Jiachen Li

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https://jiachenli2001.github.io/

Education background

Harbin Institute of Technology 2019.9 - 2023.7

- Automation, *undergraduate junior*
- GPA: $3.72/4$, $86.54/100$
- Institute of Intelligent Control and Systems, supervised by Jianbin Qiu and Tong Wang

Nanyang Technological University Summer School 2021.7 - 2021.8

- Robotics, Automation and IoT Programme
- Distinction, supervised by Ming Xie

Harbin Institute of Technology International Summer School 2021.8 - 2021.9

- Artificial Intelligence
- Lecture-based, supervised by Jianwei Ma

Reaserch interests

Fuzzy control, event-triggered control, nonlinear control, fault-tolerant control, partial differential equations, game theory, decision-making and planning, robotics, reinforcement learning, computer vision

Publications

1. 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. Under review.
2. Hao Zhang, **Jiachen Li**, Tong Wang, Jianbin Qiu. Control of Nonlinear Coupled Burgers' PDE-ODE Systems with Sensor Nonlinearities: A Mixed Control Approach.
3. 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

Tracking control of nonlinear discrete systems based on zero-sum games 2021.9 - present

- Designed a distributed feedforward tracking controller which can transform distributed tracking control problem in strict-feedback form into an equivalent distributed differential game problem of tracking error dynamics in affine form
- Proposed a distributed zero-sum differential game strategy bu using adaptive dynamic programming technique and creating a critic network to

Autonomous vehicles decision-making algorithm research 2022.1 - present

- Applied reinforcement learning to make specific behavioral decisions combined with the perception module
- Designed Fuzzy Petri nets to validate and propose more specific metrics for our algorithm

Intelligent Micromanipulation Robots 2021.7 - 2021.9

- Used zebrafish as a model to test the realization of different functions of the system
- Processed 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 Hopfiled 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 identified 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

Automatic Control Practice II 2022.4 - 2022.5

- Used matlab and simulink to identificate 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.
- **Duolingo**: 110
- **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