**Minhyeong Yu** **Updated on Jan 26, 2023.**

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

EDUCATION
**Korea University**
M.S. in Computer Science and Engineering (*Advisor: Prof. Seung Jun Baek*) Mar 2019 - Feb 2022
**University of Seoul**
B.S. in Statistics and Data Science Mar 2012 - Feb 2019

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
- Project lead: AI system for Rehabilitation Medicine (Government funded)
- Research on Medical Image Segmentation of Median Nerve on Ultrasound Imaging Modality

PUBLICATIONS
- **Minhyeong Yu**, Federica Spinola, Myeongjun Kim, Philipp Benz, Tae-hoon Kim, "Rethinking of Straight-Through Estimator: Quantization-Bias Aware Training", (Under Review), 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 a challenging task due to the lack of annotated data and the reluctance of institutions to share sensitive patient information. To address this issue, recent advances in Federated Learning and Semi-Supervised Learning have enabled the training of models with limited labels in a privacy-preserving manner. To further enhance the segmentation process, we propose FedWeP, a method for Federated Semi-Supervised Segmentation. FedWeP utilizes Randomized Weight Perturbation, in which the server modulates model weights with Gaussian noise and disseminates perturbed models to clients for semi-supervised 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