ZIFAN XU

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EDUCATION

- **PhD in Computer Science**, University of Texas at Austin, GPA 4.0/4.0 *Sep 2021 to present*
  Supervisor: *Prof. Peter Stone*
  Research Interests: Autonomous Navigation, Reinforcement Learning, Curriculum Learning, Lifelong Learning
- **MS in Physics**, University of Texas at Austin, GPA 3.73/4.0 *June 2018 to Sep 2021*
- **BS in Applied Physics**, University of Science and Technology of China (USTC), GPA 3.67/4.3 *July 2014 to June 2018*

RESEARCH PROJECTS

Deep Reinforcement Learning for Autonomous Navigation *Austin, TX*
Project Supervisor: *Prof. Peter Stone* *July 2020 to present*

- Implemented a distributed deep RL training pipeline using TD3 with OpenAI gym environment based on ROS Gazebo simulation.
- Proposed and implemented Adaptive Planner Parameter Learning from Reinforcement (APPLR) algorithm that improves the classical navigation planner by 30% by dynamically tuning the hyper-parameters.
- Proposed and implemented Self-Supervised Environment Synthesis (SES) algorithm that facilitates the domain adaptation to new navigation environments through Generative Adversarial Network (GAN).

Curriculum/Lifelong Learning for Embodied System *Austin, TX*
Project Supervisor: *Prof. Peter Stone* *Nov 2020 to present*

- Implemented a lifelong training pipeline using A2C with Habitat AI simulation.
- Implemented a intrinsic reward algorithm that enables faster adaptation to new coming environments or tasks.
- Build a Scavenger Hunt service robot that plans a near optimal navigation path to collect required objects in the list based on a DQN policy.

Smartphone-based Foreground Speech Detection *Austin, TX*
Project Supervisor: *Prof. Edison Thomaz* *March 2020 to August 2020*

- Set up the prototype that collected and processed the audio data from smartphones and trained deep learning models with different architectures (CNN, CNNLSTM, VGG-slimmer) to detect the foreground speech from the audio
- Developed a model-free detection method that utilizes the cosine similarity of embedding features. The simple model-free method showed almost the same performance to those trained models.

PUBLICATIONS

1. **Zifan Xu**, Anirudh Nair, Xuesu Xiao, and Peter Stone. **"Improving Autonomous Navigation by Self-Supervised Environment Synthesis"**. Submitted to ICRA 2020
2. Dawei Liang, **Zifan Xu**, Yinuo Chen, Rebecca Adaimi, Edison Thomaz. **"Smartwatch-Based Foreground Speech Detection in Domestic Environments by Using Generalizable Audio Representations and Speaker Embeddings"**. Submitted to IMWUT
3. **Zifan Xu**, Xuesu Xiao, Garrett Warnell, Anirudh Nair, and Peter Stone. **"Machine Learning Methods for Local Motion Planning: A Study of End-to-End vs. Parameter Learning"**. In *Proceedings of the 2021 IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR 2021)*
4. **Zifan Xu**, Gauraang Dhamankar, Anirudh Nair, Xuesu Xiao, Garrett Warnell, Bo Liu, Zizhao Wang, and Peter Stone. **"APPLR: Adaptive Planner Parameter Learning from Reinforcement"**. In *Proceedings of the 2021 IEEE International Conference on Robotics and Automation (ICRA 2021)*
5. Harel Yedidsion, Jennifer Suriadinata, **Zifan Xu**, Stefan Debruyn, Peter Stone. **"A Scavenger Hunt for Service Robots"**. In *Proceedings of the 2021 IEEE International Conference on Robotics and Automation (ICRA 2021)*, June 2021.
6. Md Hasibul Alam, **Zifan Xu**, Sayema Chowdhury, et al. **"Lithium-ion electrolytic substrates for sub-1V high-performance transition metal dichalcogenide transistors and amplifiers"**. *Nature Communications*, 11(1). doi:10.1038/s41467-020-17006-w (2020)

7. Ryo Noguchi, Masaru Kobayashi, Zhanzhi Jiang, [et al, including **Zifan Xu**]. **"Evidence for a higher-order topological insulator in a 3D material built from van der Waals stacking of bismuth-halide chains"**, *Nature Materials* 20, 473 (2021).
8. Zhaodong Chu, Emma C. Regan, Xuejian Ma, Danqing Wang, **Zifan Xu**, M. Iqbal Bakti Utama, Kentaro Yumigeta, Mark Blei, Kenji Watanabe, Takashi Taniguchi, Sefaattin Tongay, Feng Wang, and Keji Lai, **"Nanoscale Conductivity Imaging of Correlated Electronic States in WSe2/WS2 Moire Superlattices"**, *Physical Review Letters* 125, 186803 (2020).

TECHNICAL SKILLS

- **Programming:** Python, Bash, Java, C++, C language, LabVIEW
- **Tools/Framework:** Tensorflow, Sciki Learn, PyTorch, Pandas, Numpy, Librosa
- **Machine Learning:** Machine Learning algorithms, XGBoost, LightGBM, Deep Learning (Multi-layer Perception, Convolutional Neural Network), Reinforcement Learning (Q-learning, Policy Gradient, PPO, DQN, A2C, TD3)
- **General Technologies:** database (MySQL), cloud computing (AWS), distributed computing, Docker, Robot Operating System (ROS), data acquisition, data visualization, 3D printing (SOLIDWORKS)