Letian Chen

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Academic Interests

Reinforcement Learning (RL), Inverse Reinforcement Learning (IRL), Human Goal Inference, Human Learning Mechanisms

Education

Georgia Institute of Technology, Atlanta, GA
Master of Science in Computer Science, College of Computing **Expected May 2020**

- **GPA: 4.0**
- Concentration: Machine Learning
- *Selected Coursework*: Machine Learning, Deep Learning, Interactive Robot Learning, Robot Intelligence: Planning, Graphical Models in ML

Peking University, Beijing, China
Bachelor of Science in Psychology, School of Psychological and Cognitive Sciences **July 2018**

- Concentration: Cognitive Science and Neuroscience

Bachelor of Science in Computer Science, School of Electronics Engineering and Computer Science **July 2018**

- **Overall GPA: 3.70, Psychology Major GPA: 3.78, Computer Science Major GPA: 3.80**
- Zhang Wenjin Scholarship (1%)
- Scholarship for undergraduate research
- First Prize of National Olympiad in Informatics in Provinces Advanced Group
- *Selected Coursework - Cognitive Science*: Psychological Statistics, Experimental Psychology, Physiology, Cognitive Psychology, Cognitive Neuroscience, Computational Modeling for Psychology and Neuroscience, Physiological Psychology
- *Selected Coursework - Computer Science*: Computer Vision, Deep Learning, Parallel & Distributed Computing, Discrete mathematics, Linux, Functional Programming, C++, Java, JavaScript, Web Technology, Databases, Software Engineering, Operating Systems, Computer Networks

Research Experience

Joint Inference of Task Reward and Strategy Reward

Graduate Research Assistant, Advisor: Matthew Gombolay, Georgia Institute of Technology **Aug – Nov 2019**

- Modeled the reward functions that human demonstrations optimize as a linear combination of task reward (shared by all strategies) and strategy reward (specific to each strategy)
- Proposed a novel IRL framework where task rewards and strategic rewards are jointly inferred to gain a better estimation of the task reward and decomposition of strategy reward components
- Applied algorithm on two virtual robot control tasks (Inverted Pendulum and Hopper) and one real robot table-tennis task; achieved better learning of task reward than SOTA AIRL and successfully extracted strategic rewards

Model-Free and Model-Based Algorithms in Human Sequential Decision Making

Undergraduate Thesis (link), Advisor: Hang Zhang, Peking University **Sep 2017 – May 2018**

- Designed an experiment to investigate human's strategy (model-free vs model-based) under multi-task RL setting
- Showed hybrid model with forgetting mechanism better explain subject data than all other models via computational model comparison; Confirmed conclusion by simulation that learned hybrid model recovered subject behavior
- Still exploring meta-learning computational model explanation

Better Exploration using Good and Bad Demos

Team Leader, Undergraduate Research, Advisor: Yizhou Wang, Peking University **Sep 2016 – Jan 2018**

- Introduced new algorithm built on Bayesian Neural Network and Thompson Sampling
- Proposed sample efficiency proof for the new method based on Gaussian Process and Thompson Sampling
- Developed tool to record human demonstrations on OpenAI Universe platform

Projects

Self-Supervised Action Mining for Fish, *Georgia Institute of Technology*, Atlanta, GA **Sep 2019 – Dec 2019**
- Designed pretext tasks to self-supervised learn features that capture fish behaviors
- Clustered learned features to discover meaningful fish behaviors

Reconnaissance Blind Multi-Chess, *Georgia Institute of Technology*, Atlanta, GA **Jan 2019 – May 2019**
- Applied maximum information gain principle for reconnaissance and maintained belief space for possible board states
- Learned neural network policy to choose action based on belief state

Doodle Recognition, *Georgia Institute of Technology*, Atlanta, GA **Sep 2018 – Dec 2018**
- Explored NN architectures (ShuffleNet, MobileNet, 3D-CNN, LSTM, etc.) to tackle Doodle Recognition task
- Results are shown on Github

Face Morphing, *Peking University*, Beijing, China **Mar 2016 – May 2016**
- Implemented face morphing algorithm in C++ via face landmark detection and Delaunay triangulation
- Codebase and Results are shown on Github

Chinese Work Segmentation, *Peking University*, Beijing, China **Feb 2016 – May 2016**
- Developed crawler to automatically scrape Chinese news articles
- Calculated condensation degree and freedom degree for each word, applied *n*-gram to divide sentence into words
- Improved accuracy by introducing work frequency to assist segmentation

Leadership Experience

Minister of Academic Department, *Students' Union, School of Psychological and Cognitive Sciences, Peking University*, Beijing, China **Sep 2015 – July 2016**
- Scheduled academic events (e.g., academic seminars, psychology culture events, senior experience sharing seminars, etc.)
- Liaised with students and departments regarding academic affair

Work Experience

Georgia Institute of Technology, *Research Assistant*, Atlanta, GA **May 2019 – Dec 2019**
- Assisted Professor Matthew Gombolay
- Worked on multi-agent expected policy gradient and sampling-based policy gradient from May 2019 - Aug 2019
- Worked on heterogeneous inverse reinforcement learning and robot table tennis from Sep 2019 - Dec 2019

Georgia Institute of Technology, *Teaching Assistant*, Atlanta, GA **Jan 2019 – May 2019**
- Assisted CS 7641 *Machine Learning*
- Graded homework and exam papers

Peking University, *Teaching Assistant*, Beijing, China **Sep 2016 – Jan 2017**
- Assisted Professor Jun Sun in *Introduction to Computation*
- Designed practice sets, held office hour, set exam papers

Peking University, PKU Helper Team, *Senior iOS Developer*, Beijing, China **Sep 2015 – Aug 2018**
- Developed and maintained iOS app "PKU Helper" for Peking University campus life (10k+ users)

Skills

Python, Tensorflow, C/C++, Matlab, Java, Bash, SQL, JavaScript, HTML, CSS, Scheme, Swift, R