Youngrock Oh

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Baumoe-ro, Seocho-gu, Seoul, Republic of Korea

Research Interests

Mathematics: statistical inference, stochastic process

Machine Learning: representation learning, interpretable machine learning, graph neural networks

Education

KAIST

Ph.D., Mathematical Sciences — Mar 2015 – Feb 2019

- Dissertation: *Mathematical Modeling and Analysis for Adaptive Medium Access Protocols in Wireless Networks*
- Adviser: Prof. Ganguk Hwang
- Research area: stochastic geometry, stochastic process, performance optimization of communication systems

M.S., Mathematical Sciences — Mar 2013 – Feb 2015

- Thesis: *Tail Asymptotics for the Sums of Independent Light-Tailed Random Variables*
- Adviser: Prof. Ganguk Hwang
- Research area: stochastic process, heavy-tailed distribution

B.S., Mathematical Sciences — Feb 2008 – Feb 2013

- Minor: Financial Engineering Program

Professional Experience

Senior Research Engineer

- AI Vision Lab, Samsung SDS, Seoul, Republic of Korea

  Jan 2021 – Present
- AI Advanced Research Lab, Samsung SDS, Seoul, Republic of Korea

  Mar 2019 – Dec 2020

Publications

International Journal

1. **Y. Oh** and G. Hwang. "Stochastic Geometry Analysis of the Correlation Between Consecutive Packet Transmission in WLAN", *Ann Oper Res*, vol. 293, No. 1, pp. 213-235, Oct 2020.
2. **Y. Oh**, Y. Kim, J. Kim, G. Hwang, and S. Park. "A New Autonomous Adaptive MAC Protocol in Wireless Networks", *IEEE Access*, vol. 6, Apr 2018.

International Conference

1. **Y. Oh**, H. Jung, J. Park, and M. Kim. "EVET: Enhancing Visual Explanations of Deep Neural Networks Using Image Transformations", Winter Conference on Applications of Computer Vision (**WACV**), Virtual, Jan 5-9, 2021, accepted. [link]

2. **Y. Oh** and G. Hwang. "Spatial Modeling and Analysis of WLAN with Poisson Point Process", 13th International Conference on Queueing Theory and Network Applications (**QTNA**), Tsukuba, Japan, July 25-27, 2018 (oral presentation).
3. **Y. Oh**, Y. Kim, G. Hwang, and S. Park. "A New Contention Based Adaptive MAC Protocol Based on The Renewal Access Protocol", 27th *IEEE* International Symposium on Personal, Indoor and Mobile Radio Communication (**PIMRC**), Valencia, Spain, September 4-7, 2016 (oral presentation).

International Workshop

1. H. Jung, **Y. Oh**, J. Park, and M. Kim. "Jointly Optimize Positive and Negative Saliencies for Black Box Classifiers", 25th International Conference on Pattern Recognition Workshop on Explainable Deep Learning-AI (**ICPR** 2020 EDL-AI), Virtual, Jan 11, 2021, accepted.

Research Projects

XAI-assisted Representation Learning
Jan 2021 – Present

- Funded by Samsung SDS
- Developing interpretable deep metric learning schemes

Interpretability Method for Graph Neural Network Models
Nov 2020 – Present

- Funded by Samsung SDS
- Developing efficient interpretability methods for graph neural network models

AI Framework for Interpretable Machine Learning and Continual Learning
Jan 2020 – Oct 2020

- Funded by Samsung SDS
- Developed interpretability methods for DNN image classification models
- Developed a continual learning scheme using interpretability methods

Explainable AI Mar 2019 – Dec 2019

- Funded by Samsung SDS
- Research on confidence scores for deep neural network models' decisions
- Proposed a novel confidence score which covers both in-distribution and out-of-distribution data

Simulation for Data Infrastructure based Application Service
Oct 2018 – Dec 2018

- Funded by ETRI
- Mathematical modeling and analysis of data-centric network with in-network processing based on queuing theory
- Derived the optimal routing policy for current data flows to design adaptive in-network processing

Stochastic Modeling, Analysis and Optimization for IoT
Mar 2017 – Dec 2018

- Funded by Government of the Republic of Korea

- A stochastic geometry analysis of dynamic WLAN for a short period

Experience

AI Research Seminar Moderator Jun 2020 - Dec 2020

- Moderator and presenter of the lab-wide seminars for recent AI research papers

Teaching Assistant Mar 2014 - Dec 2018

- Undergraduate courses: Calculus, Introduction to Linear Algebra, Probability and Statistics, Elementary Probability Theory
- Graduate courses: Probability Theory, 4th Industrial Revolution and New Technology Convergence

Teaching Assistant and Staff (Coursera) Aug 2016 - Nov 2017

- Introduction to Ordinary Differential Equations

Math Tutor for Foreign Students Apr 2014 - June 2014, Feb 2015 - Aug 2015

- Course: Elementary College Mathematics

Skills

- **Mathematics** Stochastic processes, stochastic geometry, queuing theory, statistics
- **Programming** LaTeX, Pytorch, Tensorflow, Keras, MATLAB, C++