

Sung Ju Hwang

CONTACT INFORMATION

KAIST

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Address: 291 Daehak-ro, E3-1 1427, Yuseong-gu, Daejeon, Korea, 34141

RESEARCH INTERESTS

My research interest mainly focuses on developing novel models and algorithms for tackling practical challenges in deploying artificial intelligent systems to various real-world application domains. I am currently interested in the following topics:

- **Low-resource learning:** meta-learning, network pruning & quantization, few-shot classification & generation, self-supervised and semi-supervised learning.
- **On-device learning:** network compression (pruning, quantization, and knowledge distillation), continual learning, federated learning.
- **Safe and secure learning:** uncertainty modeling & quantification, robustness to distributional shifts, defense against adversarial attacks.
- **Large-scale learning:** meta-learning, neural architecture search, distributed optimization and federated learning.

The application domains of interests include but are not limited to visual recognition (real-time vision, few-shot image classification and generation), natural language understanding (low-resource language models, question answering/generation, dialogue agents), speech recognition & synthesis, automatic drug/material discovery, healthcare and finance.

PROFESSIONAL EXPERIENCE

KAIST

Associate Professor

03/01/2020 - Current

Assistant Professor

01/01/2018 - 02/29/2020

UNIST

Assistant Professor

08/26/2014 - 12/31/2017

Disney Research

Postdoctoral Research Associate

09/16/2013 - 08/24/2014

EDUCATION

The University of Texas at Austin, Austin, Texas USA

Ph.D., Computer Science, Aug 2013

- Thesis: *Discriminative Object Categorization with External Semantic Knowledge*
- Advisor: Professor Kristen L. Grauman
- Area of Study: Machine Learning and Computer Vision

M.A., Computer Science, May 2010

- Thesis: *Reading Between the Lines: Object Localization Using Implicit Cues from Image Tags*
- Advisor: Professor Kristen L. Grauman
- Area of Study: Computer Vision

Seoul National University, Seoul, Korea

B.S., Computer Science and Engineering, February 2008

- *Magna Cum Laude*, With Honors in Engineering

PROFESSIONAL
SERVICES

Area Chair

- 2020, 2021 International Conference on Machine Learning (**ICML**)
- 2021 International Joint Conference on Artificial Intelligence (**IJCAI**)
- 2021 International Conference on Learning Representations (**ICLR**)
- 2020 Asian Conference on Machine Learning (**ACML**)

Senior Program Committee

- 2020, 2021 AAAI Conference on Artificial Intelligence (**AAAI**)
- 2020 International Joint Conference on Artificial Intelligence (**IJCAI**)

Organizing Committee

- 2019 ICCV Workshop on Interpreting and Explaining Visual Artificial Intelligence Models (**VXAI**)
- 2017, 2018 Korean Conference on Computer Vision (**KCCV**)

JOURNAL
PUBLICATIONS

[j2] **Learning the Relative Importance of Objects from Tagged Images for Retrieval and Cross-Modal Search**, S. J. Hwang and K. Grauman
International Journal of Computer Vision (**IJCV**) (**IF=5.428**), Oct 2011.

[j1] **Reading Between the Lines: Object Localization Using Implicit Cues from Image Tags**, S. J. Hwang and K. Grauman,
IEEE Transaction on Pattern Analysis and Machine Intelligence (**TPAMI**) (**IF=6.085**),
Jun 2012.

CONFERENCE
PUBLICATIONS

[c55] **Meta-GMVAE: Mixture of Gaussian VAE for Unsupervised Meta-Learning**, D. B. Lee, D. Min, S. Lee, and S. J. Hwang,
International Conference on Learning Representation (**ICLR**), 2021, Online
(**spotlight presentation**) (**acceptance rate = 3.8%**)

[c54] **Accurate Learning of Graph Representations with Graph Multiset Pooling**, J. Baek, M. Kang, and S. J. Hwang,
International Conference on Learning Representation (**ICLR**), 2021, Online
(**acceptance rate = 28.7%**)

[c53] **Rapid Neural Architecture Search by Learning to Generate Graphs from Datasets**, H. Lee, E. Hyung, and S. J. Hwang,
International Conference on Learning Representation (**ICLR**), 2021, Online
(**acceptance rate = 28.7%**)

[c52] **Contrastive Learning with Adversarial Perturbations for Conditional Text Generation**, S. Lee, D. B. Lee, and S. J. Hwang,
International Conference on Learning Representation (**ICLR**), 2021, Online
(**acceptance rate = 28.7%**)

[c51] **Federated Semi-Supervised Learning with Inter-Client Consistency & Disjoint Learning**, W. Jeong, J. Yoon, E. Yang, and S. J. Hwang,
International Conference on Learning Representation (**ICLR**), 2021, Online
(**acceptance rate = 28.7%**)

[c50] **Learning to Sample with Local and Global Contexts from Experience Replay Buffers**, Y. Oh, K. Lee, J. Shin, E. Yang, and S. J. Hwang,

