

JAE MYUNG KIM

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RESEARCH INTEREST

Bayesian Deep Learning, Approximate Bayesian Inference, Uncertainty Estimation, Unsupervised Learning, Computer Vision, Weak Supervision, Semantic Segmentation, Medical Analysis

EDUCATION

Seoul National University, Seoul, South Korea

2018 - Present

M.S. in Electrical and Computer Engineering

Advised by Jungwoo Lee

Seoul National University, Seoul, South Korea

2011 - 2018

B.S. in Electrical and Computer Engineering

2-year absence to fulfill military duty (2013 - 2015)

Peking University, Beijing, China

Jul. 2015

International academic exchange program for engineering students

PUBLICATIONS/PREPRINTS

International

- [1] REST: Performance Improvement of a Black Box Model via RL-based Spatial Transformation
Jae Myung Kim*, Hyungjin Kim*, Chanwoo Park*, and Jungwoo Lee
In Proceedings of 34th AAAI Conference on Artificial Intelligence, 2020
- [2] DropoutCAM: Dropout Uncertainty for Weakly Supervised Object Localization
Jae Myung Kim, Yeongwook Kim, Sungyeob Han, and Jungwoo Lee
Submitted, 2019
- [3] Exploring linearity of deep neural network trained QSM: QSMnet+
Woojin Jung, Jaeyeon Yoon, Joon Yul Choi, **Jae Myung Kim**, Yoonho Nam, Eung-Yeop Kim, and Jongho Lee
In <https://arxiv.org/abs/1909.07716>, 2019
- [4] Sampling-based Bayesian Inference with Gradient Uncertainty
Chanwoo Park, **Jae Myung Kim**, Seok Hyeon Ha, and Jungwoo Lee
In NIPS Workshop on Bayesian Deep Learning, 2018

Domestic

- [1] Classifying Malignant Breast Cancer by Multiple Instance Learning
Jae Myung Kim and Jungwoo Lee
in Joint Conference on Communication and Information, 2019

RESEARCH EXPERIENCE

Uncertainty Estimation

2018 - 2019

- Developed a sample efficient uncertainty estimation method that generates a small number of weight samples. We define a new measure to quantify 'gradient uncertainty' which indicates whether the weights are near local minimum. Accepted at NIPS Workshop on Bayesian Deep Learning, 2018.
- Studying a sample efficient uncertainty estimation method by generating a small number of weight samples located at different modes in the posterior. (ongoing)
- Developing a sampling-free epistemic uncertainty estimation method using jacobian, which can be interpreted as a noise injection in Bayesian Neural Network. (ongoing)

Uncertainty Usage in Other Tasks

2019

- Developed robustness to the shift in data distribution when the black-box model is given. Reinforcement learning and the confidence score (prediction probability or epistemic uncertainty) is used for training additional network. Accepted at AAAI conference, 2020.
- Proposed a new Class Activation Map (CAM) method which achieved state-of-the-art in a weakly supervised object localization problem. The proposed method utilizes uncertainty obtained from dropout layers. Currently under review.

Others

2018 - 2019

- **Medical Analysis** Diagnosed the lung cancer prognosis by applying multiple instance learning method in whole slide images.
- **Fake Image Discrimination** Participated in *Fake Image Discrimination* challenge sponsored by the Korean government. Trained network to discriminate real and fake images by making fake dataset in several different generative models. Ranked under top-9 among competitors.

TEACHING EXPERIENCE

Teaching Assistant, Introduction to Deep Learning, SNU

Sep. - Dec. 2018

Lectured python tutorial, managed middle and final project, answered questions in person and online, marked assignments, and proctored exams

Major Course Assistant, Introduction to Data Structure, SNU

Sep. - Dec. 2017

Helped students who had difficulty understanding Data Structure course. Ran Q&A hours every week, answered questions in person and online

FELLOWSHIPS & AWARDS

Full Tuition, National Scholarship for Science and Engineering

2011 - 2017

Korea Student Aid Foundation

Silver Medal, 23rd Korea Mathematical Olympiad (KMO)

2009

Korea Mathematical Society

WORK EXPERIENCE & OTHER ACTIVITIES

Deepest (SNU Deep Learning study club)

2017 - 2018

- Lectured *Introduction to Bayesian Deep Learning* and *Tutorial on SG-MCMC*
- Participated in various projects such as *Caricature-Human translation using CycleGAN* and *Pikachu Volleyball Game Reinforcement Learning*

Cleanfly (Startup Company), Software Engineer Intern

Jan. - Jun. 2017

- Worked as a back-end developer and a data visualization programmer

ROKAF (Republic of Korea Air Force), Sergeant

2013 - 2015

- Representative of battalion soldiers for 6 months
- Discharged from the army with the reward for a great leader

TNT (SNU tennis club)

2012 - Present

- Winner, 20th SNU Tennis Double Competition in group B (tennis career less than 4 years), 2016
- Winner, 16th SNU Tennis Single Competition in group C (tennis career less than a year), 2012

Volunteer

2015 - Present

- Volunteered a pediatric care program organized by the Children's Hospital at SNU, 2016
- Volunteered in sharing briquettes, 2017
- Sponsors international medical relief organization, a regular sponsor