Junyu Zhang

jyzhang1208@gmail.com | jyzhang1208 | Homepage | +86 15167752011

Education

- **Huazhong University of Science and Technology (HUST)** Hubei, China
  *Undergraduate student majoring in **Artificial Intelligence*** *Sept 2020 - Present*
  - A Top-10 University in China
  - **Pilot Class** of Artificial Intelligence, having the top 29 students in the School of Artificial Intelligence and Automation
  - **GPA: 3.88**/4; **Rank: 1**/29 (selected from 360 students in the school)
  - **Relevant Coursework:** Linear Algebra(92), Data Structure and Algorithmic Analysis (93), Foundations of Data Science(97), Python Programming(98), Complex Function and Integral Transform(97), Database Technology(98), Computer Networks(97), Principle of Automatic Control(I)(98), Machine Learning(97)
  - **English Proficiency:** TOEFL 105 (Speaking 24); GRE 325+3.5 (Verbal 156, Quantitative 169, Writing 3.5)

Publications and Preprints

- Heng Dong, **Junyu Zhang**, Tonghan Wang, Chongjie Zhang, "Symmetry-Aware Robot Design with Structured Subgroups", in **ICML 2023** [PDF] [Website]
- Jianhao Wang*, Jin Zhang*, Haozhe Jiang, **Junyu Zhang**, Liwei Wang, Chongjie Zhang, "Offline Meta Reinforcement Learning with In-Distribution Online Adaptation", in **ICML 2023** [PDF]
- Heng Dong, **Junyu Zhang**, Chongjie Zhang, "Leveraging Hyperbolic Embeddings for Coarse-to-Fine Robot Design", under review [PDF] [Website]

Research Experience

- **Research Intern - MIT-IBM Watson AI Lab** Massachusetts, US (remote)
  Supervisor: Prof. Chuang Gan *April 2023 - Present*

  Sequential Decision Making for 3D Object Manipulation
  - Proposed a novel framework that enabled efficient policy generalization in the offline multi-task and imitation learning settings.
  - Evaluated our method on the RLBench benchmark that showed great generalization ability on unseen tasks.
  - The project is still in progress.

- **Research Intern - IIIS, Tsinghua University** Beijing, China
  Supervisor: Prof. Chongjie Zhang *July 2022 - Present*

  Robot Design via Reinforcement Learning
  - Designed robots with various functionalities in simulated environments by exploiting the structure of the robot design space with symmetry.
  - Proposed a novel plug-and-play transformation module to map any robot design into a given symmetry space and provided theoretical analysis to verify its rationality.

- Evaluated our framework on six MuJoCo tasks and it outperformed previous algorithms in terms of both sample efficiency and final performance.
- Our work is accepted by ICML 2023.

Offline Meta Reinforcement Learning

- Revealed theoretical insights for offline meta-RL with online adaptation.
- Generated in-distribution context using a given uncertainty quantification and performed effective task belief inference to address new tasks.
- Evaluated the proposed method that achieved state-of-the-art performance on Meta-World and modify and implement popular algorithms such as FOCAL, MACAW, BOReL, etc.
- Our work is accepted by ICML 2023.

Multi-cellular Soft Robot Design

- Inspired from real multi-cellular organisms and developed a novel algorithm to co-design soft robots in behavior and morphology.
- Achieved efficiency and produced high-performing morphologies on various benchmarks.
- Our project is submitted to ICLR 2024 (under review).

- **Research Assistant - School of AI, HUST** Hubei, China
  Supervisor: Prof. Dongrui Wu *May 2021 - May 2022*

  Epilepsy Seizure Detection and Automatic Classification Project

  - Cooperated with Wuhan Children's Hospital Affiliated to Tongji Medical College.
  - Integrated transfer learning to deal with the lack of epileptic seizure data.
  - Utilized manually extracted features to regularize and initialize neural network.

  World Robot Contest - BCI Brain Control Robot Contest

  - Completed Event-Related Potential experiments to figure out the position of target images in the sequence and determine their categories by analyzing the EEG signals.
  - Introduced Euclidean-Space Alignment to deal with the differences of EEG signals between users and XDawn spatial filter to maximize the signal-to-noise ratio.
  - Mapped the covariance matrix from the Riemannian manifold to a certain tangent space for better use of machine learning models.
  - Our project won the Second Prize.

- **Innovation Project Member - School of AI, HUST** Hubei, China
  Supervisor: Prof. Wenbing Tao *Mar 2022 - July 2022*

  Innovation and Entrepreneurship Training Program

  - Aimed to build a complete football analysis system from football player detection, player identification to real-time position tracking and action recognition.
  - Applied TinaFace based on RetinaNet to achieve face recognition due to the high degree of blurriness in facial images and the difficulty in capturing faces in videos.

Honors and Awards

- Outstanding Undergraduate Student Award (top 2%) - *2022*
- Freshman Self-improvement Scholarship - *2021*
- Excellent Academic Scholarship - *2021*
- The Second Prize of the World Robot Contest-BCI Brain Control Robot Contest - *2021*
- Science and Technology Innovation Scholarship - *2022*

- Honorable Mention in Mathematical Contest in Modeling - *2022*
- Third Prize of the Seventeenth C Programming Language Contest - *2022*

Skills Summary

- **Programming Languages** Python, C/C++, Matlab, SQL, Bash
- **Languages** Chinese, English
- **Frameworks** PyTorch, TensorFlow, Keras, OpenCV, Scikit, etc.
- **Tools** PyCharm, VS Code, Markdown, Jupyter Notebook, Mobaxterm, Kubernetes, Git