- International Conference on Learning Representation (**ICLR**), **2021**, Online
(**acceptance rate = 28.7%**)
- [c49] **FedMix: Approximation of Mixup under Mean Augmented Federated Learning**, T. Yoon, H. Jeong, E. Yang, and **S. J. Hwang**,
International Conference on Learning Representation (**ICLR**), **2021**, Online
(**acceptance rate = 28.7%**)
- [c48] **Clinical Risk Prediction with Temporal Probabilistic Asymmetric Multi-Task Learning**, T. Nguyen, H. Jeong, E. Yang, and **S. J. Hwang**,
AAAI Conference on Artificial Intelligence (**AAAI**), **2021**, Online
(**acceptance rate = 21.4%**)
- [c47] **GTA: Graph Truncated Attention for Retrosynthesis**,
S. Seo, Y. Y. Song, J. Y. Yang, S. Bae, H. Lee, J. Shin, **S. J. Hwang**, and E. Yang,
AAAI Conference on Artificial Intelligence (**AAAI**), **2021**, Online
(**acceptance rate = 21.4%**)
- [c46] **MetaPerturb: Transferable Regularizer for Heterogeneous Tasks and Architectures**, J. U. Ryu, J. Shin, H. B. Lee, **S. J. Hwang**,
Conference on Neural Information Processing System (**NeurIPS**) **2020**, Online
(**spotlight presentation**) (**acceptance rate = 4.1%**)
- [c45] **Learning to Extrapolate Knowledge: Transductive Few-shot Out-of-Graph Link Prediction**, J. Baek, D. B. Lee, and **S. J. Hwang**,
Conference on Neural Information Processing System (**NeurIPS**) **2020**, Online
(**acceptance rate = 20.1%**)
- [c44] **Adversarial Self-Supervised Contrastive Learning**,
M. Kim, J. Tack, and **S. J. Hwang**,
Conference on Neural Information Processing System (**NeurIPS**) **2020**, Online
(**acceptance rate = 20.1%**)
- [c43] **Time-Reversal Symmetric ODE Network**,
I. Huh, E. Yang, **S. J. Hwang**, and J. Shin,
Conference on Neural Information Processing System (**NeurIPS**) **2020**, Online
(**acceptance rate = 20.1%**)
- [c42] **Bootstrapping Neural Processes**,
J. Lee, Y. Lee, J. Kim, E. Yang, **S. J. Hwang**, and Y. W. Teh,
Conference on Neural Information Processing System (**NeurIPS**) **2020**, Online
(**acceptance rate = 20.1%**)
- [c41] **Few-shot Visual Reasoning with Meta-Analogical Contrastive Learning**,
Y. Kim, J. Shin, E. Yang, and **S. J. Hwang**,
Conference on Neural Information Processing System (**NeurIPS**) **2020**, Online
(**acceptance rate = 20.1%**)
- [c40] **Neural Complexity Measures**,
Y. Lee, J. Lee, **S. J. Hwang**, E. Yang, S. Choi, , Conference on Neural Information
Processing System (**NeurIPS**) **2020**, Online
(**acceptance rate = 20.1%**)
- [c39] **Attribution Preservation in Network Compression for Reliable Network Interpretation**, G. Park, J. Y. Yang, **S. J. Hwang**, E. Yang,
Conference on Neural Information Processing System (**NeurIPS**) **2020**, Online
(**acceptance rate = 20.1%**)

- [c38] **Distribution Aligning Refinery of Pseudo-label for Imbalanced Semi-supervised Learning**, J. Kim, Y. Hur, S. Park, E. Yang, **S. J. Hwang**, and J. Shin, Conference on Neural Information Processing System (**NeurIPS**) **2020**, Online (acceptance rate = **20.1%**)
- [c37] **Neural Mask Generator: Learning to Generate Adaptive Word Maskings for Language Model Adaptation**, M. Kang, M. Han and **S. J. Hwang**, Conference on Empirical Methods in Natural Language Processing (**EMNLP**) **2020**, Online (long paper) (acceptance rate = **22.4%**)
- [c36] **Meta-Learning for Short Utterance Speaker Recognition with Imbalance Length Pairs**, S. M. Kye, Y. Jung, H. B. Lee, **S. J. Hwang**, and Hoirin Kim, Conference of the International Speech Communication Association (**InterSpeech**) **2020**, Online (acceptance rate = **47%**)
- [c35] **Adversarial Neural Pruning with Latent Vulnerability Suppression**, D. Madaan, J. Shin, and **S. J. Hwang**, International Conference on Machine Learning (**ICML**) **2020**, Online (acceptance rate = **21.8%**)
- [c34] **Cost-effective Interactive Attention Learning with Neural Attention Processes**, J. Heo, J. Park, H. Jeong, K. J. Kim, J. Lee, E. Yang, and **S. J. Hwang**, International Conference on Machine Learning (**ICML**) **2020**, Online (acceptance rate = **21.8%**)
- [c33] **Meta Variance Transfer: Learning to Augment from the Others**, S. J. Park, S. Han, J. Baek, I. Kim, J. Song, H. B. Lee, J. Han and **S. J. Hwang**, International Conference on Machine Learning (**ICML**), **2020**, Online (acceptance rate = **21.8%**)
- [c32] **Self-supervised Label Augmentation via Input Transformations**, H. Lee, **S. J. Hwang** and J. Shin, In Proceedings of the International Conference on Machine Learning (**ICML**), **2020**, Online (acceptance rate = **21.8%**)
- [c31] **Generating Diverse and Consistent QA pairs from Contexts with Information-Maximizing Hierarchical Conditional VAEs**, D. B. Lee, S. Lee, W. T. Jeong, D. Kim, and **S. J. Hwang**, Conference for Association for Computational Linguistics (**ACL**), **2020**, Online (long paper) (acceptance rate = **25.2%**)
- [c30] **Segmenting 2K-Videos at 36.5 FPS with 24.3 GFLOPs: Accurate and Lightweight Realtime Semantic Segmentation Networks**, D. Oh, D. Ji, C. Jang, Y. Hyun, H. S. Bae, **S. J. Hwang**, International Conference on Robotics and Automation (**ICRA**), **2020**, Online (acceptance rate = **42%**)
- [c29] **Learning to Balance: Bayesian Meta-Learning for Imbalanced and Out-of-distribution Tasks**, H. B. Lee, H. Lee, D. Na, S. Kim, M. Park, E. Yang and **S. J. Hwang**, International Conference on Learning (**ICLR**), **2020**, Online (oral presentation) (acceptance rate = **1.9%**)
- [c28] **Meta Dropout: Learning to Perturb Latent Features for Generalization**, H. B. Lee, T. Nam, E. Yang and **S. J. Hwang**, International Conference on Learning (**ICLR**), **2020**, (acceptance rate = **26.5%**)

