Renbo Tu

5000 Forbes Ave, Pittsburgh, PA 15213
renbo@cmu.edu | (516)-439-0933 | rtu715.github.io

EDUCATION

Carnegie Mellon University, School of Computer Science, Pittsburgh PA
Master of Science Candidate, Machine Learning, Expected December 2021
Research Advisor: Ameet Talwalkar
Overall GPA: 4.06/4.0

Columbia University, Columbia College, New York, NY
Bachelor of Arts, Major in Computer Science and Major in History of Science, May 2020
Overall GPA: 3.93/4.0

Standardized Testing: GRE: 167+170+6.0; TOEFL(iBT): 118 (R:30, L:28, S:30, W:30)

GRADUATE COURSEWORK

- Adv. Introduction to Machine Learning
- Convex Optimization
- Probability & Mathematical Statistics
- Statistical Machine Learning
- Deep Reinforcement Learning
- ML Ethics and Society

PUBLICATION

Work in Submission

- **R. Tu**, M. Khodak, N. Roberts, A. Talwalkar. *NAS-Bench-360: Benchmarking Diverse Tasks for Neural Architecture Search.* (2021)

- M. Khodak, **R. Tu**, T. Li, L. Li, M.-F. Balcan, V. Smith, A. Talwalkar. *Federated Hyperparameter Tuning: Challenges, Baselines, and Connections to Weight-Sharing*. (NeurIPS, 2021)

- S. Tripathi**, R. Tu**. Towards deeper generative architectures for GANs using dense connections. (2018)

RESEARCH EXPERINECE

Carnegie Mellon Talwalkar Lab, Pittsburgh, PA 09/2020 – Present
Advisor: Prof. Ameet Talwalkar
I am constructing a neural architecture search benchmark for evaluating state-of-the-art methods on a diverse set of underexplored tasks, which aims to serve as the standard application-oriented benchmark for practitioners. In another project, I built a hyperparameter tuning pipeline (FedEx) in a federated learning setting inspired by weight sharing in NAS, beating a strong FedAvg baseline on all 3 federated datasets.

MIT LIDS, Remote 03/2021 – Present
Advisor: Prof. Devavrat Shah
I am building a multidimensional database using PostgreSQL on policing in the U.S. incorporating 911 calls, stop and search incidents, and use of force data. I also performed synthetic intervention (SI) analysis on New York and New Orleans policing data for detecting racial bias in police behavior.

Carnegie Mellon Biorobotics Lab, Pittsburgh, PA 05/2019 – 08/2019
Advisors: Prof. Howie Choset and Lu Li
I implemented discrete differentiable communication for Multi-Agent Reinforcement Learning problems, enabling the model to converge in 50% of the baseline iterations while achieving a higher end reward. In another project, I optimized computer vision algorithms on NXP's i.MX RT 1060 board using TF Lite and MCUXpresso. The embedded device maintained 90% accuracy on the CIFAR-10 classification task with less than 100ms inference time on 600 MHz processor.

Columbia Creative Machines Lab, New York, NY 09/2017 – 01/2018
Advisors: Prof. Hod Lipson and Oscar Chang
I designed a variant of FisherGAN with residual/dense connections in between convolution blocks, experimented with connections schemes and network depths. The best model achieved inception scores better than baseline on CelebA dataset.

WORK EXPERIENCE

SenseTime Group Limited, Beijing, China 07/2017 – 09/2017
Summer R&D Intern
Section: OCR (Optical Character Recognition) Group
I experimented with recognition models such as Google Inception v1 for Chinese text detection and recognition in natural settings, done in TensorFlow. I also researched ways to incorporate attention mechanisms into state-of-the-art generative models like DCGAN, before Self-Attention GAN, to generate not-noisy training data for recognition. Produced 10k+ training images.

Baidu, Inc., Beijing, China 06/2017 – 07/2017
Product Manager Intern
Section: AI Research Group
I designed product prototypes across 5 AI branches such as an automatic prescription tool which transcribes doctor's notes while filtering accents, and a smart-home music player capable of detecting user emotions and adjust accordingly.

PROJECTS

YHack - *Trackne*, New Haven, CT 01/2018
Code: https://github.com/rtu715/Tracne
We built a mobile app with React allowing users to keep track of their skin conditions through "visual diaries" using the camera interface.

DevFest - *Layer*, New York, NY 04/2017
Code: https://github.com/rtu715/Layer
Layer was a desktop app for windows that displays useful information in a centralized location, allowing users to customize the flow of data. We used Java Swing to build the GUI of the app.

HONORS & ACTIVITIES

CMU Master's Program Admissions Committee Member, Pittsburgh, PA 01/2021 – Present
Columbia Magna Cum Laude, New York, NY 05/2020
US-China Better Relations Coalition (UCBRC) Tech Chair, Beijing, China 05/2020 – Present
Columbia Global Recruitment Committee Member, New York, NY 09/2017 – Present

SKILLS

Programming Languages: Python, Java, Shell, C, JavaScript, C++, HTML/CSS
Framework/Software/Service: TensorFlow, PyTorch, Docker, AWS, Google Cloud, PostgreSQL, OpenCV, Flask, jQuery, React, Nginx
Languages: Mandarin(native), English(fluent), Spanish(professional), German(beginner)