

Guofei CHEN

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Zheda Rd. 38, Xihu District, Hangzhou, 310000, China

EDUCATION

Zhejiang University, Hangzhou, China

Sep 2019 - Jul 2023

GPA: 3.95/4.0

Bachelor of Engineering in Automation

Chukochen Honors College - Mixed Class (4% in 3000)

Research Interest: Multi-robot systems, Estimation, Optimization

Major Courses: Analysis, Algebra, Numerical Optimization, Control Theory, Robotics, Analog Circuit Design, Combinatorial Mathematics, Advanced Data Structure, Algorithm Analysis

PUBLICATIONS

1. Zhichao Chen, Luyao Wang, **Guofei Chen**, Zhiqiang Ge. Probabilistic Generative Model with Long-Term Memory and its Application in Chemical Process Modeling. *International Symposium on Process Systems Engineering (PSE)*. 2021. [\[paper\]](#)

RESEARCH EXPERIENCE

Relative Localization in Swarm using Range Measurements

June 2022 - Present

FAST Lab, Zhejiang University

Advisor: Prof. Fei Gao

- Proposed a certifiable relative state estimator for quadrotor swarm with range measurements. Assumed multiple range sensors attached to each agent, which gives (only) the range measurements to the estimator. The estimator outputs the relative pose between each agent. It guarantees the optimality of the result, and gives an estimated upper bound between the result and the optimal result.
- Adopted a novel re-modeling of the matrix completion problem which integrates the constraints of the optimization problem. Then relaxed the original problem to a convex problem. Used the riemannian staircase and riemannian elevator algorithms to quickly solve the convex problem, and use the result as the initial value to the original problem as well as a lower bound for the optimization result. [\[thesis\(Chinese\)\]](#)

RoboCup Small Size League Team - ZJUNlict

June 2020 - July 2022

State Key Laboratory of Industrial Control, Zhejiang University

Advisor: Prof. Rong Xiong, Dr. Zheyuan Huang

- Led the team on planning & motion control module, multi-robot defense module, and kick module. In charge of maintenance, code reviewing and responsive changes in matches. Reviewed more than 30,000 lines of code. We were awarded the **champion title** among teams across the nation at *2020* and *2021 RoboCup China Open*. [\[video\]](#) [\[news\]](#)
- Proposed a mapping and planning method that accelerated the planning module by **6 times**. Leveraged the features of the soccer field for mapping and designed an efficient recursive path searching method using a visibility graph. This reduced the planning module time consumption from more than 60% to 10% per execution cycle and solved the bottleneck caused by planning efficiency, leaving more possibilities to the decision module at higher level. [\[technical report\]](#)

Soft Sensor based on Bayesian Inference

Mar 2021 - June 2022

State Key Laboratory of Industrial Control, Zhejiang University

Advisor: Prof. Zhiqiang Ge, Dr. Zhichao Chen

- Proposed a structure in Gaussian Mixture Variational Autoencoder that uses Gumbel-Softmax reparameterization to accomplish multimodal information mixture. The work consolidated the theory of Gaussian Mixture Variational Autoencoder and improved the fitting accuracy (R^2 : 0.92→0.997). The modified GM-VAE outperforms several state-of-art Auto-Encoders on chemical processes. [\[code\]](#) [\[technical report\]](#)
- Collaboratively proposed Dynamic Long-term Memory Probabilistic Generative Model (**LTM-PGM**), **the first** to consider long-term feature extraction in data-driven chemical process soft sensor. Assumed the Markov property of latent variables, used GRU cells to generate latent space, and adopted gated residual mechanism to estimate the transformation of latent space. By analyzing the evidence lower bound (ELBO), the loss function that fits the stochastic gradient descent (SGD) framework is derived strictly. LTM-PGM outperforms the strong benchmarks of Autoencoders and LSTM networks in soft sensor research.
- Paper on *LTM-PGM* was accepted by *Symposium on Process Systems Engineering*. [\[code\]](#)[\[paper\]](#)

PROJECTS

Vision-Based Electrical Transformer Inspection System

Sept 2020 - Jan 2021

College of Electric Engineering, Zhejiang University

Advisor: Prof. Jianliang Zhang

- Built a vision-based inspector for electrical transformers and working conditions.
- Implemented and trained *Faster-RCNN* for object detection and *Resnet-50* for object recognition. Adopted *pytesseract* for optical character recognition (OCR), and double-check the result of OCR with another lightweight convolution neural network. Designed a pipeline for transformer inspection and built a web-based front end.

TinySQL - An Original Relational Database Management System

Mar 2022 - Jun 2022

College of Computer Science, Zhejiang University

Advisor: Prof. Yunjun Gao

- Built a relational database supporting SQL without using third-party libraries (except the SQL parser). The project includes a catalog manager to manipulate the table header, an index manager to manipulate index, a record manager to manipulate table data a buffer manager that abstracts the memory model.
- Architect of the project. Team leader, code reviewer (20k+ lines). Designed the memory model of files for table and index. Implemented the index manager, record manager, and buffer manager.
- Basic features include: SELECT Query, DELETE Query, INSERT Query, DROP Query. Other features include: Nested SELECT Query, A simple Execution Optimizer, Externally Stored Index, etc. [\[documentation\]](#) [\[code\]](#)[\[post\]](#)

HONORS AND AWARDS

- 2023 Chiang Chen Overseas Graduate Scholarship (**9 in China**) [\[Website\]](#)
- 2020, 2021 RoboCup (ChinaOpen) Champion of Small Size League [\[highlights\]](#)
- 2022 Zhejiang Robot Competition, Champion in Robot Soccer (**1 in 36**)
- 2019-2020, 2020-2021, 2021-2022 Excellence Award in Academics, Zhejiang University

SKILLS

Programming: C/C++, Python, Lua, JavaScript, MATLAB

Robotics: Airsim, ROS, IoT Chips (STM32)

Machine Learning: PyTorch, OpenCV

Language: English (TOEFL: 111, S: 25), Mandarin Chinese