- [c27] **Scalable and Order-robust Continual Learning with Additive Parameter Decomposition**, J. Yoon, S. Kim, E. Yang and **S. J. Hwang**, International Conference on Learning (**ICLR**), **2020**, Online (acceptance rate = **26.5%**)
- [c26] **Why Not to Use Zero Imputation? Correcting Sparsity Bias in Training Neural Networks**, J. Yi, J. Lee, **S. J. Hwang** and E. Yang, International Conference on Learning (**ICLR**), **2020**, Online (acceptance rate = **26.5%**)
- [c25] **Deep Mixed Effect Model using Gaussian Processes: A Personalized and Reliable Prediction for Healthcare**, I. Chung, S. Kim, J. Lee, **S. J. Hwang** and E. Yang, AAAI Conference on Artificial Intelligence (**AAAI**), **2020**, New York, USA (acceptance rate = **20.6%**)
- [c24] **Episodic Memory Reader: Learning What to Remember for Question Answering from Streaming Data**, M. Han, M. Kang, H. Jung, S. J. Hwang, Conference for Association for Computational Linguistics (**ACL**), **2019**, Florence, Italy. (long paper, oral presentation) (acceptance rate = **22.7%**)
- [c23] **Learning What and Where to Transfer**, Y. Jang, H. Lee, **S. J. Hwang** and J. Shin, International Conference on Machine Learning (**ICML**), **2019**, Long Beach, USA. (acceptance rate = **22.6%**)
- [c22] **Learning to Quantize Deep Networks by Optimizing Quantization Intervals with Task Loss**, S. Jung, C. Son, S. Lee, J. Son, J. J. Han, Y. Kwak, **S. J. Hwang**, and C. Choi, IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2019**, Long Beach, USA. (oral presentation) (acceptance rate = **5.6%**)
- [c21] **Learning to Propagate Labels: Transductive Propagation Networks for Few-shot Learning**, Y. Liu, J. Lee, M. Park, S. Kim, E. Yang, **S. J. Hwang**, and Y. Yang, International Conference on Learning Representations (**ICLR**), **2019**, New Orleans, USA. (acceptance rate = **31.4%**)
- [c20] **Dropmax: Adaptive Variational Softmax**, H. Lee, J. Lee, S. Kim, E. Yang and **S. J. Hwang**, Conference on Neural Information Processing System (**NeurIPS**), **2018**, Montreal, Canada. (acceptance rate = **20.8%**)
- [c19] **Uncertainty-Aware Attention for Reliable Interpretation and Prediction**, J. Heo, H. Lee, S. Kim, J. Lee, K. Kim, E. Yang and **S. J. Hwang**, Conference on Neural Information Processing System (**NeurIPS**), **2018**, Montreal, Canada. (acceptance rate = **20.8%**)
- [c18] **Joint Active Feature Acquisition and Classification with Variable-Size Set Encoding**, H. Shim, **S. J. Hwang**, and E. Yang, Conference on Neural Information Processing System (**NeurIPS**), **2018**, Montreal, Canada. (acceptance rate = **20.8%**)
- [c17] **Deep Asymmetric Multitask Feature Learning**, H. Lee, E. Yang and **S. J. Hwang**, International Conference on Machine Learning (**ICML**), **2018**, Stockholm, Sweden. (acceptance rate = **25.0%**)

