Sang Keun Choe

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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

Juheon Lee, Sungkyun Chang, Sang Keun Choe, and Kyogu Lee. Coversong Identification using Song-to-song Cross-similarity Matrix with Convolutional Nueral Networks. *In ICASSP*, 2018.

Sungkyun Chang, Juheon Lee, Sang Keun Choe, and Kyogu Lee. Audio Coversong Identification using Convolutional Neural Networks. *In NIPS ML4A Workshop*, 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