

Jiachen Li

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EDUCATION BACKGROUND

The University of Texas at Austin	2023.9 - 2028.6(Expected)
<ul style="list-style-type: none">Mechanical Engineering, first year PhD student	
University of California, San Diego	2022.9 - 2023.7
<ul style="list-style-type: none">Academic Exchange StudentScalable Optimization and Control (SOC) Lab, supervised by Prof. Yang Zheng	
Harbin Institute of Technology	2019.9 - 2023.7
<ul style="list-style-type: none">Control Engineering, <i>Bachelor Degree</i>GPA: 3.7/4, 88/100Institute of Intelligent Control and Systems, supervised by Prof. Jianbin Qiu and Prof. Tong Wang	
Nanyang Technological University Summer School	2021.7 - 2021.8
<ul style="list-style-type: none">Robotics, Automation and IoT ProgrammeDistinction, supervised by Prof. Ming Xie	
Harbin Institute of Technology International Summer School	2021.8 - 2021.9
<ul style="list-style-type: none">Artificial IntelligenceLecture-based, supervised by Prof. Jianwei Ma	

REASERCH INTERESTS

Optimization, control, game theory, decision-making and planning, reinforcement learning

PUBLICATIONS

- Hao Zhang, **Jiachen Li**, Tong Wang, Tong Wang, Qingshuang Zeng, and Huaicheng Yan. PDE-based event-triggered containment control of multi-agent systems with input delay under spatial boundary communication. International Journal of Robust and Nonlinear Control.
- Runsheng Guo, **Jiachen Li**, Kangkang Sun, Tong Wang, and Jianbin Qiu. Output-Feedback Boundary Adaptive Fault-Tolerant Control for Scalar Hyperbolic PDE Systems with Actuator Faults. International Journal of Adaptive Control and Signal Processing.
- Hao Zhang, **Jiachen Li**, Tong Wang, Jianbin Qiu. Control of Nonlinear Coupled Burgers' PDE-ODE Systems with Sensor Nonlinearities: A Mixed Control Approach.
- Zichen Yao, Zhanwen Yang, Yongqiang Fu, **Jiachen Li**. Asymptotical stability for fractional-order Hopfield neural networks with multiple time delays. Mathematical Methods in the Applied Sciences.

RESEARCH EXPERIENCES

Analysis of the Optimization Landscape of Linear Quadratic Gaussian (LQG) Control	2022.9 - 2023.7
<ul style="list-style-type: none">Analyzed two aspects of the optimization landscape of the LQG problem: connectivity of the set of stabilizing controllers and the structure of stationary points.Introduced a novel perturbed policy gradient (PGD) method to escape a large class of bad stationary points (including high-order saddles)	
PDE-Based Event-Triggered Containment Control of Multi-Agent Systems	2021.9 - 2022.7
<ul style="list-style-type: none">Described the collective dynamics of multi-agent systems as PDEsProposed the optimal protocols by minimizing the 2-norm of the designed control gain matrix	
Autonomous vehicles decision-making algorithm research	2022.1 - 2022.7
<ul style="list-style-type: none">Applied reinforcement learning to make specific behavioral decisions combined with the perception moduleDesigned Fuzzy Petri nets to validate and propose more specific metrics for our algorithm	
Intelligent Micromanipulation Robots	2021.7 - 2021.9
<ul style="list-style-type: none">Used zebrafish as a model to test the realization of different functions of the systemProcessed the image of zebrafish based on OpenCV	

Output-Feedback Boundary Adaptive Fault-Tolerant Control for Scalar Hyperbolic PDE Systems with Actuator Faults 2021.4 - 2021.9

- Developed parameter updating laws of gradient type to compensate actuator faults along with parameter uncertainties, based on which the adaptive FTC problem for scalar hyperbolic PDE system was effectively addressed

Control of Nonlinear Coupled Burgers' PDE-ODE Systems with Sensor Nonlinearities 2021.4 - 2021.9

- Proposed a mixed control approach to produce a fuzzy-model-based controller tackling the time dimensional nonlinearity and a boundary controller eliminating the space dimensional nonlinearity
- Applied the proposed mixed control approach to a nonlinear hypersonic rocket car to testify its validity

Asymptotical stability for fractional-order Hopfield neural networks 2020.9 - 2021.4

- Gave a boundary of the stability region for linear fractional-order differential equations with delay, which is an open problem for six years
- Established framework for stability analysis of fractional-order Hopfield neural networks with multiple time delays and obtained a necessary and sufficient condition in a coefficient-type criterion, which is delay-independent

COMPETITION EXPERIENCES

National College Competition on Internet of Things 2022.1 - 2022.4

Disorderly gripping of robotic arms

- Used 3D point clouds to identify object types and locations
- Designed a robotic arm to gripping control by hand-eye calibration

National Undergraduate Electronics Design Contest 2021.10 - 2021.11

Appliance analysis and identification device

- Designed a device that determined the type and operating status of an electrical appliance
- Used converter, filter circuits and LSTM for signal processing

National University Student Engineering Training Comprehensive Ability Competition 2020.12 - 2021.4

Intelligent Delivery Robot

- Designed a robot that can identify objects and automatically deliver

COURSE PROJECTS

Introduction to Optimization 2023.8 - 2023.12

- Reproduced the work: Optimizing Solution-Samplers for Combinatorial Problems: The Landscape of Policy-Gradient Methods.

Learning for Dynamics and Control 2023.8 - 2023.12

- Designed optimal strategy for stable grasping with a three-finger Plato hand

Machine Learning for Physical Applications 2023.2 - 2022.6

- Added attention to DnCNN and made the network more targeted extraction of noise components in the removal of random noise from seismic data random noise in earthquake data

Stochastic Process/Dynamic Systems II 2022.9 - 2022.12

- Object tracking via kalman filter, with radar data
- Advised by [Prof. David D. Sworner](#)

Automatic Control Practice II 2022.4 - 2022.5

- Used matlab and simulink to identify the parameter of servo system in Webots virtual environment
- Adopted the double closed-loop PID controller and the disturbance observer to control the pitch axis and yaw axis of aircraft

Automatic Control Practice I 2021.11 - 2021.12

- Designed a specific motor control circuit with adjustable-speed drives, user-friendly operations, and a low cost, and then completed the soldering
- Analyzed the relationship between input/output quantities by regulating the input signal and measuring the corresponding output

SKILLS AND QUALIFICATIONS

- **Proficient** : Python, PyTorch, Matlab, Simulink, Latex, HTML
- **Familiar** : C/C++, TensorFlow, Keras, Verilog, etc.
- **TOEFL**: 108 (Reading: 30, Listening: 30, Speaking: 21, Writing: 27)
- **GRE**: 334/340+5/6.0 (Verbal: 165, Quantitative: 169, Analytical Writing: 5)

OTHERS / SUMMARY

- Passionate about technology, love programming, solid foundation, good programming habits
- Lively and polite personality, strong communication and collaboration as well as social skills, organizational leadership
- Love writing, travel, good at organizing and summarizing