

Gukyeong Kwon

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EDUCATION

- **Georgia Institute of Technology** Atlanta, GA
Ph.D. in Electrical and Computer Engineering (Advisor: Dr. Ghassan AlRegib) August 2015 – Present
M.S. in Electrical and Computer Engineering (GPA: 4.0/4.0) August 2015 – May 2018
- **Sungkyunkwan University (SKKU)** Suwon, South Korea
B.S. in Electronic and Electrical Engineering (GPA: 4.29/4.5) March 2009 – August 2015

RESEARCH AND PROJECT

- **Characterizing Missing Knowledge in Deep Networks** Georgia Tech
Graduate Research Assistant January 2019 – Present
 - Proposed a gradient-based representation for characterizing knowledge that deep networks have not learned during training and ensuring the robustness of deep networks.
 - Developed an anomaly detection algorithm based on the backpropagated gradient representation and achieved the state-of-the-art performance on MNIST, fMNIST, CIFAR-10, and CURE-TSR using PyTorch.
- **Aberrant Event Detection for Autonomous Vehicles** Georgia Tech
Graduate Research Assistant August 2018 – Present
 - Developed algorithms to detect driving events occurring in unexpected ways to ensure safe autonomous driving.
 - Incorporated out-of-distribution detection into Faster-RCNN to detect abnormal objects in driving scenes.
- **Vision-Based Driver's Misbehavior Detection** Panasonic Automotive
Deep Learning Research Intern May 2018 – July 2018
 - Developed driver's misbehavior detection algorithms through deep learning-based pose estimation and hand detection in autonomous vehicle using Tensorflow and C++.
 - Improved computational time for hand detection algorithm 99.97% and showcased developed algorithms in the Ford Innovation Drive and Tech Expo 2018.
- **Robust Visual Understanding Under Challenging Conditions** Georgia Tech
Graduate Research Assistant September 2017 – December 2017
 - Introduced a large-scale (>2,000,000 images) traffic sign recognition dataset (CURE-TSR) which is among the most comprehensive datasets with controlled synthetic challenging conditions.
 - Benchmarked the robustness of data-driven algorithms and analyzed shortcomings using PyTorch.

PUBLICATIONS

- G. Kwon*, M. Prabhushankar*, D. Temel and G. AlRegib, “**Distorted Representation Space Characterization Through Backpropagated Gradients**,” *2019 IEEE International Conference on Image Processing (ICIP)*, Taipei, Taiwan, 2019. (*: equal contribution, **Best Paper Award (top 0.1%)**) [[arXiv](#)] [[GitHub](#)] [[Poster](#)]
- M. Prabhushankar*, G. Kwon*, D. Temel and G. AlRegib, “**Semantically Interpretable and Controllable Filter Sets**,” *2018 25th IEEE International Conference on Image Processing (ICIP)*, Athens, 2018. (*: equal contribution) [[arXiv](#)] [[GitHub](#)] [[Poster](#)]
- D. Temel, G. Kwon*, M. Prabhushankar*, and G. AlRegib, “**CURE-TSR: Challenging Unreal and Real Environments for Traffic Sign Recognition**,” *MLITS workshop in Neural Information Processing Systems (NIPS)*, Long Beach, U.S.A, 2017. (*: equal contribution) [[arXiv](#)] [[GitHub](#)] [[Poster](#)]
- M. Aabed, G. Kwon, and G. AlRegib, “**Power of Tempospatially Unified Spectral Density for Perceptual Video Quality Assessment**,” *2017 IEEE International Conference on Multimedia and Expo (ICME)*, Hong Kong, 2017. (**Finalist of the World's FIRST 10K Best Paper Award (top 3%)**) [[arXiv](#)] [[GitHub](#)] [[Slides](#)]

AWARDS & SCHOLARSHIPS

- **Best Paper Award (Top 0.1%) @ ICIP 2019** September 2017
- **Finalist of the World's FIRST 10K Best Paper Award (Top 3%) @ ICME 2017** July 2017
- **National Science Engineering Scholarship** March 2013

PROGRAMMING SKILLS

- **Languages:** Python, MATLAB, C/C++, **Deep Learning Framework:** PyTorch, Tensorflow