- [c16] **Lifelong Learning with Dynamically Expandable Networks**,
J. Yoon, E. Yang, J. Lee and **S. J. Hwang**,
International Conference on Learning Representations (**ICLR**), **2018**, Vancouver,
Canada. (acceptance rate = **33.7%**)
- [c15] **SplitNet: Learning to Semantically Split Deep Networks for Parameter
Reduction and Model Parallelization**,
J. Kim, Y. Park, G. Kim and **S. J. Hwang**,
International Conference on Machine Learning (**ICML**), **2017**, Sydney, Australia.
(acceptane rate = **25.5%**)
- [c14] **Combined Group and Exclusive Sparsity for Deep Neural Networks**,
J. Yoon and **S. J. Hwang**,
International Conference on Machine Learning (**ICML**), **2017**, Sydney, Australia.
(acceptance rate = **25.5%**)
- [c13] **Taxonomy-Regularized Semantic Deep Convolutional Neural Networks**,
W. Goo, J. Kim, G. Kim and **S. J. Hwang**,
European Conference on Computer Vision (**ECCV**), **2016**, Amsterdam, Netherland.
(acceptance rate = **26.6%**)
- [c12] **Asymmetric Multi-task Learning Based on Task Relatedness and Loss**,
G. Lee, E. Yang, and **S. J. Hwang**,
International Conference on Machine Learning (**ICML**), **2016**, New York City, NY.
(acceptance rate = **24%**)
- [c11] **Knowledge Transfer with Interactive Learning of Semantic Relation-
ships**, J. Choi, **S. J. Hwang**, L. Sigal, and L. S. Davis,
AAAI Conference on Artificial Intelligence (**AAAI**), **2016**, Phoenix.
(oral presentation) (acceptance rate = **26%**)
- [c10] **Exploiting View-Specific Appearance Similarities Across Classes for
Zero-shot Pose Prediction: A Metric Learning Approach**,
A. Kuznetsova, **S. J. Hwang**, B. Rosenhahn, and L. Sigal,
AAAI Conference on Artificial Intelligence (**AAAI**), **2016**, Phoenix, AZ.
(acceptance rate = **26%**)
- [c9] **Expanding Object Detector’s Horizon: Incremental Learning Frame-
work for Object Detection in Video**,
A. Kuznetsova, **S. J. Hwang**, B. Rosenhahn, and L. Sigal,
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2015**,
Boston, MA. (acceptance rate = **25%**)
- [c8] **A Unified Semantic Embedding: Relating Taxonomies with Attributes**,
S. J. Hwang and L. Sigal,
Conference on Neural Information Processing System (**NeurIPS**), **2014**, Montreal,
Canada. (acceptance rate = **25%**)
- [c7] **Analogy-preserving Semantic Embedding for Visual Object Categoriza-
tion**, **S. J. Hwang**, K. Grauman, and F. Sha,
International Conference on Machine Learning (**ICML**), **2013**, Atlanta, GA. (ac-
ceptance rate = **24%**)
- [c6] **Semantic Kernel Forests from Multiple Taxonomies**,
S. J. Hwang, K. Grauman, and F. Sha,
Conference on Neural Information Processing System (**NeurIPS**), **2012**, Lake Tahoe,
NV. (acceptance rate = **25%**)

- [c5] **Context-Based Automatic Local Image Enhancement**,
S. J. Hwang, A. Kapoor, and S. B. Kang,
European Conference on Computer Vision (**ECCV**), **2012**, Firenze, Italy
(**acceptance rate = 25%**)
- [c4] **Learning a Tree of Metrics with Disjoint Visual Features**,
S. J. Hwang, K. Grauman, and F. Sha,
Conference on Neural Information Processing System (**NeurIPS**), **2011**, Granada,
Spain. (**acceptance rate = 22%**)
- [c3] **Sharing Features Between Objects and Their Attributes**,
S. J. Hwang, F. Sha and K. Grauman,
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2011**,
Colorado Springs, CO. (**acceptance rate = 22.5%**)
- [c2] **Accounting for the Relative Importance of Objects in Image Retrieval**,
S. J. Hwang and K. Grauman,
British Machine Vision Conference (**BMVC**), **2011**, Aberystwyth, UK.
(**oral presentation**) (**acceptance rate = 8.4%**)
- [c1] **Reading Between the Lines: Object Localization Using Implicit Cues
from Image Tags**, S. J. Hwang and K. Grauman,
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), **2010**, San
Francisco, CA. (**oral presentation**) (**acceptance rate = 4.5%**)
- [w11] **Federated Semi-Supervised Learning with Inter-Client Consistency**,
W. Jeong, J. Yoon, E. Yang, and S. J. Hwang,
ICML Workshop in Federated Learning, 2020, Online,
(**long presentation**) (**best student paper award**)
- [w10] **Federated Continual Learning with Weighted Inter-Client Transfer**, J.
Yoon, W. Jeong, G. Lee, E Yang, and S. J. Hwang,
ICML Workshop in Lifelong Learning, 2020, Online
- [w9] **Adversarial Neural Pruning**, D. Maadan and S. J. Hwang,
NeurIPS Workshop on Safety and Robustness in Decision Making, 2019,
Vancouver, CA
- [w8] **Uncertainty-Aware Deep Temporal Asymmetric Multi-task Learning**,
H. Jeong, T. A. Nguyen, E. Yang and S. J. Hwang,
Women in Machine Learning Workshop, NeurIPS 2019, Vancouver, CA
- [w7] **Cost-Effective Interactive Attention Learning for Action Recognition**,
J. Heo, J. Park, H. Jeong, W. Shin, K. J. Kim, and S. J. Hwang,
**ICCV Workshop on Interpreting and Explaining Visual Artificial Intelli-
gence Models, 2019**, Seoul, Korea
- [w6] **A Metric Learning Approach for Multi-View Object Recognition and
Zero-shot Pose Estimation**,
A. Kuznetsova, S. J. Hwang, B. Rosenhahn and L. Sigal,
ICCV Workshop on Object Understanding for Interaction, ICCV 2015,
Santiago, Chile, Dec 2015.
- [w5] **Interactive Semantics for Knowledge Transfer**,
J. Choi, S. J. Hwang, L. Sigal and L. S. Davis,
ICML Active Learning Workshop, 2015, Lille, France, July 2015.

