Lingwei Zhu

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Born 25 Aug 1995

Personal Statement

Currently I am a PhD candidate at Robot Learning Lab, Nara Institute of Science and Technology (NAIST), Japan.

I received the master degree from Intelligent System Control Lab, NAIST, and the bachelor degree from Tianjin Polytechnic University, China.

My research interest lies in developing scalable and safe reinforcement learning algorithms for realizing autonomous control of large-scale systems such as factory or robots.

Scholarship/Award

Apr. 2021 – present

Japan Society for Promotion and Science - DC2

JSPS DC2 is a scholarship for cultivating excellent young researchers in Japan.

Aside from monthly stipend, selected researchers (doctor candidates) receive also independent research funding from KAKENHI.

In 2020 the acceptance rate for DC2 was 19.8%. I was the only foreigner JSPS DC from NAIST for the past 5 years.

Apr. 2019 – Mar. 2020

Japanese Government Scholarship (MEXT)

MEXT is the Japanese Government Scholarship granted by Ministry of Education, Culture, Sports, Science and Technology of Japan.

I was recommended by university based on scientific performance.

Mar. 2021

IEEE Kansai Section Student Paper Award

The student paper award was conferred by IEEE Kansai Chapter to recognize the contribution on safe reinforcement learning in this ICRA conference paper.

EDUCATION

Oct. 2019 - Sep. 2022 (expected)

Doctor of Engineering - NAIST

I researched reinforcement learning (RL) algorithms and their applications on large-scale systems under the supervision of Takamitsu Matsubara, with a specific focus on industrial processes and robots.

During this period my main research theme was safe RL including using actor-advisor framework and monotonic policy improvement within entropy-regularized MDPs to realize safety in RL.

Oct. 2017 - Sep. 2019

Master of Engineering - NAIST

During my master I proposed the first RL algorithm for plant-wide control of a large-scale chemical process in simulation. This result was the first successful attempt on using RL for plant-wide control of large-scale industrial process.

I was under the supervison of Takamitsu Matsubara and Sugimoto Kenji.

Publications/Patents

Journal
- Scalable Reinforcement Learning for Plant-wide Control of Vinyl Acetate Monomer Process, *Control Engineering Practice*, Vol. 97, April 2020, link
- Exploiting KL Regularization in Monotonic Policy Improvement for Reinforcement Learning, *Neural Networks*, under review
- Alleviating Parameter-tuning Burden in Reinforcement Learning for Large-scale Process Control, *Computers and Chemical Engineering*, under review

Conference	• Dynamic Actor-Advisor Programming for Scalable Safe Reinforcement Learning, ICRA, 2020, link
	• Factorial Kernel Dynamic Policy Programming for Vinyl Acetate Monomer Plant Model Control, CASE, 2018, link
	• Cautious Actor-Critic, ACML, 2021, under review, link
	• Geometric Value Iteration: Dynamic Error-Aware KL Regularization for Reinforcement Learning, ACML, 2021, under review
Patents	• United States patent (inventor of apparatus, method, program and recording medium, same as below; Patent Number US20200057416A1). Takamitsu Matsubara, Yunduan Cui, Lingwei Zhu, et al.
	• European patent (Patent Number EP3620868A1). Takamitsu Matsubara, Yunduan Cui, Lingwei Zhu, et al.
	• Chinese patent (Patent Number CN110837893A). Takamitsu Matsubara, Yunduan Cui, Lingwei Zhu, et al.
	• Japanese patent (Patent Number JP2020027556A) Takamitsu Matsubara, Yunduan Cui, Lingwei Zhu, et al.

Skills

Languages	English, Japanese, Chinese (native)
Programming	Programmining: Matlab, Python, Tensorflow, PyTorch

Work Experience / Professional Activities

Work Experience *Apr.2021 - present*	JSPS-KAKENHI funded researcher Annual research grants of around $10K were provided by JSPS KAKENHI for two years for pursuing high quality research in application of RL to safety-critical control problems such as real-time process control (e.g. chemical process) or robotics (e.g. safety-critical assembly robots or human-robot interaction).
Jul.2021 - present	Intern Student, Advanced Telecommunication Research (ATR) I am an currently an intern in the world-renowned research institute Advanced Telecommunication Research Institute International (ATR), supervised by Dr. Eiji Uchibe.
Apr.2018 - present	Research Technician, NAIST-Yokogawa cooperated research Cooperated with Yokogawa Electric Corporation in developing RL agents for plant-wide control of large-scale vinyl acetate monomer (VAM) manufacturing process. This result was featured by multiple press releases and magazines such as (in Japanese) Nikkei Robotics or Nikkan.
Apr. 2018 - Sep. 2019	Teaching Assistant, Intelligent System Control Lab, NAIST
Reviewer	IEEE Robotics and Automation Letter (RAL) IEEE International Conference on Robotics and Automation (ICRA)