

Namuk Park

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RESEARCH SUMMARY

My research has focused on elucidating the underlying nature of deep neural networks and, more importantly, applying it to real-world problems. In particular, I am interested in Bayesian neural networks, ensemble methods, uncertainty estimation, robustness, generalization, loss landscapes, and scalable algorithms.

EDUCATION

Yonsei University, Incheon, South Korea Mar 2011 – Feb 2022 (Expected)
M.S. and Ph.D. in School of Integrated Technology (Computer Science)
‣ Thesis: “Practical Bayesian Neural Networks: A Data Uncertainty Perspective”
‣ Advisor: Prof. Songkuk Kim

Yonsei University, Seoul, South Korea Mar 2008 – Feb 2011
B.S. in Physics
‣ GPA: 4.18/4.30., Valedictorian of the College of Sciences & 1 year early graduation based on academic excellence.

Daejeon Science High School, Daejeon, South Korea Mar 2006 – Feb 2008
‣ 1 year early graduation based on academic excellence.

PUBLICATIONS

[3] [Namuk Park](#) and Songkuk Kim. “*How Do Vision Transformers Work?*”, 2021. Under review. git.io/JDq4y.

‣ We show that the success of “*multi-head self-attention*” (MSA) is *not* from capturing long-range dependency, but from spatially ensembling feature maps. In particular, we demonstrate that (1) MSAs flatten the loss landscapes, (2) MSAs are low-pass filters as opposed to Convs, and (3) MSAs at the end of a stage significantly improve the accuracy.

[2] [Namuk Park](#) and Songkuk Kim. “*Blurs Behave Like Ensembles: Spatial Smoothings to Improve Accuracy, Uncertainty, and Robustness.*”, 2021. Under review. git.io/JDqC0.

‣ We show that “*spatial smoothing*” (a simple blur filter) improves accuracy, uncertainty, and robustness of CNNs simultaneously. Such improvement is primarily attributable to flattening loss landscapes by “*spatially ensembling*” neighboring proximate feature maps of CNNs.

[1] [Namuk Park](#), Taekyu Lee, and Songkuk Kim. “*Vector Quantized Bayesian Neural Network Inference for Data Streams.*” In AAAI, 2021.

‣ We show that “*temporal smoothing*” (moving average of recent predictions) significantly improves the computational performance of Bayesian NN inference without loss of accuracy. To do so, we propose “*ensembles for proximate data points*” as an alternative to ensembles for *a single data point*.

AWARDS & HONORS

Qualcomm Innovative Fellowship South Korea Winner (Qualcomm) Nov 2021
Research Grant Support for Ph.D. Students (National Research Foundation of South Korea) Jun 2021 - Feb 2022

	National Fellowship from Global Open Source Frontier (NIPA ¹)	Jun 2019 – Dec 2020
	China–Japan–South Korea OSS Award (The Organizing Committee of the CJK OSS Award)	Nov 2019
	OSS Competition, Honorable Mention (NAVER Corporation)	Feb 2019
	OSS Challenge, First prize—the Award From the Minister of Science and ICT	Nov 2018
	OSS Competition (2 nd phase), First prize (NAVER Corporation)	Aug 2018
	OSS Competition (1 st phase), Second prize (NAVER Corporation)	Feb 2018
	National Ph.D. Full Ride Fellowship (Institute for Information and Communications Technology Promotion of South Korea)	Mar 2011 – Feb 2016
	Yonsei University Alumni Full Ride Scholarship, GE Scholarship, National Scholarship for Science and Engineering, and other merit-based scholarships	Sep 2008 – Feb 2011
TALKS	“How Do Vision Transformers Work?”	
	‣ NAVER Tech Talk by NAVER Corporation	Dec 2021
	“Uncertainty in AI: Deep Learning Is Not Good Enough for Safe AI”	
	‣ Keras Korea Meetup by AI Yangjae Hub	Dec 2019
	‣ OSS Contribution Festival by NIPA	Dec 2019
	‣ South Korea-Uzbekistan SW Technology Seminar by NIPA & Tashkent University of Information Technologies	Oct 2019
	“A Fast and Lightweight Probability Tool for AI in Scala”	
	‣ North-East Asia OSS Forum by NIPA	Nov 2019
	‣ OSS Day by NIPA (Keynote)	Nov 2018
	‣ Scala Night Korea by Scala User Group Korea	Apr 2018
INDUSTRY	Probe Technology , Seoul, South Korea	Mar 2013 – Feb 2018
EXPERIENCE	Co-founder and CEO	
	‣ We provided enterprise resource planning & data analysis tool for small businesses.	
SKILLS	PyTorch, TensorFlow, Python, Scala (Functional Programming)	

¹National IT Industry Promotion Agency of South Korea