- [w4] **A Unified Semantic Embedding: Relating Taxonomies and Attributes**,
S. J. Hwang and L. Sigal and L. S. Davis,
 AAAI Spring Symposium on Knowledge Representation and Reasoning (**KRR**),
2015, Stanford, CA.
- [w3] **A Unified Semantic Embedding: Relating Taxonomies and Attributes**,
S. J. Hwang and L. Sigal and L. S. Davis,
NIPS Workshop on Learning Semantics, NIPS 2014, Montreal, Canada.
- [w2] **Semantic Kernel Forests from Multiple Taxonomies**,
S. J. Hwang, F. Sha, and K. Grauman,
 International Workshop on Large Scale Visual Recognition and Retrieval (**BigVi-**
sion), **NIPS, 2012**, Lake Tahoe, NV, Dec 2012. (oral presentation)
- [w1] **Sharing Features Between Visual Tasks at Different Levels of Granu-**
larity, **S. J. Hwang**, F. Sha, and K. Grauman,
 Fine-Grained Visual Categorization Workshop (**FGVC**), **CVPR 2011**, Colorado
 Springs, CO.

PREPRINTS

- [i10] **Model-Augmented Q-Learning**,
 Y. Oh, J. Shin, E. Yang, and **S. J. Hwang**,
 arXiv:2102.03866, Feb 2021.
- [i9] **Large-Scale Meta-Learning with Continual Trajectory Shifting**,
 J. Shin, H. B. Lee, B. Gong, and **S. J. Hwang**,
 arXiv:2102.07215, Feb 2021.
- [i8] **Improving Uncertainty Calibration via Prior Augmented Data**,
 J. Willette, J. Lee, and **S. J. Hwang**,
 arXiv:2102.10803, Feb 2021.
- [i7] **Semi-Relaxed Quantization with DropBits: Training Low-Bit Neural**
Networks via Bit-wise Regularization,
 J. Lee, J. Yun. **S. J. Hwang**, and E. Yang
 arXiv:1911.12990, Nov 2019
- [i6] **Learning to Disentangle Robust and Vulnerable Features for Adversarial**
Detection, B. Joe, **S. J. Hwang** and I. Shin,
 arXiv:1909.04311, Sep 2019
- [i5] **H. Lee, D. Na, H. Lee and S. J. Hwang, Learning to Generalize to Unseen**
Tasks with Bilevel Optimization,
 arXiv:1908.01457, Aug 2019
- [i4] **Reliable Estimation of Individual Treatment Effect with Causal Infor-**
mation Bottleneck S. Kim, Y. Baek, **S. J. Hwang** and E. Yang,
 arXiv:1906.03118, Jun 2019
- [i3] **Adaptive Network Sparsification with Dependent Beta-Bernoulli Dropout**,
 J. Lee, S. Kim, J. Yoon, H. Lee, E. Yang, and **S. J. Hwang**,
 arXiv:1805.10896, May 2018
- [i2] **Learning to Separate Domains in Generalized Zero-Shot and Open Set**
Learning: a Probabilistic Perspective, H. Dong, Y. Fu, Y. Jiang, W. Liu, **S. J.**
Hwang, L. Sigal, and X. Xue,
 arXiv:1810.07368, May 2018
- [i1] **Hierarchical Maximum-Margin Clustering**, G. Zhou, **S. J. Hwang**, M.
 Schmidt, L. Sigal and G. Mori,
 arXiv:1502.01827, Feb 2015

PATENTS

- [p3] **Incremental Learning Framework for Object Detection in Videos**,
A. Kuznetsova, **S. J. Hwang** and L. Sigal,
US Patent 9,805,264, Oct 2017
- [p2] **Incremental Category Embedding for Categorization**,
S. J. Hwang and L. Sigal,
US 9317782 B2, Apr 2016
- [p1] **Object Classification Through Semantic Mapping**,
S. J. Hwang, J. Choi and L. Sigal,
US 20160292538 A1, Mar 2015

REVIEWER
SERVICES

Program Committee

- 2015, 2016, 2017, 2018, 2019 International Conference on Machine Learning (**ICML**)
- 2016, 2017, 2019 AAAI Conference on Artificial Intelligence (**AAAI**)
- 2016, 2018, 2019 International Joint Conference on Artificial Intelligence (**IJCAI**)

