Gaole Dai

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School of Computer Science and Engineering, Nanyang Technological University, Singapore

EDUCATION

Ph.D. Candidate, Computer Science, Nanyang Technological University, 2022-Present

GPA: 4.67/5.00   Supervisor: Prof Li Mo & Prof Tan Rui

Bachelor, Automation, Beihang University, **with honors**. 2018-2022
In Beihang, only 5% of students are with honors, and I rank Top 4% among them.

GPA: 3.86 /4.00   Average Points: 93/100   TOEFL Score*:* 108

Skills: Proficient in C, Python, MATLAB, Multisim, Proteus, Arduino, and LaTeX,

Research Interests: Cyber-Physical Systems, Mobile Computing, Scheduling and Optimization

PUBLICATIONS

[1] Yoon Hyungjun, Jaehyun Kwak, Biniyam Aschalew Tolera, **Gaole Dai,** Mo Li, Taesik Gong, Kimin Lee, and Sung-Ju Lee, "ADAPT^ 2: Adapting Pre-Trained Sensing Models to End-Users via Self-Supervision Replay", *arXiv preprint arXiv:2404.15305* (2024).

[2] **Gaole Dai**, Huatao Xu, Yoon Hyungjun, Mo Li, Rui Tan, and Sung-Ju Lee, "ContrastSense: Domain-invariant Contrastive Learning for In-the-wild Human Activity Recognition," UbiComp (IMWUT) 2025.

[3] **Gaole Dai**, Yongping Zhang, Ying Cheng, and Fei Tao, "Collaboration Tiredness Aware Manufacturing Service Collaboration Incentive and Optimization," IEEE Transactions on Industrial Informatics, 2022, vol. 19, pp. 3341-3350. **IF=11.7, Q1.**

[4] Xiyuan Zhu, Yahong Rosa Zheng, and **Gaole Dai**, "Low-cost Calibration of Inertial Measurement Unit for Accurate Position Estimation," Global Oceans 2020: Singapore – U.S. Gulf Coast, 2020.

SELECTED AWARDS & HONORS

Competitions:

Meritorious Award of American Mathematical Contest in Modeling (Top 7%)	2021
2nd Award of Contemporary Undergraduate Mathematical Contest in Modeling (Top 3.5%)	2020
2nd Award of The Chinese Mathematics Competitions	2020
3rd Award of National Physics Competitions for College Students in China	2019

Scholarships & Honors:

Beijing Outstanding Graduates	2022
Canada Mitacs Globalink Research Internship Award	2021
China National Scholarship, Highest Scholarship in China (Top 2%)	2021
First Class Scholarship for Excellent Students in Beihang University (Top 5%)	2020
Second Class Scholarship for Excellent Students in Beihang University (Top 10%)	2019

"When shall I reach the top and hold all mountains in a single glance"

RESEARCH EXPERIENCE

A. Mobile Computing

Aug. 2022-Mar. 2023 School of Computer Science and Engineering, Nanyang Technological University

Topic: **Human Activity Recognition. Advisor: Prof. Mo Li,** *IEEE Fellow*

Content: Investigated domain-invariant contrastive learning for wearable sensing.

Contributions: 1. Proposed a new and realistic scenario with domain shifts and label scarcity.

2. Proposed a novel framework to achieve domain invariant contrastive learning.

3. Outperformed existing works **by more than 10%.**

May 2021-Aug. 2021 Department of Computing and Software, McMaster University, Canada

Topic: **Human Motion Analysis. Advisor: Prof. Rong Zheng,** *Canada Research Chair*

Content: Carried out joint angles estimation for Gait Analysis with 9 IMUs on lower limbs.

Contributions: 1. Investigated calibration-free methods and deep learning frameworks;

2. Formulated a novel joint angles estimation framework;

2. Designed a new drift-free algorithm, which saved the need for Magnetometer;

3. Proposed and proved *quaternion back-propagation* to eliminate bias.

July 2020-Oct. 2020 Department of Electrical & Computer Engineering, Lehigh University, USA

Topic: **Underwater IoT. Advisor: Prof. Yahong Rosa Zheng,** *IEEE Fellow*

Content: Worked on underwater localization for a datalogger with one IMU.

Contributions: 1. Carried out IMU sensors calibration, data collecting, and data pre-processing;

2. Implemented novel data fusion algorithms. **Improved accuracy by 17%.**

B. Manufacturing Systems

Oct. 2021-May 2022 School of Automation Science & Electrical Engineering, Beihang University, China

Topic: **Resilient Manufacturing Systems. Advisor: Prof Ying Cheng**.   [Thesis]

Content: Studied tolerance strategies to handle cascading failures in manufacturing systems.

Contributions: 1. Formulated mathematical models to describe cascading failures;

2. Proposed a novel failure tolerance model with graph neural networks and reinforcement learning to deal with failures;

3. Achieved better time-to-accuracy than existing methods.

Oct. 2020-May 2021 School of Automation Science & Electrical Engineering, Beihang University, China

Topic: **Dynamic Scheduling. Advisor: Prof. Fei Tao,** *Changjiang Chair*

Content: Incorporated the open-loop control into the dynamic scheduling for incentive.

Contributions: 1. Defined a new term, *collaboration tiredness*, to describe the collaboration willingness of stakeholders on the Industrial Internet Platform;

2. Formulated a new long-term dynamic utility model;

3. Proposed a novel incentive scheduling strategy.

PROGRAMMES EXPERIENCE

Nov. 2020-Dec. 2020 School of Automation Science & Electrical Engineering, Beihang University

Topic: **Two Wheels Self-balancing Intelligent Vehicle**   [Curriculum Project]

Contributions: 1. Achieved path recognition with one linear CCD;

2. Proposed a new direction control model.

Oct. 2020-Dec. 2020 School of Automation Science & Electrical Engineering, Beihang University

Topic: **Speech Recognition based Automatic Door Opening with One Manipulator**

Contributions: 1. Designed speech recognition circuits and manipulator control circuits;

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2. Designed one manipulator, including kinematics, dynamics, and control strategy.

July 6th - 17th 2020 **Cambridge Online Academic Training Programme, University of Cambridge**

　　　　Content: Professors were invited to give Computer Science related academic seminars.

PRESENTATION

[1] **Gaole Dai**, "International Online Academic Programs for Honors Undergraduates during 2020," *Honors College Conference, Krasnoyarsk 2020*. Introduced the International Online Academic Programs for honors undergraduates in Shen Yuan Honors College as a student representative.

TEACHING

- Teaching Assistant for Computer Networks, Software Engineering, Microprocessor Design and Development, Nanyang Technological University　　　　　　　　　2023-2024
- Teaching Assistant for Psychology and Laws, Beihang University　　　　　　　2021

EXTRACURRICULAR ACTIVITIES

Hobbies: reading, jogging, and playing basketball

- Volunteer time: **360h, Two-Star Beijing Volunteer**　　　　　　　　　　2018-2022
- Mentor of five freshmen in Beihang University　　　　　　　　　　　　　2019-2020
- Champion of the Youth Debate Competition of Shou E College, Team Leader　　2019
- A hot-water supply schedule reform of Beihang University, Team Leader　　　2019

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