

Jiin Woo

Ph.D. Candidate at Carnegie Mellon University

✉ [jiinw \[at\] andrew.cmu.edu](mailto:jiinw[at]andrew.cmu.edu) | 🏠 jiinw.github.io | 🎓 Jiin Woo

Research Interests

Reinforcement Learning, Federated Learning, Statistical Inference

Education

Carnegie Mellon University (CMU)

Ph.D. in Electrical & Computer Engineering

• Advisors: Yuejie Chi and Gauri Joshi

Pittsburgh, PA, USA

Aug. 2021 - Present

Korea Advanced Institute of Science and Technology (KAIST)

M.S. in Electrical Engineering

• Advisor: Yung Yi

Daejeon, South Korea

Sep. 2016 - Aug. 2018

Korea Advanced Institute of Science and Technology (KAIST)

B.S. in Mathematical Sciences

Daejeon, South Korea

Feb. 2011 - Aug. 2016

Work Experience

NAVER Search

Machine Learning Engineer

Seongnam, South Korea

Sep. 2018 - Aug. 2021

- Developed a large-scale keyword representation model that identifies the intention of all queries using texts in search engine results pages (SERPs) and click logs, which covers long-tail keywords. Implemented a regularized BERT text classifier based on the co-click distance between keywords to extract fine-grained embeddings of SERPs.
- Developed a personalized keyword recommendation algorithm that considers real-time search trends and personal preferences depending on user features with contextual multi-armed bandit and Bradley-Terry model.
- Developed the embedding of user actions for various user analysis tasks, such as user satisfaction prediction and next action prediction. Contributed by developing an attention-based representation model, which encodes a sequence of search actions to a compact embedding.

Selected Publications

[4] The Blessing of Heterogeneity in Federated Q-Learning: Linear Speedup and Beyond

Jiin Woo, Gauri Joshi, Yuejie Chi

International Conference on Machine Learning (ICML), 2023

Hawaii, USA

[3] Iterative Learning of Graph Connectivity from Partially-Observed Cascade Samples

Jiin Woo, Jungseul Ok, Yung Yi

ACM MobiHoc, 2020

Online

[2] Information Source Finding in Networks: Querying With Budgets

Jaeyoung Choi, Sangwoo Moon, Jiin Woo, KyungHwan Son, Jinwoo Shin, Yung Yi

IEEE/ACM Transactions on Networking, 2020

[1] Rumor Source Detection under Querying with Untruthful Answers

Jaeyoung Choi, Sangwoo Moon, Jiin Woo, KyungHwan Son, Jinwoo Shin, Yung Yi

IEEE INFOCOM, 2017

Atlanta, USA

Research Experience

Yuejie Chi Group and Optimization Probability and Learning (OPAL) Lab, CMU

Graduate Researcher (Advisors: Yuejie Chi and Gauri Joshi)

Aug. 2021 - Present

- Developed an offline federated Q-learning algorithm that prevents overestimation of Q-estimates via aggregated pessimism and guarantees linear speedup with a relaxed concentrability condition using the collective coverage of local agents.
- Developed a provably efficient federated Q-learning algorithm that leverages heterogeneity in local trajectories via weighted averaging and achieves linear speedup without requiring every agent to have full coverage of state-action space.

LeArning in Networking: Algorithm, Design, and Analysis (LANADA) Lab, KAIST

Sep. 2016 - Aug. 2018

Graduate Researcher (Advisor: Yung Yi)

- Developed a graph inference algorithm estimating the connectivity of a graph from a collection of partially observed epidemic cascades via approximate maximum likelihood estimation, which guarantees near-optimal sample complexity.
- Improved a rumor source localization algorithm via active querying with provable guarantees and analyzed the dependency between accuracy and querying cost.
- Designed a lightweight DQN structure via parameter sharing based on the symmetricity of MDP, which significantly reduces the computational complexity while guaranteeing local optimality.

Algorithmic Intelligence Laboratory (ALIN-LAB), KAIST

Jun. 2015 - Dec. 2015

Undergraduate Intern (Advisor: Jinwoo Shin)

- Studied the principles of graphical models. Focused on variational methods in parameter estimation.

Artificial Intelligence & Probabilistic Reasoning Laboratory (AIPR-LAB), KAIST

Jan. 2015 - May. 2015

Undergraduate Intern (Advisor: Kee-Eung Kim)

- Studied and implemented reinforcement learning (RL) methods for competition examples. Focused on kernel-based RL.

Teaching Experience

Special Topics in Artificial Intelligence: Foundations of Reinforcement Learning (18-813B)

Spring 2023

Teaching Assistant, Carnegie Mellon University (CMU)

Data Structures and Algorithms for Electrical Engineering (EE205)

Fall 2017

Teaching Assistant, Korea Advanced Institute of Science and Technology (KAIST)

Calculus 1, 2 (MAS101, MAS102)

Fall 2016, Fall 2017

Tutor, Korea Advanced Institute of Science and Technology (KAIST)

EE Co-op Program (Field Training and Education Program)

Spring 2017

Teaching Assistant, Korea Advanced Institute of Science and Technology (KAIST)

Honors & Awards

Hsu Chang Memorial Fellowship

USA

Electrical and Computer Engineering Department at Carnegie Mellon University (CMU)

2022-2023

Carnegie Institute of Technology Dean's Fellowship

USA

Carnegie Institute of Technology at Carnegie Mellon University (CMU)

2021-2022

KAIST Support Scholarship

South Korea

Korea Advanced Institute of Science and Technology (KAIST)

Fall 2016 - Spring 2018

Excellence Award in Creative Challenge Type SW R&D Program

Seoul, South Korea

Korea IT Business Promotion Association (IPA)

Nov. 2015

The National Scholarship for Science and Engineering

South Korea

Korea Student Aid Foundation (KOSAF)

Spring 2011 - Spring 2015

Relevant Coursework

Machine Learning

Distributed and Federated Learning Algorithms, Advanced Introduction to Machine Learning, Convex Optimization, Information Theory, Fundamentals of Machine Learning

Statistics/Math

Intermediate Statistics, Mathematical Statistics, Graph Theory, Lebesgue Integral Theory, Logic and Set Theory, Analysis, Discrete Mathematics, Probability and Statistics, Linear Algebra

Programming/Systems

Operating Systems and System Programming for Electrical Engineering, System Programming, Data structure, Computer Network

Skills

Programming

Python, MATLAB, C, Java, LaTeX

ML, Data Science

Pytorch, Spark, Hive, Hadoop

Others

HTML, CSS, Javascript, MongoDB, Express, AngularJS, NodeJS

Professional Services

Reviewer

NeurIPS (2023), ICLR (2024)