

Junyu Zhang

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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: 4/29** (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:** GRE Verbal 156, Quantitative 169, Writing 3.5

PUBLICATIONS

- 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]

RESEARCH EXPERIENCE

- **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.
- Partitioned the design space according to the complexity of robots that aligned with the controllability of control policy.
- Achieved efficiency and produced high-performing morphologies on various benchmarks.
- The project is still in progress.

- **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 online policy adaptation in the offline multi-task and meta reinforcement learning settings.
- Incorporated mixture of experts layers into the decision transformer model that prevented the sharing of the entire backbone model between all tasks.
- Utilized the multi-modal hyper-network to generalize to unseen tasks with learning history and evaluated our method on the RL Bench benchmark that showed promising results.
- The project is still in progress.

- **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
- Science and Technology Innovation Scholarship - 2022

- The Second Prize of the World Robot Contest-BCI Brain Control Robot Contest - *2022*
- Honorable Mention in Mathematical Contest in Modeling - *2022*

SKILLS SUMMARY

- **Languages** Python, C/C++, Matlab, SQL, Bash
- **Human Languages** Chinese, English
- **Frameworks** Scikit, PyTorch, TensorFlow, Keras, Opencv, etc.
- **Tools** Pycharm, VS Code, Markdown, Jupyter Notebooks, MobaXterm, Kubernetes, Git