

RESEARCH INTERESTS

- Statistical machine learning, including generative models and out-of-distribution detection.
- Application of machine learning on natural sciences and industrial problems.

EDUCATION

Seoul National University <i>Ph.D. Student in Mechanical Engineering</i> Advisor: Frank Chongwoo Park	Mar 2020 - Present
Seoul National University <i>M.S. in Interdisciplinary Program in Neuroscience</i> Advisor: Byoung-Tak Zhang (Department of Computer Science and Engineering) Thesis: Adaptive Bayesian Optimization for Organic Material Screening	Mar 2014 - Feb 2016
Seoul National University <i>B.S. in Chemical and Biological Engineering</i> Graduated <i>cum laude</i> (GPA: 3.85 / 4.3)	Mar 2008 - Feb 2013
Gyeonggi Science High School The valedictory honor granted by the Gyeonggi province governor One-year early graduation	Mar 2006 - Feb 2008

WORK EXPERIENCE

<i>Research scientist intern @ Kakao Brain</i> (https://www.kakaobrain.com/) A research-oriented affiliate of Kakao Crop., No.1 messenger app provider in Korea. <ul style="list-style-type: none">• Research on scene-graph based image-to-image and text-to-image retrieval algorithms	Oct 2019 - May 2020
<i>Researcher @ Saige Research</i> (http://www.saigeresearch.ai/) A start-up providing deep learning-based fault detection solutions for manufacturers. <ul style="list-style-type: none">• Research on deep learning algorithms for optical surface defect inspection	Mar 2019 - Sep 2019
<i>Machine learning team lead @ Haezoom Inc.</i> (https://www.haezoom.com/) A start-up providing machine learning solutions for solar power plants. <ul style="list-style-type: none">• Lead a team of five to develop machine learning solutions for solar power plants• Develop a data processing pipeline that integrates data from weather stations, satellite, numerical weather forecasters, and solar power plants• Develop fault detection system for solar power plants and solar power generation forecasting system• Develop future cloud movement prediction algorithm based on 3D convolutional neural networks	Jan 2016 - July 2018

PUBLICATIONS

Journal

1. Minwoo Lee, **Sangwoong Yoon**, Juhan Kim, Yuangang Wang, Keeman Lee, Frank Chongwoo Park, Chae Hoon Sohn. **Classification of Impinging Jet Flames Using Convolutional Neural Network with Transfer Learning**, *Journal of Mechanical Science and Technology*, 2022. [link](#)
2. Kyu Min Park, Younghyo Park, **Sangwoong Yoon**, and Frank C. Park. **Collision Detection for Robot Manipulators Using Unsupervised Anomaly Detection Algorithms**, *IEEE Transactions on Mechatronics*, doi: 10.1109/TMECH.2021.3119057., 2021. [link](#)

Conference

1. Yonghyeon Lee, **Sangwoong Yoon**, Minjun Son, and Frank C. Park. **Regularized Autoencoders for Isometric Representation Learning**, *Proceedings of International Conference on Learning Representations (ICLR)*, 2022. [link](#)
2. **Sangwoong Yoon**, Yung-Kyun Noh, and Frank C. Park. **Autoencoding Under Normalization Constraints**, *Proceedings of the 38th International Conference on Machine Learning (ICML)*, 2021. [link](#)
3. **Sangwoong Yoon**, Woo Young Kang, Sungwook Jeon, SeongEun Lee, Changjin Han, Jonghun Park, and Eun-Sol Kim. **Image-to-Image Retrieval by Learning Similarity between Scene Graphs**, *Proceedings of the 35th AAAI Conference on Artificial Intelligence (AAAI)*, 2021. [link](#)

4. SooKyung Kim, Hyojin Kim, Joonseok Lee, **Sangwoong Yoon**, Samira E. Kahou, Karthik Kashinath, Mr Prabhat. **Deep Hurricane-Tracker: Tracking and Forecasting Extreme Climate Events**, *IEEE Winter Conference on Applications of Computer Vision*, 2019.

Workshop

1. **Sangwoong Yoon**, Frank C. Park, and Yung-Kyun Noh. **Kullback-Leibler Divergence Estimation using Variationally Weighted Kernel Density Estimators**, *Neural Information Processing Systems 2019 Information Theory and Machine Learning Workshop*, 2019.
2. **Sangwoong Yoon**, Yonho Song, Minsoo Kim, Frank C. Park and Yung-Kyun Noh. **Interpretable Feature Selection Using Local Information for Credit Assessment**. *Neural Information Processing Systems 2018 Workshop on Challenges and Opportunities for AI in Financial Services*, 2018 (Oral).
3. **Sangwoong Yoon**, Sang-Woo Lee, and Byoung-Tak Zhang, **Predictive Property of Hidden Representations in Recurrent Neural Network Language Models**, *Neural Information Processing Workshop Systems 2014 Workshop on Modern Machine Learning Methods and Natural Language Processing*, 2014.

PATENTS

1. Oh-Hyun Kwon, Jung-Seok Hyung and **Sangwoong Yoon**, **Method, Server, and System for Detecting Abnormality of a Power Plant using Solar Energy**, the Republic of Korea patent, KR101775065B1, applied in Aug 5, 2016, granted in Sep 6, 2017.
2. Oh-Hyun Kwon, Jung-Seok Hyung and **Sangwoong Yoon**, **Method and Server for Forecasting Generation of a Power Plant using Solar Energy**, the Republic of Korea patent, KR101808047B1, applied in Aug 5, 2016, granted in Dec 14, 2017.

PROFESSIONAL SERVICES

Services for Academic Communities

- Served as a reviewer in NeurIPS 2021, NeurIPS 2020, NeurIPS 2019, NeurIPS 2018, ICML 2021, ICML 2020, ICML 2019, AISTATS 2020, and many others
- Volunteered as a website admin for the second Korea-Japan Machine Learning Workshop

Services for Developer Communities

- Submitted 5 merged pull requests to Pandas¹: #17253, #19427, #22380, #26157, #26158
- Volunteered as a staff in PYCON KR 2015 and PYCON APAC 2017

AWARDS

- Qualcomm Innovation Fellowship Korea 2021 (Sep 2021)
- Youlchon AI Stars Scholarship 2021 (Aug 2021)
- Best Poster Award (the highest score) and Most Popular Poster Award at MLSS 2021 Taipei (Aug 2021)
- Best Poster Award (the first place) at The AI KOREA 2019 (Aug 2019)
- Four-year full tuition scholarship granted by Korea Student Aid Foundation (2008 - 2012)

SKILLS

- **Languages:** Korean (native), English (TOEFL: 107/120 (2019.8.4), TEPS 852/990 (2015.8.22))
- **Programming Languages:** Expert in Python, competent in MATLAB, SQL, Bash, JavaScript, and some knowledge of C, C++, Java
- **Tools:** Git, PyTorch, TensorFlow, Django, Jenkins, Linux/Ubuntu, Docker, Vim, CuPy, OpenCV, Keras, PostgreSQL, PostGIS, HDF5, Vue.js

¹<https://github.com/pandas-dev/pandas>