ZEHUA JIANG

zehua.jiang@nyu.edu ⋄ jiangzehua.github.io

EDUCATION

New York University   Brooklyn, New York
PhD student in Computer Science and Engineering   *09/2022 - 05/2027(Expected)*
Advisor: Julian Togelius, Nasir Memon

New York University   Brooklyn, New York
Master of Science in Electrical Engineering   *01/2021 - 08/2022*

Sun Yat-Sen University   Guangzhou, China
Bachelor of Science in Opto-electronics Information Science and Engineering, School of Physics   *09/2016 - 06/2020*

University of California, Berkeley   Berkeley, California
Berkeley International Study Program   *01/2019 - 05/2019*

SELECTED PUBLICATIONS

- **Jiang, Zehua**, Sam Earle, Michael Green, and Julian Togelius (2022). "Learning Controllable 3D Level Generators". In: *Proceedings of the 17th International Conference on the Foundations of Digital Games*, pp. 1–9

- M Charity, Nasir Memon, **Jiang, Zehua**, Abhi Sen, and Julian Togelius (2022). "Diversity and Novelty MasterPrints: Generating Multiple DeepMasterPrints for Increased User Coverage". In: *2022 International Conference of the Biometrics Special Interest Group (BIOSIG)*. IEEE, pp. 1–4

RESEARCH EXPERIENCES

Learning Controllable 3D Level Generators, NYU Tandon   Brooklyn, New York
Research Intern   *01/2022 - 04/2022*
· Used reinforcement learning algorithms and evolutionary algorithms to solve Procedural Content Generation(PCG) problems that generate diverse, playable game maps, and expanded the previous work from 2-dimensional to 3-dimensional;
· Implemented reinforcement learning agent using proximal policy optimization algorithm with different agent action representations, compared different policy network structures including feedforward models, skip-connection models, etc;
· Implemented Quality-Diversity algorithms such as MAP-Elites, CMA-ME for evolving Neural Cellular Automata(NCA) models;
· Generated playable maze in Minecraft with diameter of over 35 in a $7 \times 7 \times 7$ maze;

Attacking Detection Algorithm with Adversarial Images, SYSU   Guangzhou, China
Research Assistant   *11/2019 - 06/2020*
· Developed a scheme to generate content-based adversarial examples for attacking well-known object detection algorithm. With detection accuracy depreciated, these adversarial examples have the potential to make human invisible in intelligent surveillance cameras;
· Implemented adversarial attack algorithms by Tensorflow, e.g. DeepFool, FGSM, CW, to generate adversarial examples and attack the trained inception model, Fast RCNN model and YOLOv3 model;
· Tested on the dataset of Iris using YOLOv3 to obtain the optimal fighting patch and decreased the accuracy of detection from 95% to 26.46%;

Inverse Design Optical Metasurface with Generative Adversarial Network (GAN), SYSU   Guangzhou, China
Research Assistant   *04/2019 - 06/2020*
· Developed a deep learning algorithm to obtain brand-new metasurface structure pattern design from specific spectral response, which would reduce the demanding computational cost of traditional genetic design approach;
· Filtered out the viable metasurface by applying Finite-difference time-domain method to solve the Maxwell equations;
· Achieved 60% diffraction efficiency for the predicted patterns, marginally below the state-of-art result (about 70%);

WORK EXPERIENCES

Geek+   Beijing, China
Algorithm Intern   *07/2020 - 01/2021*
- Abstracted the dynamic model from the logic of autonomous mobile robots (AMR) warehouse, defined the state, action and transition space of the environment;
- Proposed a multi-robot dynamic task assignment algorithm according to the prediction of the robots' arrival time. The total idle time of the workstations was reduced by 27.78% on average compared to the baseline algorithm of greedy strategy;

- Adjusted the path planning algorithm A-star to adapt the multi-robot system based on the CBS algorithm, taking the congestion, the number of turns of the robots, and path re-planning into consideration;
- Assisted in the development of the simulation platform for multi-robot intelligent warehouses, and implemented the baseline algorithm with python;
- Set up field testing in real-time warehouse during Double Eleven Shopping Festival to verify the effectiveness of the task allocation algorithm. The AMR warehouse shipped 13.19 million orders, with the delivery efficiency twice than that of the manual warehouse after the optimization of allocation algorithm;

TEACHING EXPERIENCES

Teaching Assistant: CS-GY 6553 Game Design   01/2023-Present
- Supervised student teams on game design. Provided feedback and grading for students prototypes.

TECHNICAL STRENGTHS

Programming Language	Python, Shell, C, html, Matlab, C#, SQLite
ML/DL tool	Pytorch, TensorFlow, Keras, Gym, Rllib, stable-baseline3, Hydra
Other tools	git, slurm, Vim, LaTeX, Blender, Unity