Minhyeong Yu **Updated on Apr 5, 2023.**

RESEARCH STACKS
Computer Vision: Classification, Semantic Segmentation, Object Detection
Data Scarcity, Privacy and Efficiency: Semi/Self Supervised Learning, Privacy Preserving, Dataset Distillation
On Device Learning: Federated Learning, Quantization, Network Pruning

EDUCATION

Korea University Mar 2019 - Feb 2022
M.S. in Computer Science and Engineering (*Advisor: Prof. Seung Jun Baek*)

University of Seoul Mar 2012 - Feb 2019
B.S. in Statistics and Data Science

EXPERIENCE

Machine Learning Researcher — **Deeping Source** Jun 2022 - present
- Research on Quantization and Efficiency

M.S. Candidate — **System INtelligence Group (SING) Lab, Korea University** Mar 2019 - Feb 2022
- Research on Federated Semi-Supervised Segmentation, Medical Image Domain
- Project lead: AI system for Rehabilitation Medicine (Government funded)

PUBLICATIONS

- **Minhyeong Yu**, Federica Spinola, Myeongjun Kim, Philipp Benz, Tae-hoon Kim, "Rethinking of Straight-Through Estimator: Quantization-Bias Aware Training", (Under Review), 2023.
- Federica Spinola, Philipp Benz, **Minhyeong Yu**, Tae-hoon Kim, "Knowledge Assembly: Semi-Supervised Multi-Task Learning from Multiple Datasets with Disjoint Labels", Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), 2023.
- **Minhyeong Yu**, Sunwoo Kim, Seungjun Baek. "Federated Semi-Supervised Segmentation with Randomized Weight Perturbation", International Symposium on Biomedical Imaging (ISBI), 2023.
- Beom Suk Kim*, **Minhyeong Yu***, Sunwoo Kim, Joon Shik Yoon, Seungjun Baek, "Scale-Attentional U-Net for the Segmentation of the Median Nerve in Ultrasound Images", Ultrasonography, 2022.
- Minki Kim* **Minhyeong Yu***, "Selection and Proposal of Vertical Building Forest Sites in preparation for the implementation of the Seoul Park Cancellation", Review of Korean Society for Internet Information, 2018.

SELECTED PROJECTS

- **Quantization Aware Training for Object Detection**, Deeping Source Jun 2022 - Jan 2023
  Quantization is a promising technique for faster speed of inference. However, it often struggles to maintain its performance. To address this issue, we conducted a study on quantization aware training. Our findings suggest that the quantization bias between fake quantized activation and full precision one can be reduced when the interaction in matrix multiplication is taken into account. We have documented our observations in a paper for further reference.
- **Federated Semi-Supervised Segmentaton**, Korea University Feb 2022 - Mar 2022
  Medical Image Segmentation is challenging due to limited annotated data and privacy concerns. Federated Learning and Semi-Supervised Learning help train models in a private way. We introduce FedWeP, a Federated Semi-Supervised Segmentation method using Randomized Weight Perturbation, where the server adds Gaussian noise to model weights for client training.
- **AI system for Rehabilitation Medicine**, Korea University Sep 2020 - Dec 2021
  We have been developing an AI-based system for rehabilitation medicine, supported by the Ministry of Science and ICT (MSIT) of Korea and supervised by the Institute for Information and Communications Technology Planning and Evaluation (IITP). During the first year of the ICT Creative Consilience program, we developed a system to assess hemiplegic patients and recommend suitable exercises. In the second year, we created an automated system for the detection of videofluoroscopic swallowing studies in stroke patients.
- **Medical Image Segmentaton**, Korea University May 2020 - Nov 2021
  We collaborated with Korea Guro Hospital to study nerve segmentation on ultrasound imaging modality, for which we were awarded the Excellence Prize at the Korean Academy of Neuromusculoskeletal Sonography. Subsequent to this, we applied for a patent for this research and further studied it to propose a novel convolution, namely Scale Attentional Convolution, specialized in ultrasound nerve image segmentation.

PATENTS & HONORS

- "Method and apparatus for automatically recognizing peripheral nerves and measuring nerve indicators in ultrasound images based on deep learning algorithms", 10-2020-0067199, Rep. of Korea Jun 2020
- Excellence Prize, Korean Academy of Neuromusculoskeletal Sonography Nov 2020
- Excellence Prize, Seoul Digital Foundation Nov 2018