YUNHAI HAN

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EDUCATION BACKGROUND

University of California, San Diego (UCSD) 09/2019 - present
M.S. in Dynamics & Controls, Mechanical and Aerosapce Engineering *GPA: 3.909/4.00*

· **Relevant Course:** Robotics

Yanshan University 09/2015 - 07/2019
B.S. in Mechatronics, Mechanical Engineering *GPA: 3.761/4.5, Major GPA: 3.804/4.5*

· **Relevant Course:** Mechatronics *Ranking:* 2^{nd} of 594 (First six semesters)

FILED OF INTERESTS

Robot Perception; Robot Manipulation and Control; State Estimation;

RESEARCH PROJECTS

Auto-calibration Method for Urban Autonomous Driving Applications

- Present a system for dynamic camera calibration based on recognition of stop signs
- Camera intrinsic parameters are tracked over time and converges to stable values within a short time
- Experimental results show improved performance for the auto-calibration
- Submitted a paper to **IEEE RA-L with ICRA** as first-author

Surgical Simulation Framework for Tool-Tissue Interaction

- Propose the framework that continuously tracks the motion of manipulator and simulates the tissue deformation
- Compute the deformation energy for the control and planning task using implicit Euler energy
- Published a paper at **IROS Workshop (Cognitive Robotic Surgery)** as first author and gave a spotlight presentation

***Real-to-Sim* Registration of Deformable Soft Tissue with Position-Based Dynamics**

- Propose an online, continuous, registration method to bridge from 3D visual perception to position-based dynamics modeling of tissues
- Account for differences between the simulation and the real, live surgical scenes.
- Submitted a paper to **ICRA** as second-author

Numerical verification of the differential privacy for a novel moving-horizon estimator

- Design a differential privacy test framework for distributional systems using numerical verification method
- Capable of being easily extended to other estimators for the verification of the claimed differential privacy

PAPERS

- Han. Y, Liu. Y, Paz. D, and Christensen. I. H, "Auto-calibration Method Using Stop Signs for Urban Autonomous Driving Applications", arXiv:2010.07441

- Han. Y, Liu. F and M. C. YIP, "A 2D Surgical Simulation Framework for Tool-Tissue Interaction", arXiv:2010.13936
- Liu. F, Li. Z, Han. Y, J Lu, F Richter and M. C. YIP, "*Real-to-Sim* Registration of Deformable Soft Tissue with Position-Based Dynamics for Surgical Robot Autonomy", arXiv:2011.00800

SELECED GROUP PROJECTS

RoboMaster Competition

- Design and build a squad of multi-purpose robots from scratch that are capable of completing different tasks required for the competition
- Responsible for the system design of visual components(including object tracking and monocular vision) and the PID stability adjustment of the gimbal unit on the mobile tank (to prevent bumps and collisions during movement)
- Divide the whole task into several modules for each group member as the leader of vision group

AWARDS & HONORS

AWARDS

· *06/2016* China Undergraduate Mathematical Contest in Modelling (CUMCM) *Second Prize*
· *03/2017* Zhou Peiyuan Mechanics Competition *National Excellence Award*
· *05/2017* National Electronic Design Competition *Successful Entry Certificate*
· *09/2017* Asia-Pacific Mathematical contest in modeling (APMCM) *Second Prize*
· *01/2018* Mathematical Contest in Modeling (MCM/ICM) *Honorable Mention*
· *08/2018* RM RoboMasters *Second Prize*

HONORS

· *11/2017* National Scholarship from Chinese Ministry of Education
· *07/2018* Certificate for Attendance of CDIO 2018 Academy (Japan)
· *06/2019* Certificate of Excellent Graduate in Hebei Province

STANDARD TESTS

Test Date: ***24th Mar 2018*** TOEFL Score 101 (101, R30, W26, L23, S22)
Test Date: ***7th Sep 2018*** GRE Score 325 (V156, Q169, W3.5)

COMPUTER SKILLS

Programming Language C/C++, Python, MATLAB/Simulink, LaTeX
Embedded Development STM32