Shuijing Liu

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Research Interest

Reinforcement Learning, Robotics, Computer Vision, Machine Learning

Education

University of Illinois at Urbana Champaign 2018 — 2020
Master of Science in Electrical Engineering (CGPA: 3.91/4.0)
Advisor: Prof. Katherine Driggs-Campbell

University of Illinois at Urbana Champaign 2014 — 2018
Bachelor of Science in Computer Engineering, minor in Art and Design (CGPA: 3.86/4.0)

Publications

Conference Publications

- P. Chang, **S. Liu,** H. Chen, and K. Driggs-Campbell, "*Robot Sound Interpretation: Combining Sight and Sound in Learning-Based Control*", In IEEE International Conference on Robotics and Automation (ICRA), 2020. (Under review)
- A. Pattanaik, **S. Liu*,** Z. Tang*, G. Bommannan, and G. Chowdhary, "*Robust Deep Reinforcement Learning with Adversarial Attacks*", In 17th International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2018. (extended abstract)

Undergraduate Thesis

- **S. Liu,** A. Parameswaran, and J. Peng, "*Prostate Cancer Diagnosis by Deep Learning*".

Research Projects

Decentralized Vision-based Robot Crowd Navigation 2019 — Present
Advisor: Prof. Katherine Driggs-Campbell

- Reformulated robot crowd navigation problem with partially observability

Robot Sound Interpretation: Combining Sight and Sound in Learning-Based Control Summer 2019
Advisor: Prof. Katherine Driggs-Campbell

- Designed and conducted empirical experiments to show that our proposed deep neural network enables robots to interpret sound commands for decision making, in simulation and real world.

Cancer Diagnosis with Deep Learning 2017 — 2018
Advisors: Prof. Aditya Parameswaran and Prof. Jian Peng

- Proposed ResNet binary classifiers to detect cancer biopsy images in US Biomax prostate cancer dataset, achieved 80% testing accuracy
- Proposed ensemble methods that boosted the performance of our classifiers to near 100%

Robust Deep Reinforcement Learning with Adversarial Attacks 2017 — 2018
Advisors: Prof. Girish Chowdhary and Anay Pattanaik

- Implemented novel adversarial attacks on deep RL algorithms including DDQN and DDPG
- Implemented robust RL algorithm that leveraged the adversarial attacks, achieved good performance compared with state-of-art deep RL algorithms

Selected Courses

Robotics

- **Introduction to Robotics:** rigid body motion, forward and inverse kinematics, path planning
- **Safe Autonomy:** localization, probabilistic filtering, control theory, system verification

Reinforcement Learning

- **Sergey Levine's Deep RL (self-learned):** imitation learning, model-based RL, exploration, transfer learning, RL algorithms
- **David Silver's RL (self-learned):** MDP, dynamic programming, model-free prediction & control, value function approximation
- **Statistical Reinforcement Learning:** theoretical RL, sample complexity analyses

Machine Learning & Computer Vision

- **Fei-Fei Li's CNN for Visual Recognition (self-learned):** design & optimization of CNN
- **Computer Vision:** low-level vision, grouping and fitting, geometric vision, recognition
- **Machine Learning:** regression, classification, optimization, neural networks, unsupervised learning
- **NLP:** RNN, POS tagging, parsing, machine translation, semantics
- **AI:** search, Bayes nets, HMM

Teaching Experience

Graduate Teaching Assistant

- ECE 470: Introduction to Robotics — Fall 2019
  - Developed homework and quizzes on PrarieLearn, an online learning and assessment tool
  - Monitored and Advised student projects
- ECE120: Introduction to Computing **(Head TA)** — Fall 2018 — Spring 2019
  - Lead discussion sections, held office hours, and graded exams

Undergraduate Course Assistant

- ECE110: Introduce to Electronics — Fall 2016 — Spring 2018
  - Running laboratory sections, question answering, and technical problem solving

Honors and Awards

- Lauren Kelley Memorial Scholarship — 2017 – 2018
- Professor N. Narayana Rao Scholarship — 2016 – 2017
- Oakley Scholarship — 2015 – 2016
- Dean's List — 2014 – 2016

Skills

Programming: Python, Keras, Tensorflow, PyTorch, C++, C, Matlab, MySQL, PHP, HTML

Software: Latex, Adobe Photoshop, Adobe Illustrator, Adobe After Effects

References

- Prof. Katherine Driggs-Campbell, Electrical and Computer Engineering, UIUC.
  krdc@illinois.edu
- Prof. Girish Chowdhary, Agricultural and Biological Engineering, UIUC.
  girishc@illinois.edu
- Prof. Aditya Parameswaran, Electrical Engineering and Computer Science, UC Berkeley.
  adityagp@berkeley.edu
- Prof. Jian Peng, Computer Science, UIUC.
  jianpeng@illinois.edu