

Chang Ye

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EDUCATION

New York University

Master of Science in Computer Science. 3.778/4.0

New York, NY

Aug. 2018 - May 2020

Dalhousie University

Joint Program in Computer Science. 3.44/4.3

Halifax, NS, Canada

Aug. 2017 - April 2018

Zhejiang University of Technology

Bachelor of Engineering in Software Engineering. 3.3/4.0. Ranking: 24/186

Hangzhou, ZJ, China

Aug. 2014 - Jun 2017

RESEARCH INTEREST

- Deep Reinforcement Learning for games, robotics and autonomous vehicles with a focus on generalization.
- Deep Reinforcement learning with prediction-based intrinsic rewards.

PUBLICATION (*=EQUAL CONTRIBUTION)

- **C. Ye**; A. Khalifa; P. Bontrager and J. Togelius. Rotation, Translation, and Cropping for Zero-Shot Generalization. *IEEE Conference on Games (CoG)*, 2020. (39.9% Acceptance Rate) [[paper](#), [code](#), [presentation](#)]
- **C. Ye***; G. Mittal*; Y. ruksachatkun*; L. Cui*. SeqG(SC)AN: SeqGAN baseline for Grounded SCAN. DS-GA 1016 Final Project. [[paper](#), [code](#), [Course Website](#)]
- **C. Ye** and M. Heywood. Uniform Cost Search in Procedural Content Generation for Angry Bird Games. **Honour Thesis**. [[paper](#), [code](#)]

RESEARCH EXPERIENCE

Research Intern

New York University, Game Innovation Lab, Supervisor: Julian Togelius

Jan 2019 - Present

New York, NY

- Designed and executed the **MAP-Elites** algorithm to explore the generalization in policy space. Created t-SNE plots to visualize the search space.
- Implemented an RL algorithm that adopts data-augmentation techniques and showed that it improved generalization.
- Utilized an **imitation learning** algorithm to learn MCTS policies by training an embedding that maintains sequence information. Trained an RL agent that uses the embedding as an extra reward.

PROJECTS

Curiosity-based reinforcement learning

July 2020 - Present

- Reimplemented the **random network distillation** algorithm in PyTorch and achieved state-of-the-art performance. The code is submitted to the Github repository, [CleanRL](#) which has around **300** stars on GitHub.
- Designed a new curiosity reward based on the difference between RND's curiosity reward in 2 consecutive steps.

Policy-Dynamics Value function (PD-VF) extension

Sep 2020 - Present

- Designed a transformer encoder that takes rewards, states and actions as input, and a feed-forward network decoder that takes states and actions as input and outputs rewards. Trained network by using the ℓ_2 error of predicted rewards and real rewards as the objective function.
- Performed an ablation study by training PPO agents conditioned on learned embeddings.

Representation learning for reinforcement learning

Feb 2020 - March 2020

- Designed an algorithm that learns a suitable representation while performing policy gradient by incorporating **SimCLR** structure into the standard A2C algorithm.
- Created an asynchronous version that learns representations simultaneously. Added more data augmentation options

Human-face recognition and mosaic

Jan 2016 - May 2016

- Utilized **histogram equalization** in **OpenCV** to solve the low contrast problem that causes the face recognition algorithm unable to recognize the face features. The face recognition rate improved **30%** by adopting that technique.
- Took function from **Dlib** to extract face features and used these features to designed a module that can efficiently locate the multiple facial features on multiple faces and convert them to contours for Gaussian blur purpose.
- Designed the whole backend pipeline, implemented in **C++** under the **Qt** platform and ran backend unit tests. Built the system that is able to process up to **40** frames per sec with ignorable latency. The system achieved a **95%** detection rate in the real-time video under a low-light environment.

TEACHING

Course Assistant

New York University

New York, NY

- CS-GY 6943 AI for Game. Instructor: Julian Togelius (2020 Spring)
- ECE-GY 6143 Introduction to Machine Learning. Instructor: Anna choromanska (2019 Fall)

TECHNICAL SKILLS

Languages: Python, Java, C++, C, C#, Shell, SQL, Haskell, Matlab

Software & Tools: Pytorch, Tensorflow, OpenAI Gym, OpenAI Baseline, Numpy, Scipy, Git, L^AT_EX, .Net, Vim, Tmux