Reviewer

- 2012, 2013, 2014, 2017, 2018, 2019, 2020 Neural Information Processing System (NeurIPS, NIPS), Top 10% Reviewer (NeurIPS 2020)
- 2013, 2014, 2015, 2019, 2020 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)
- 2013, 2017, 2019 International Conference on Computer Vision (ICCV)
- 2012, 2014, 2020 European Conference on Computer Vision (ECCV)
- 2019, 2020, 2021 Annual Meeting of the Association for Computational Linguistics (ACL)
- 2020 Conference on Empirical Methods in Natural Language Processing (EMNLP)
- 2017, 2020 International Conference on Artificial Intelligence and Statistics (AISTATS)
- 2012, 2014, 2018 Asian Conference on Computer Vision (ACCV)
- 2012, 2013 IEEE Transaction on Multimedia
- 2014 ACM SIGGRAPH
- 2014 ACM SIGGRAPH Asia
- 2014 CVPR Workshop on Egocentric Vision (EgoVision)
- 2014 ECCV Workshop on Storytelling with Images and Videos (VisStory)
- 2016 Eurographics (EG)

AWARDS

- Engineering School Technology Innovation Award, KAIST, 2020
- Best Student Paper Award, International Workshop on Federated Learning for User Privacy and Data Confidentiality, 2020
- Google AI Focused Research Award, Google, 2018
- Dean's Excellence Award from the College of Natural Sciences, University of Texas at Austin, 2010

GRANTS

Have secured **₩8.48B (\$7.53M USD)** research funding in total.

- Deep Learning Based AI Learning and Inference Technology for Drones (4/2020-12/2023) **₩280M**, ETRI
- Deep Knowledge Inference from Large-Scale Text (11/2019-10/2020) **₩200M**, Samsung Electronics
- Penetration Security Testing of ML Model Vulnerabilities and Defense (co-PI) (4/2020-12/2027) **₩1.35B**, Institute for Information & Communication Technology Planning & Evaluation
- Center for Applied Research in AI (co-PI) (12/2019-12/2022) **₩371M**, Agency for Defense Development
- Fixed-Point Adaptive Personalized Federated Learning (co-PI) (12/2020-12/2022) **₩320M**, Samsung Electronics
- Specialized Deep Learning Models for Automated Inspection Process (PI) (4/2020-12/2020) **₩120M**, LG CNS
- Explainable AI-based Interactive Satellite Image Analysis and Deep Learning Acceleration (PI) (11/2019-10/2022) **₩300M**, SI
- Human-Inspired Large Scale Visual Recognition System (12/2015-02/2020) (PI), **₩1.1B**, Samsung Research Funding Center of Samsung Electronics
- Improving Generalization and Reliability of Any Deep Neural Networks (10/2018-10/2021) (PI) **\$150K**, Google
- Exploiting Temporal Locality in CNN-RNN Architectures (09/2018-06/2020), **₩200M**, Samsung Electronics
- Affective Conversational Agents (5/2017-4/2018) (PI), **₩200M**, Naver
- Deep Learning-Based Survivor Detection System for Unmanned Aerial Vehicles (09/2016-05/2018) (PI), **₩260M**, National Research Foundation
- Semantic-Based Interactive Learning System for Visual Recognition (11/2015-10/2018) (PI), **₩150M**, National Research Foundation
- Massive Machine Learning - KAIST MARS AI Integrated Research Center (08/2018-02/2024) (co-PI), **₩125M per year**, National Research Foundation
- Efficient Large-Scale Deep Learning – Neural Research Processing Center (11/2017-10/2020) (Co-PI), **₩150M per year**, Samsung Electronics
- Explainable Artificial Intelligence – Next Generation Artificial Intelligence (08/2017-07/2021) (Co-PI), **₩200M per year**, Institution for Information & Communications & Technology Promotion
- Adaptive Machine Learning Technology Development for Intelligent Autonomous Digital Companion (01/2018-08/2020) (Co-PI), **₩150M per year**, Institution for Information & Communications & Technology Promotion
- Petaflop-Scale Machine Learning Framework - Next Generation High-Performance Computing (11/2016-07/2021) (Co-PI), **₩100M per year**, National Research Foundation
- Multitask Deep Learning Models for Disease Prediction from Electronic Health Records (04/2017-09/2017) (PI), **₩70M**, AITrics
- Semantic and Contextual Dialogue Generation Using Generative Adversarial Networks (04/2017-12/2017) (PI), **₩80M**, SKT
- Incremental Learning for Object Detection, Pose Estimation, and Object Trajectory Estimation (09/2016-08/2017) (PI), **₩72.25M**, Hyundai Motor Company
- Automatic Vibration Analysis using Deep Learning (07/2016-03/2017) (PI), **₩55M**, Hyundai Motor Company
- Simultaneous Object/Scene Recognition and Learning from Driving Videos (12/2015-5/2016) (PI), **₩30M**, Hyundai NGV
- Hazard/Accident Prediction and Evasion System Leveraging Big Data (12/2015-5/2016) (PI), **₩30M**, Hyundai NGV

