Zhenggang Tang

zt15@illinois.edu
https://recordmp3.github.io
(+1) 217-200-0937

EDUCATION

BS, Department of Machine Intelligence, School of EECS, Peking University, China.   GPA**: 3.77**/4 Rank: **9**/91

09/2017 - 06/2021

Doctor of Philosophy in Computer Science, University of Illinois at Urbana-Champaign, United States.

Advised by Prof. Alexander Schwing   08/2021 - present

RESEARCH INTERESTS

Currently I'm interested in anything on **Neural fields and their applications**.
Previously I worked on reinforcement learning and multi agent system.

PUBLICATIONS

1. Yuchen Fang*, **Zhenggang Tang***, Kan Ren, Weiqing Liu, Li Zhao, Jiang Bian, Dongsheng Li, Weinan Zhang, Yong Yu, Tie-Yan Liu, "Learning Multi-Agent Intention-Aware Communication for Optimal Multi-Order Execution in Finance", ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2023, Long Beach, California, United States. (* contribute equally).

2. **Zhenggang Tang**, Balakumar Sundaralingam, Jonathan Tremblay, Bowen Wen, Ye Yuan, Stephen Tyree, Charles Loop, Alexander Schwing, Stan Birchfield. "RGB-Only Reconstruction of Tabletop Scenes for Collision-Free Manipulator Control", IEEE International Conference on Robotics and Automation (ICRA) 2023, London, UK.

3. **Zhenggang Tang***, Chao Yu*, Boyuan Chen, Huazhe Xu, Xiaolong Wang, Fei Fang, Simon Shaolei Du, Yu Wang, Yi Wu, "Discovering Diverse Multi-Agent Strategic Behavior via Reward Randomization", Accepted in International Conference on Learning Representations (ICLR), Vienna, Austria (2021) (* contribute equally)

PREPRINTS

4. **Zhenggang Tang***, Kai Yan*, Liting Sun, Wei Zhan, Tianhao Wei, Changliu Liu, "A Microscopic Epidemic Model and Pandemic Prediction of Allegheny County using Multi-Agent Reinforcement Learning", arXiv preprint arXiv:2108.06589. (* contribute equally).

RESEARCH AND INDUSTRIAL EXPERIENCE

Fast NeRF adaptation
Independent Research, Supervised by Prof. Alex Schwing, UIUC   10/2022 – present

RGB-Only SDF Reconstruction of Tabletop Scenes for Collision-Free Manipulator Control
Research Intern, Supervised by Dr. Stan Birchfield, NVIDIA   5/2022 – 9/2022
- Presented a system for collision-free control of a robot manipulator given only RGB views of the world.
- Used instant-ngp to reconstruct the 3D geometry of the scene in one minute, then use a gpu-accelerated octree-based method to calculate the global SDF.
- Experiments showed that our system outperforms all other baselines by controlling the robot arm to desired poses both accurately and safely in real dataset collected and annotated in our lab.

Learning to negotiate intentions in multi-asset order execution
Research Intern, Supervised by researcher Kan Ren, Microsoft Research Asia   1/2021 – 6/2021
- Applied MARL techniques on multi-asset order execution problems, where every agent is regarded as an individual operator to trade one specific order while communicating with each other for better collaboration to maximize the overall profits.
- Designed a novel algorithm and corresponding training process to improve elaborate collaboration: intended actions of all agents are communicated via a multi-round protocol at each timestep before the final actions executed in the environment.
- Tested the algorithm on data from China A-share stock market and US stock market. And outperform other baseline methods.

Discovering Diverse Multi-Agent Strategic Behavior via Reward Randomization
Core group member, Supervised by Dr. Yi Wu, UC Berkeley   1/2020 – 1/2021
- Proposed a novel algorithm: Reward Randomized Policy Gradient (RPG) to discover distinctive and strategic policies in challenging temporal trust dilemmas, where multiple equilibria exist but standard multi-agent policy gradient algorithms often converge to a sub-optimal one even with SOTA exploration methods, but RPG can find and converge to the optimal one.
- Employed discovered diverse policies to train an adaptive agent, which can form ad hoc team with a capricious partner.
- Open-sourced a new MA testbed: *Agar.io*, which has great flexibility, policy-variety and need moderate computational resources.

A Microscopic Epidemic Model and Pandemic Prediction of Allegheny County using Multi-Agent Reinforcement Learning
Core group member, Supervised by Prof. Changliu Liu, Carnegie Mellon University   6/2020 – 1/2021
- Built an agent-based COVID-19 epidemic model of Allegheny County where a variety of facilities such as recreational places and retail stores are built, and all individuals can adaptively change its action according to information of dynamics of the epidemic attained from its surroundings and the governments.

- Modeled people as RL agents and designed a new DQN variant to solve the very large-scale MARL problem.
- Tested and Analyzed government policies such as information disclosure, partial blockade and contact tracing.

<u>Learning to Communicate in a Hierarchical Way in a MARL System</u>

Independent Research, Supervised by Prof. Zongqing Lu, Peking University   7/2019 – 9/2019
- Designed a method to elect part of agents to be hubs, which aggregate information, communicate with other hubs and distribute information downward. Extended the method to multi-hierarchies, which enable the agent to get all ranges of information. Applied this method to cooperative MA problem where a natural neighborhood of each agent exists.

<u>AWARDS AND HONORS</u>
- Award of Stars of Tomorrow Internship Program in Microsoft Research Asia. 06/2021
- Top 10% thesis reward when graduating from Peking University. 06/2021
- Ben Jing Award of Turing Class in Peking University (Top10 in AI direction) 10/2019
- Silver Medal in 33rd National Olympiad in Informatics 07/2016
- Gold Medal in 10th Asia-Pacific Informatics Olympiad (China District).   05/2016

<u>SELECTED COURSE PERFORMANCE</u>

<u>Math courses</u> (GPA: **3.85**/4)

Mathematical Analysis (I)(II) 92/100, 90/100	Discrete Math and Structures(I)(II) 94/100,97/100
Advanced Algebra (I)(II) 90/100, 95/100	Math in Information Science (John Hopcroft) 98.5/100

<u>Algorithm courses</u> (GPA: **3.94**/4)

Introduction to Computing (A) (Honor Track) EX	Practice of Programming in C&C++ 99/100
Data Structure and Algorithm (A) 92/100	Algorithm Design and Analysis (Honor Track) 94/100

<u>Experiment courses</u>(GPA: **3.86**/4)

Study and Practice on Topics of Frontier Computing(I) (Liwei Wang) 92/100	Study and Practice on Topics of Frontier Computing(II) (Baoquan Chen) 90/100
Deep Learning in Action: Computer Vision 90/100	
Introduction to Intelligent Robots 94/100	Neural Computation (Tai Sing Lee) 93/100

<u>COMPUTING SKILLS AND OTHERS</u>
- **Computer skills: Programming languages:** C/C++, Java, MATLAB, Python.
- **Other Library and Tools:** Numpy, Scipy, Cython, PyTorch, Tensorflow, Linux, AWS, Git
- **Languages:** English: TOEFL 103 (oral 22), GRE 324 (V 155, Q 169)