of Adaptive Control and Signal Processing** 31.8 (2017): 1205-1216.

[5] Hui Xiao, and Xu Chen. "Multi-band beyond Nyquist Disturbance Rejection on a Galvanometer Scanner System." **IEEE International Conference on Advanced Intelligent Mechatronics**, Munich, Germany. 2017. (**Best Student Paper on Mechatronics Award)**

[6] Xu Chen and **Hui Xiao.** Multirate Forward-model Disturbance Observer for Feedback Regulation beyond Nyquist Frequency. **In Proceedings of American Control Conference**, Boston, USA, 2016.

[7] Tianyu Jiang, **Hui Xiao**, and Xu Chen. "An Inverse-Free Disturbance Observer for Adaptive Narrow-Band Disturbance Rejection With Application to Selective Laser Sintering." **In Proceedings of ASME 2017 Dynamic System and Control Conference**, Oct 11, Tysons Corner, Virginia, USA, 2017. (**Best Vibration Paper Award**)

[8] Hui Xiao, D. Che, W. Zhang, Z. Sun, "Electronic Coupled and Self-adaptive Grasp Robotic Finger," **IEEE International Conference. on Robotics & Biomimetics**, Shenzhen, China, pages 1568-1573, 2013.

SKILLS

C++, Python, MATLAB, OpenCV, Robotic Operating System (ROS), TensorFlow, CAD