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: The Artificial Intelligence, Control Theory, Random Mathematics and Statistics, Signal and System Analysis, Numerical Analysis and Algorithms, Data Structure, Digital Image Processing

WORK EXPERIENCES

Short Term Scholar 2023
Intelligent Control Lab, Carnegie Mellon Univeristy (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 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.

WORKING PAPERS

Hierarchical and Multimodal Human-Robot Collaboration 2023
Manuscript in Preparation
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

https://github.com/Patricia1019
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