Shaobo Wang

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EDUCATION

Carnegie Mellon University Pittsburgh, PA
Master of Science in Mechanical Engineering Dec. 2022
GPA: 3.88/4.00
Selected Coursework: Modern Control Theory; Multivariable Linear Control; Robot Dynamics and Analysis (TA); Advanced Control Systems Integration; Planning and Decision-making in Robotics; Computer Vision for Engineer

Wuhan University Wuhan, China
Bachelor of Science in Mechanical Design Manufacturing and Automation Jun. 2021

University of California, Berkeley (Remote) Wuhan, China
Exchange Program - Coursework: Mechatronic Design Sep. 2020 – Dec. 2020

SKILLS

Programming Languages: Advanced – C, C++ 11/14; Intermediate – Python, Java
Software/Libraries: MATLAB/Simulink; ROS; OMPL; OpenCV; LabVIEW; Git
Featured Knowledge: LQR/LQG; Kalman Filter; Robust Control; First Principles Modeling; System Identification

EXPERIENCE

Johnson & Johnson MedTech Santa Clara, CA
Robotics and Controls Intern May. 2022 – Aug. 2022

- Facilitated collision-detection software development of the OTTAVA surgical robot
- Researched motion planning tasks for high-DoF surgical robots and benchmarked multiple planning algorithms through on-the-fly dry tests to evaluate their performance metrics for future reference

PROJECTS

State Estimation of Needle Steering Pittsburgh, PA
Carnegie Mellon University Sep. 2022 – Present

- Deployed Extended Kalman Filter to estimate the unmeasured roll angle in the heading direction of the flexible needle based on the nonlinear bicycle model of the beveled tip to enable trajectory tracking in 3D space
- Evaluated the state estimator through Simulation and in-vitro testing with gelatin tissue phantoms.

Dual-rotor Aerospace System Control Pittsburgh, PA
Carnegie Mellon University Apr. 2022 – May. 2022

- Modeled nonlinear MIMO system dynamics and performed parametric and non-parametric system identification
- Designed LQR optimal controllers with Luenberger Observer and Kalman Filter to follow the desired trajectory
- Designed H-inf controller for the parameter uncertainty system's robust control

Single-legged Jumping Robot Research Pittsburgh, PA
Carnegie Mellon University Feb. 2022 – May. 2022

- Performed kinematics and hybrid dynamics modeling of a two-DoF robot leg for simulation and feedforward position and torque control to research the effects of the tibia-femur length ratio on jumping performance

Controller Design for Autonomous Vehicles Simulation Pittsburgh, PA
Carnegie Mellon University Oct. 2021 – Nov. 2021

- Implemented Model Predictive Controller for the lateral control and PID controller for the longitudinal control of autonomous vehicles to realize trajectory tracking under Webots simulation environment

Wearable Device for Hand Gesture Recognition Wuhan, China
Wuhan University Oct. 2019 – Mar. 2021

- Designed motion sensor to read intention commands based on flexible-printed-circuit technique and measurement of capacitance variation due to muscle contraction on a 10-picofarad scale

PATENTS

- A Flexible E-skin Based on Capacitive Sensing Array for Motion Recognition, China, CN202010030563.0 [P]. (Zhao Guo, **Shaobo Wang**, Jiwei Huang)