

Jiin Woo

Machine Learning Researcher @ Data Insight Center in NAVER Corporation

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Research Interests

Theoretical study of optimization, statistical inference, and machine learning for large-scale systems and complex networks.

Education

Korea Advanced Institute of Science and Technology (KAIST)

M.S. in Electrical Engineering

- Advisor: Yung Yi
- Thesis: Greedy Learning of Graph Connectivity from Partially-Observed Cascade Samples
- Committee: Yung Yi, Song Chong, Jinwoo Shin

Daejeon, South Korea

Sep. 2016 - Aug. 2018

Korea Advanced Institute of Science and Technology (KAIST)

B.S. in Mathematical Sciences

- Cum Laude

Daejeon, South Korea

Feb. 2011 - Aug. 2016

Linköping University

Exchange Student

Linköping, Sweden

Feb. 2014 - Aug. 2014

Work Experience

NAVER Data Insight Center

Machine Learning Researcher

- Developed a large-scale keyword classification 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. Reduced class spaces by clustering classes with non-negative matrix factorization.
- Participated in the development of a search engine evaluation system. Contributed to the selection of features for high-quality indicators with XGBoost.
- Developed a personalized keyword recommendation algorithm that considers real-time search trends and personal preferences depending on gender and age with contextual multi-armed bandit and Bradley-Terry model.
- Provided 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.

Seongnam, South Korea

Sep. 2018 - Present

Publications

CONFERENCE

[C3] Iterative Learning of Graph Connectivity from Partially-Observed Cascade Samples

Jiin Woo, Jungseul Ok, Yung Yi

ACM MobiHoc 2020

Online

[C2] On the Asymptotic Content Routing Stretch in Network of Caches: Impact of Popularity Learning

Boram Jin, Jiin Woo, Yung Yi

NETGCOOP 2019

New York, USA

[C1] 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

JOURNAL

[J2] 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

[J1] Estimating the Information Source under Decaying Diffusion Rates

Jiin Woo, Jaeyoung Choi

Electronics 2019

Honors & Awards

KAIST Support Scholarship

Korea Advanced Institute of Science and Technology (KAIST)

South Korea

Fall 2016 - Spring 2018

Excellence Award in Creative Challenge Type SW R&D Program

Korea IT Business Promotion Association (IPA)

Seoul, South Korea

Nov. 2015

3rd place in "Show Me The Street" Innovation Challenge 2015

Cisco Global Center of Excellence (GCoE)

Incheon, South Korea

Nov. 2015

The National Scholarship for Science and Engineering

Korea Student Aid Foundation (KOSAF)

South Korea

Spring 2011 - Spring 2015

Projects

Learning-Based Framework for Improving Large-scale Search

Jul. 2017 - Jun. 2018

NAVER Corporation

- Developed a recommendation algorithm that daily selects a small set of keywords among a massive size of candidates to maximize the user satisfaction on the search engine result pages.
- Significantly reduced the computational complexity of deep reinforcement learning by designing parameter shared Deep Q-Networks (DQN) based on the permutation equivariant and invariant properties of the problem's Markov Decision Process (MDP).
- Contributed to the MDP formulation and mathematical proofs for the local optimality of the weight shared DQN structure.

Versatile Network System Architecture for Multi-dimensional Diversity

Sep. 2016 - Dec. 2017

Institute for Information & communications Technology Promotion (IITP) funded by the Korea government (MSIP)

- Developed FogOS, a distributed operating system for IoT services, which manages the cloud and the resources at the edge and connects individually owned edge devices with incentives in a distributed manner.
- Participated in the implementation of a matching module in FogOS, which optimizes the resource allocation between service requests and available edge devices.

Real-Time Analysis and Interactive Visualization Platform for Large-Scale IoT Data

Jun. 2015 - Nov. 2015

Korea IT Business Promotion Association (IPA)

- Developed a web-based data visualization platform, which provides real-time information about large-scale streaming data. Applied the platform to smart city data, such as air pollution and energy consumption, collected from sensors and provided real-time urban information to citizens.
- Implemented interactive data visualization web pages with MEAN stack (MongoDB, Express.js, AngularJS, and Node.js).

Other Selected Research Experience

Algorithmic Intelligence Laboratory (ALIN-LAB), KAIST

Jun. 2015 - Dec. 2015

Undergraduate Intern (Advisor: Jinwoo Shin)

- Studied Minimum weight perfect matching (MWPM) and maximum weight matching (MWM) problems. Focused on parallelizable algorithms for MWPM and MWM with multiple intermediate max-product belief propagations (BPs).
- 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

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)

Courses

CS: Computer Science, EE: Electrical Engineering, IE: Industrial & Systems Engineering, MAS: Mathematical Sciences

Machine Learning

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| • [CS] Artificial Intelligence and Machine Learning | A0 |
| • [EE] Epidemics and Information Diffusion in Complex Networks | A+ |
| • [EE] Economics in Communication Networks | A0 |
| • [MAS] Fundamentals of Machine Learning | A+ |

Theory

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|---|----|
| • [IE] Engineering Statistics 1 | A0 |
| • [IE] Engineering Statistics 2 | A0 |
| • [EE] Information Theory | A0 |
| • [MAS] Introduction to Graph Theory | A- |
| • [MAS] Mathematical Statistics | A0 |
| • [MAS] Lebesgue Integral Theory | A- |
| • [MAS] Introduction to Differential Geometry | A0 |
| • [MAS] Logic and Set Theory | A0 |
| • [MAS] Analysis 1 | A0 |
| • [MAS] Analysis 2 | A+ |
| • [MAS] Discrete Mathematics | A0 |
| • [MAS] Probability and Statistics | A0 |
| • [MAS] Differential Equations and Applications | A- |
| • [MAS] Introduction to Linear Algebra | A0 |
| • [MAS] Calculus 1 | A+ |
| • [MAS] Calculus 2 | A+ |

Systems

- [CS] System Programming
- [CS] Data structure
- [CS] Introduction to Programming
- [IE] Information Technology for IE
- [EE] Computer Network
- [EE] Operating Systems and System Programming for Electrical Engineering

A-
A0
A-
A0
A0
B+

Technical Skills

Programming

Python, MATLAB, C, Java, LaTeX

ML · Big data

Pytorch, Tensorflow, Spark, Hive, Hadoop

Others

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