INVITED TALKS

AI for the Real-World

- Korean Artificial Intelligence Association Summer Conference, Online, 2020
- Seoul National University, Seoul, Korea, 2020
- Samsung Advanced Institute of Technology, Suwon, Korea, 2020

Low-Resource Deep Learning

- Workshop on Low-Resource Learning, Beijing, China, 2019

Learning to Balance: Bayesian Meta-Learning for Imbalanced and Out-of-distribution Tasks

- 2019 International Conference on Data Science, Shanghai, China, 2019
- AI Korea 2019, Seoul, Korea 2019

Beyond Explainable AI - Reliable AI

- Korean Society of Artificial Intelligence in Medicine, Seoul, Korea, 2019

Explainable AI vs. Unexplainable AI

- Patent Court of Korea, Daejeon, Korea, 2018

Models and Algorithms for Large-scale Deep Learning

- Naver AI Colloquium 2018, Seoul, Korea, 2018
- Samsung Electronics (DS), Suwon, Korea, 2018
- Samsung Research, Seoul, Korea, 2018
- Seoul National University, Seoul, Korea, 2018
- KAIST, Daejeon, Korea, 2018
- Postech, Pohang, Korea, 2018

Machine Learning for Healthcare

- Korean Society of AI for Law, 2018
- 2018 AI Summer School, Seoul, Korea, 2018
- Samsung Research, Seoul, Korea, 2018
- Samsung SW Center Seoul R&D Forum, Seoul, Korea, 2018
- Postech, Pohang, Korea, 2018

Real-time Sports Commentary Generation with Deep Learning

- AI Worldcup 2018, Daejeon, Korea, 2018
- AI Worldcup 2017, Daejeon, Korea, 2017

Dynamically Expandable Networks

- Pangyo Future Forum, Pangyo, Korea
- AI Korea 2018, Seoul, Korea, 2018

Advances in Deep Learning

- The AI Korea 2018, Seoul, Korea, 2018

Deep Asymmetric Multitask Feature Learning

- 2018 Korean Conference on Computer Vision, Seoul, Korea, 2018

SplitNet: Learning to Semantically Split Deep Networks for Parameter Reduction and Model Parallelization

- 2017 International Workshop on Highly Efficient Neural Network Design (HENND), Seoul, Korea, 2017

- 2017 Asian Conference on Machine Learning, AI Society Workshop, Seoul, Korea, 2017
- 2017 Korean Conference on Computer Vision, Seoul, Korea, 2017

Human-Inspired Extremely Large Scale Visual Recognition System

- Samsung Advanced Institute of Technology, Suwon, Korea, 2017
- Software Convergence Symposium 2017 (SWCS 2017), Seoul, Korea, 2017
- The 6th Winter School on Image Understanding, Gangwon, Korea, 2017
- Ulsan National Institute of Science and Technology, Ulsan, Korea, 2017

Extreme-Scale Deep Learning Framework for Petaflop-Scale Supercomputers

- Computer System Society Winter School, Gangwon, Korea, 2016

Deep Learning Methods for Object Detection on UAVs

- The 13th Short Course on UAV Technology: Guidance, Navigation, and Control, Seoul, Korea, 2016

Learning a Semantic Space for Recognition and Inference

- Postech, Pohang, Korea, 2016
- Chonnam National University, Gwangju, Korea, 2016

Exploiting View-Specific Appearance Similarities Across Classes for Zero-shot Pose Prediction

- 2015 Korean Conference on Computer Vision, Seoul, Korea, 2015

A Unified Semantic Embedding: Relating Taxonomies with Attributes

- 2014 Korean Conference on Computer Vision, Seoul, Korea, 2014

Discriminative Object Categorization with External Semantic Knowledge

- VASC Seminar, Carnegie Mellon University, Pittsburgh, PA, 2013
- Ulsan National Institute of Science and Technology, Ulsan, Korea, 2013
- Chonnam National University, Gwangju, Korea, 2013
- Chungbuk National University, Cheongju, Korea, 2013

RESEARCH
EXPERIENCE

KAIST

Assistant/Associate Professor

01/01/2018-Current

- Conducting research on deep learning, with specific focus on generalization, efficiency, and robustness of deep neural networks, to enhance its real-world applicability to diverse application areas such as visual recognition, natural language understanding, speech recognition & synthesis, healthcare, and finance.

UNIST

Assistant Professor

08/26/2014-12/31/2017

- Conducted research on deep learning for visual recognition, healthcare, and natural language understanding.

Disney Research

Postdoctoral Research Associate

09/16/2013-08/24/2014

- Conducted research on feature learning and categorization model learning for large-scale and fine-grained categorization.

- Mentor: Leonid Sigal, Senior Research Scientist (Now Professor at UBC)

Microsoft Research

Research Intern

06/06/2011-09/02/2011

- Researched and developed an automatic image enhancement system, which finds an optimal enhancement map for a given image, with coarse-to-fine search for the optimal pixelwise enhancement operators using localized hashing on the learned metrics, followed by a Gaussian process smoothing step (ECCV 2012).
- Mentors:
Sing Bing Kang, Principal Researcher
Ashish Kapoor, Principal Researcher

The University of Texas at Austin

Research Assistant

08/16/2009-08/16/2013

- Performed research on solving various computer vision tasks (object detection, image retrieval, automatic image annotation, object categorization) with machine learning approaches (multi-view learning, multitask learning, metric learning, multiple kernel learning, manifold/embedding learning).

