

Jeongyeol Kwon

CONTACT INFORMATION

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EDUCATION

The University of Texas at Austin, TX

Ph.D. Candidate in Electrical and Computer Engineering 2017.8 - present

Seoul National University (SNU), Seoul, Korea

B.S. in Electrical Engineering 2008.3 - 2016.2

Seoul Science High School, Seoul, Korea

High school diploma with distinction in 2 years 2006.3 - 2008.2

RESEARCH INTERESTS

Machine/Statistical Learning, Computational Learning Theory, Latent Variable Models, Reinforcement Learning, Partially Observable Environments, High-Dimensional Statistics, Robust Statistics, Stochastic Approximation, Large-Scale Optimization

PUBLICATIONS

J. Kwon, Y. Efroni, C. Caramanis and S. Mannor, “Reinforcement Learning in Reward-Mixing MDPs,” *Proceedings of 35th Neural Information Processing Systems (NeurIPS)*, 2021.

J. Kwon, Y. Efroni, C. Caramanis and S. Mannor, “RL for Latent MDPs: Regret Guarantees and a Lower Bound,” *Proceedings of 35th Neural Information Processing Systems (NeurIPS)*, 2021 (Spotlight).

J. Kwon, N. Ho and C. Caramanis, “On the Minimax Optimality of the EM Algorithm for Two-Component Mixed Linear Regression,” *Proceedings of 24th Artificial Intelligence and Statistics (AISTATS)*, 2021.

J. Kwon and C. Caramanis, “The EM Algorithm gives Sample Optimality for Learning Mixtures of Well-Separated Gaussians,” *Proceedings of 33rd Annual Conference on Learning Theory (COLT)*, 2020.

J. Kwon and C. Caramanis, “EM Converges for a Mixture of Many Linear Regressions,” *Proceedings of 23rd Artificial Intelligence and Statistics (AISTATS)*, 2020.

J. Kwon, Q. Wei, C. Caramanis, Y. Chen, and D. Davis, “Global Convergence of the EM Algorithm for Mixtures of Two Component Linear Regression,” *Proceedings of 32nd Annual Conference on Learning Theory (COLT)*, 2019.

PREPRINTS

J. Kwon and C. Caramanis, “MLE and EM for Well-Separated Mixtures: Minimax Rates,” *Working Paper*.

J. Zhuo, **J. Kwon**, N. Ho and C. Caramanis, “On the Computational and Statistical Complexity of Over-Parameterized Matrix Sensing,” *arXiv preprint arXiv:2102.02756 (2021)*.

TALKS

Invited Talk on Virtual RL Theory Seminar, “RL for Latent MDPs: Regret Guarantees and a Lower Bound”.

RESEARCH EXPERIENCE

DICE (Decision, Information, and Communications Engineering), The University of Texas at Austin, TX

Graduate Research Assistant (Prof. Constantine Caramanis) 2018.1 - present

- Reinforcement learning in Markov decision processes with latent contexts
- Local analysis of the likelihood landscape and Expectation-Maximization
- Theoretical study on the low-rank matrix factorization in a rank over-specified case
- Study on the application of sum-of-squares (SoS) proofs to the meta-learning of mixed linear regressions
- Lead a reading group on the theory of Reinforcement Learning: algorithms and analysis for efficient exploration, stochastic approximation and practical approaches
- Tight analysis on the EM algorithm for a mixture of well-separated Gaussians and linear regressions
- Global analysis on the EM algorithm for a mixture of two linear regressions with a tight statistical guarantee in all SNR regimes
- Adversarial Examples: Empirical study on robustifying DNN classifier to malicious perturbation on test image with GANs

PIL (Perceptron and Intelligence Laboratory), Seoul National University

Research Internship (Prof. Jin Young Choi) 2016.7 - 2017.4

- Multi-camera multi-object tracking in computer vision with network-flow formulation
- Group study on first-order optimization methods

Design Project for Electrical Engineering, Seoul National University

Course Project: Computer Vision (Prof. Nam Ik Cho) 2014.8 - 2014.12

- Image-dehazing with prior knowledge on the natural scene

TEACHING EXPERIENCE

The University of Texas at Austin, Austin, TX

Organizer, Student Seminar: Theory of Reinforcement Learning Spring 2020

The University of Texas at Austin, Austin, TX

Teaching Assistant, EE 381V, Large Scale Optimization Fall 2018

Teaching Assistant, EE 381V-SE, Introduction to Convex Optimization Spring 2018

Seoul National University, Seoul, Korea

Teaching Assistant, Convex Optimization Fall 2016

WORK EXPERIENCE

Alegion, Inc., Austin, Texas

Research Intern, Research Internship in Human-Interactive Annotation 2019.6 - 2019. 8

- Explore automated annotation algorithms/applications
- Study on image segmentation with classical computer vision algorithms
- Apply a deep-learning based human-interactive annotation tool on a real annotation task
- Development language: Python

Scientific Analog Inc., Seoul, Korea

- R&D Engineer*, Software Engineer for Mixed Circuit Simulator 2015.5 - 2016. 6
- Develop core module: first-order difference equation (ODE) solver for analog circuit
 - Applied model-order reduction technique for faster simulation speed
 - Develop scheduler and processor for events in the circuit system in a time order
 - Development language: C/C++, Python, Verilog

Redduck Inc., Seoul, Korea

- Programmer*, Software Engineer for a PC Game Client 2011.2 - 2013.12
- Develop a First Person Shooting (FPS) PC game client with Unreal Engine 3
 - Game performance profiling, Game-log data analysis, Manage game AI logic
 - Development language: C/C++, Unreal Engine Script

TECHNICAL SKILLS

- Specialty: Statistical Learning Theory, Optimization, Reinforcement Learning
- Computer Language: C/C++, Python, MATLAB, L^AT_EX

HONORS AND AWARDS

- Graduate Continuing Fellowship**, University of Texas at Austin, 2021 - 2022
- One-year scholarship for academic achievement.
- Supplemental Fellowship**, The Kwanjeong Educational Foundation, 2017 - 2021
- Four-year scholarship for doctorate program.
- President Scholarship for Undergraduate**, Korea Student Aid Foundation 2008 - 2014
- Four-year scholarship for undergraduate program.
- International Collegiate Programming Contest**, Association for Computing Machinery 2010
- 6th Place in Daejeon Region
 - 2nd Place in Hanoi Region
- Korea Olympiad in Informatics**, Ministry of Science, ICT and Future Planning 2007
- Gold in Area of High School
- Korea Physics Olympiad**, The Korean Physical Society 2007
- Silver in Area of High School