

Sang Keun Choe

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🌐 <https://github.com/sangkeun00>

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Research Interests My research interest is to develop methods further improving performance (especially robustness) of neural networks by analyzing generalization capacity of neural networks from the perspective of information theory.

Keywords: Neural networks, robustness, information theory

Education **Carnegie Mellon University** 2018 - 2020
M.S. in Computer Science (Language Technologies) CGPA: 4.11/4.33
Advisor: Jaime Carbonell

Seoul National University 2011 - 2018
B.S. in Electrical Engineering & Mathematics, *Summa Cum Laude* CGPA: 4.07/4.30

Publications Sang Keun Choe*, Quanyang Lu*, Vikas Raunak*, Yi Xu*, and Florian Metze. On Leveraging the Visual Modality for Neural Machine Translation: A Case Study on the How2 Dataset. *In Workshop on How2 Challenge: New Tasks for Vision and Language at ICML*, 2019.

Sang Keun Choe*, Quanyang Lu*, Vikas Raunak*, Yi Xu*, and Florian Metze. On Leveraging Visual Modality for ASR Error Correction. *In Workshop on How2 Challenge: New Tasks for Vision and Language at ICML*, 2019.

Juheon Lee, Sungkyun Chang, Sang Keun Choe, and Kyogu Lee. Coversong Identification using Song-to-song Cross-similarity Matrix with Convolutional Neural Networks. *In ICASSP*, 2018.
(Short version: Workshop on ML4Audio at *NIPS*, 2017)

Research & Work Experience **Carnegie Mellon University** Sep 2018 - Present
Research Assistant Advisor: Prof. Jaime Carbonell
- Working on multitask learning, transfer learning, domain adaptation and continual learning using latent variable disentanglement

HodooAI Apr 2018 - Jul 2018
Research Engineer Advisor: Prof. Jungwoo Lee
- Developed algorithm identifying fake images through adversarial learning and Bayesian learning
- Implemented state-of-the-art image style transfer algorithms and applied it to make-up transfer app

Music and Audio Research Group Jun 2017 - Dec 2017
Undergraduate Research Assistant Advisor: Prof. Kyogu Lee
- Developed cover-song identification algorithm using convolutional neural networks
- Developed content-based image retrieval algorithm by learning multi-level representation of images

Ministry of National Defense of Republic of Korea Oct 2014 - Jul 2016
- Served as an information technology specialist at Republic of Korea Army Headquarters

Cryptography and Coding Laboratory Jan 2013 - Dec 2013
Undergraduate Research Assistant Advisor: Prof. Jong-Seon No
- Completed undergraduate thesis on distributed space-time code in cooperative communication
- Analyzed the performance of wireless relaying protocol in cooperative communication, especially between AF (Amplify-and-Forward) protocol and DF (Decode-and-Forward) protocol

Projects **Music Instrument Conversion by Disentangling Latent Variables of Hierarchical VAE**
- Developed a novel hierarchical CNN-RNN VAE architecture achieving state-of-the-art reconstruction error on sequential data including music
- Significantly improved evidence lower bound (ELBO) of variational inference with carefully designed scheduled annealing and controllable capacity techniques

Applying Capsule Networks to Dialogue Systems
- Developed novel stacked capsule sequence-to-sequence models for neural dialogue systems achieving state-of-the-art BLEU score on MultiWoz multi-domain dialogue dataset

Visually Grounded Speech Recognition and Machine Translation
- Developed visually grounded error correction model and rescoring scheme for speech recognition improving word error rate on How2 dataset
- Devised multimodal attention modulation and semantic regularizer using optimal transport improving BLEU score on How2 dataset

Honors & Awards	Kwanjeong Scholarship for Graduate Study (\$30,000/yr)	2018 - 2020
	Best Undergraduate Engineering Student Award , Seoul National University	2018
	Presidential Scholarship for Science and Engineering Study	2011 - 2017
	Gold Award (Top-7 nationwide), Korea University Student Mathematical Competition	2011
	Silver Award , Korea Mathematical Olympiad	2010
Relevant Coursework	Carnegie Mellon University: Introduction to Deep Learning, Machine Translation and Sequence-to-sequence Models, Graduate AI, Large scale Multimedia Analysis, Algorithms for NLP, Intermediate Statistics	
	Seoul National University: Convex Optimization, Information Theory	
Skills	Human Language: English (Proficient), Korean (Native)	
	Programming Language: Python, Java, Matlab, C++, HTML, \LaTeX	
	Machine Learning API: PyTorch, Tensorflow	