PEIQI YU

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EDUCATION

Tsinghua University 2019.8 - 2023.6
B.E. in Automation
GPA: 3.81/4.0 Mentor: Chao Shang, Associate Professor
Major Courses: The Artificial Intelligence, Control Theory, Random Mathematics and Statistics, Signal and System Analysis, Numerical Analysis and Algorithms, Data Structure, Digital Image Processing

Carnegie Mellon University 2023.7 - 2024.2
Research Intern in Robotics Institute
Advisor: Changliu Liu, Associate Professor

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 Implicit Neural Representation(INR) distribution and sharp real-world distribution by assigning pixel-coordinate offsets near blurry edges.
* Noticed block effects of previous models and proposed using feature aggregation module instead of local ensemble model to avoid block effects, largely promoting model performances.
* Introduced double constraint strategy and confidence map to ensure the stability of performances.
* The first successful method for recovering perceptually-pleasant details in single image super-resolution, outperforming SoTA models.

Hierarchical and Multimodal Human-Robot Collaboration 2023
IEEE Robotics and Automation Letters (ready to submit in December, 2023)
Peiqi Yu, Abulikemu Abuduweili, Ruixuan Liu and Changliu Liu

* Designed a multimodal framework that enabled robots to efficiently collaborate with humans by hierarchically predicting human intentions and adapting to human trajectories.
* Introduced multimodality via perceving both vision and speech signals, promoting the robustness of human-robot collaboration.
* Proposed hierarchy in both distance estimation and planning prediction, enhancing both the precision and efficiency of human intention prediction.
* Incorporated trajectory prediction in intention prediction module and focused on user studies in real world, building a more user-friendly human-robot collaboration system with adaptation abilities.

SELECTED RESEARCH EXPERIENCES

Transformer-based Bayesian Optimization 2022 - 2023
Graduation Thesis, Tsinghua University
Supervisors: Prof.Yilin Mo, Department of Automation, Tsinghua University
Prof.Yanan Sui, School of Aerospace Engineering, Tsinghua University

* Proposed using Transformer for Bayesian Optimization(BO) by leveraging its alignment with the sequential decision-making characteristics of Bayesian optimization.
* The first to incorporate two mathematical characteristics of BO: translation&rotation invariance and input equivariance into the Transformer network, promoting the accuracy of the 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, potentially applicable in continuous learning and online learning.

Learning From the Wild: Imitation Learning From Real Life Demonstrations 2022

Cooperative Research Project, Tsinghua University

Supervisors: Prof.Yanan Sui, School of Aerospace Engineering, Tsinghua University
Prof.Dorsa Sadigh, Department of Computer Science, Stanford University

* Designed a Reinforcement Learning framework that enables robots to observe and perform actions through imitation learning on real-life videos.
* Considering the diversity of real-life videos, introduced domain adaptation to align robot and human actions during training, promoting robustness and achieving generalization.
* To avoid being interfered by moving backgrounds, incorporated optical flow to extract human actions, leading to more effective and precise learning outcomes.

Wearable Sensor Data-Based Intelligent Sleep Stage Detection 2021

Enterprise Internship Project, 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, controlling the prediction error within 5-minutes range.
* Proficiently managed a MySQL database, overseeing the storage and retrieval of critical data, including heart rate, temperature, and motion signals.

ACHIEVEMENTS

Academic excellence award 2020
Huang Yicong Scholarship (top 3%)

Science&technology excellence Award 2021
School Management Scholarship (top 10%)

Academic excellence award 2022
National Inspirational Scholarship (top 3%)

TECHNICAL SKILLS

Languages	Python, C++, Matlab, LaTeX
Libraries	PyTorch, RosPy, Numpy Matplotlib,Sci-kit,GPytorch
Hardware	Kinova, Raspberry Pi
Software	Mujuco, ROS, Openai-Gym, MySQL
Systems	Ubuntu,Windows

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