ADVISING ACTIVITY

Students' Degrees Completed Under My Supervision

- Ahra Jo, Ph.D., 08/2019
(Thesis: "Visual Recognition for Autonomous Vehicles")
- Jeong Un Ryoo, M.S., 02/2021 (Thesis: "MetaPerturb: Transferable Regularizer for Heterogeneous Tasks and Architectures")
- Hyewon Jeong, M.S. 02/2021 (Thesis: "Clinical Risk Prediction with Temporal Probabilistic Asymmetric Multi-Task Learning")
- Tuan Nguyen, M.S., 08/2020 (Thesis: "Stochastic Subset Selection")
- Bruno Andries, M.S., 02/2020
(Thesis: "Video Object Detection and Segmentation")
- Dong Hyun Na, M.S., 08/2019 (Thesis: "Learning to Balance: Bayesian Meta-Learning for Imbalanced and Out-of-distribution Tasks")
- Jay Heo, M.S., 02/2019 (Thesis: "Uncertainty-Aware Attention for Reliable Interpretation and Prediction")
- Moonsu Han, M.S., 02/2019 (Thesis: "Episodic Memory Reader: Learning What to Remember for Question Answering from Streaming Data")
- Hae Beom Lee, M.S., 02/2018
(Thesis: "DropMax: Adaptive Variational Softmax")
- Jaehong Yoon, M.S., 02/2018
(Thesis: "Lifelong Learning with Dynamically Expandable Networks")

Current Student Advisees

- Hae Beom Lee, Ph.D. student, 08/2018 - **02/2022 (Expected)**
- Jaehong Yoon, Ph.D. student, 08/2018 - **02/2022 (Expected)**
- Jay Heo, Ph.D. student, 02/2019 - **02/2022 (Expected)**
- Hayeon Lee, Ph.D. student, 02/2018 -
- Jinmyung Kwak, Ph.D. student, 02/2019 -
- Taewook Nam, Ph.D. student, 03/2020 -
- Minseon Kim, Ph.D. student, 03/2020 -

- Bruno Andries, Ph.D. student, 03/2020 -
- Junhyun Park, M.S. student, 08/2018 -
- Minki Kang, M.S. student, 03/2020 -
- Dongbok Lee, M.S. student, 09/2019 -
- Divyam Madaan, M.S. student, 09/2019 -
- Jeff Willette, M.S. student, 09/2019 -
- Eunyoung Hyung, M.S. student, 09/2019 -
- Jaewoong Shin, M.S. student, 09/2019 -
- Wongyong Jeong, M.S. student, 03/2020 -
- Jinheon Baek, M.S. student, 03/2020 -
- Minyoung Song, M.S. student, 03/2020 -
- Seanie Lee, M.S. student, 03/2020 -
- Dongchan Min, M.S. student, 09/2020 -
- Seul Lee, M.S. student, 09/2020 -

TEACHING
EXPERIENCE

KAIST

Undergraduate Courses

- Special Topics in Computer Science: Deep Learning (Spring 2018)

Graduate Courses

- Advanced Deep Learning (Spring 2020, Fall 2020)
- Machine Learning for Artificial Intelligence (Fall 2019)
- Advanced Machine Learning (Spring 2019)
- Advanced Machine Learning (Fall 2018)

UNIST

Undergraduate Courses

- Introduction to Algorithm (Fall 2017)
- Special Topics in Computer Science: Deep Learning (Spring 2017)
- Theory of Computation (Fall 2016)
- Machine Learning (Spring 2016)
- Engineering Programming (Fall 2015, Fall 2014)
- Special Topics in Computer Science: Visual Recognition (Spring 2015)

Graduate Courses

- Machine Learning for Healthcare (Fall 2017)
- Advanced Machine Learning (Fall 2016)

PROFESSIONAL
EXPERIENCE

SK Communications (EMPAS), Seoul, South Korea

Lead Staff, System Programmer - Search Department **07/16/2005-01/11/2007**

- Served as a system programmer for the search development team.
- Performed periodic experiments on disk and DB performance, built search logging tools, conducted search log analysis, and reported results.

Comin Information Systems, Gwangju, South Korea

Programmer & Researcher - R&D Department **02/24/2004-07/15/2005**

- Served as a researcher and programmer for several mission-critical projects, including development of a license plate recognition parking system, medical imaging simulator, and 3D graphics engine.

REFERENCES

- Kristen Grauman (grauman@utexas.edu)
- Fei Sha (feisha@usc.edu)
- Sing Bing Kang (sbkang@microsoft.com)
- Ashish Kapoor (akapoor@microsoft.com)
- Leonid Sigal (lsigal@disneyresearch.com)
- Byoung-Tak Zhang (btzhang@bi.snu.ac.kr)
- Seong-Whan Lee (sw.lee@korea.ac.kr)

CITIZENSHIP

- Republic of Korea

DATE OF BIRTH

- February 15th, 1982