

# PEIQI YU

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## EDUCATION

### Tsinghua University

2019 - 2023

#### *B.E. in Automation*

GPA: 3.81/4.0 Mentor: Chao Shang, Associate Professor

Major Courses: Fundamentals of Artificial Intelligence, Control Theory, Stochastic Process, Signal and System, Digital Image Processing, Numerical Analysis, Statistics, Data Structure

## WORK EXPERIENCES

### Short Term Scholar

2023

*Intelligent Control Lab, Carnegie Mellon University(CMU)*

Advisor: Prof.Changliu Liu

### Research Intern

2022-2023

*Learning & Neural Systems Group, Tsinghua University(THU)*

Co-advisor: Prof.Yilin Mo & Prof.Yanan Sui

### Research Intern

2021-2022

*Information Processing Institute, Tsinghua University(THU)*

Advisor: Prof.Jiwen Lu

## PUBLICATIONS

### Recovering Realistic Details for Magnification Arbitrary Image Super-Resolution

2022

*IEEE Transactions on Image Processing*

Cheng Ma, Peiqi Yu, Jiwen Lu and Jie Zhou

- \* Proposed Implicit Pixel Flow (IPF) to bridge the gap between blurry INR distribution and sharp real-world distribution by assigning pixel-coordinate offsets near blurry edges.
- \* Proposed feature aggregation module that aggregates the nearest flow representation vectors to utilize both changes in neighbouring features and semantic information, thereby avoiding block effects.
- \* Introduced double constraint strategy and confidence map, ensuring the stability of performances.
- \* The first successful method for recovering perceptually-pleasant details in single image super-resolution, outperforming SOTA models.

## WORKING PAPERS

### Hierarchical Intention-Driven Human-Robot Interaction through Planning Prediction

2023

*Manuscript in Preparation*

Peiqi Yu, Abulikemu Abuduweili, Ruixuan Liu and Changliu Liu

- \* Introduced a framework that enables hierarchical human detection through distance estimation and hierarchical human intention recognition via planning prediction.
- \* Proposed hierarchical human detection through distance estimation, eliminating potential interferences to enhance the precision of low-level human intention recognition.
- \* Proposed hierarchical human intention recognition, decomposing high-level intentions into a series of sub-tasks, facilitating planning prediction based on low-level intentions.
- \* Largely promote human robot collaboration efficiency by introducing hierarchy, resulting in more robust, more convenient and more intuitive human-robot interactions.

## SELECTED RESEARCH EXPERIENCES

## Transformer-based Bayesian Optimization

2022 - 2023

*Bachelor's Project, Tsinghua University*

Supervisors: Professor Yilin Mo, Department of Automation, Tsinghua University

Professor Yanan Sui, School of Aerospace Engineering, Tsinghua University

- \* Proposed using Transformer for Bayesian Optimization(BO) due to its alignment with the sequence decision-making characteristics of Bayesian optimization.
- \* Deducted mathematical analysis of BO and embedded translation and rotation invariance, as well as input equivariance into the Transformer network.
- \* Demonstrated an impressive 80% performance improvement compared to state-of-the-art (SOTA) models in few-shot learning.
- \* Combined the applicability of BO with the high-dimensional scalability of Transformer, enhancing the robustness and adaptability, can potentially be applied in continuous learning and online learning.

## Learning From the Wild: Imitation Learning From Real Life Demonstrations

2022

*Module Developer, Tsinghua University*

Supervisors: Professor Dorsa Sadigh, Department of Computer Science, Stanford University

Professor Yanan Sui, School of Aerospace Engineering, Tsinghua University

- \* Designed a Reinforcement Learning(RL) framework enabling robots to observe real-life videos, perform actions, and learn human actions through action imitation.
- \* Introduced domain adaptation to align robot and human actions during training, resulting in improved performance and generalization.
- \* Enhanced the robustness of the RL framework by incorporating optical flow to extract human actions, leading to more effective and precise learning outcomes.

## Wearable Sensor Data-Based Intelligent Sleep Stage Detection

2021

*Core Algorithm Developer, Beijing Academy of Blockchain and Edge Computing*

Supervisor: Tianyu Feng, Beijing Academy of Blockchain and Edge Computing

- \* Developed precise sleep-staging algorithms using Support Vector Machines (SVM), Random Forest, and Neural Networks, achieving a classification precision rate within a 5-minute window.
- \* Proficiently managed a MySQL database, overseeing the storage and retrieval of critical data, including heart rate, temperature, and motion signals.

## ACHIEVEMENTS

<b>Academic excellence award</b>	2020
Huang Yicong scholarship	
<b>Science&amp;technology excellence Award</b>	2021
School Management scholarship	
<b>Academic excellence award</b>	2022
National Inspirational Scholarship	

## TECHNICAL SKILLS

<b>Languages</b>	Python, C++, C, Matlab, L <sup>A</sup> T <sub>E</sub> X
<b>Libraries</b>	PyTorch, RosPy, Numpy Matplotlib, Sci-kit, GPytorch
<b>Hardware</b>	Kinova, Raspberry Pi
<b>Software Systems</b>	Mujoco, ROS, Openai-Gym, MySQL Ubuntu, Windows

Please visit my homepage for more information: <https://patricia1019.github.io>