



Faculty



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서울대학교 전기정보공학부 부교수
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2013.9.1 서울대학교 전기정보공학부 부임
2009.6 ~ 2013.8 KAIST 전산학과 조교수
전자과 및 수학과 겸직교수

2009.6 Ph.D at MIT

- 2016 여름, MIT EECS 방문교수
- 2013.5 한국연구재단 Excellent New Faculty Funding 선정
- 2010, 2009 여름, Microsoft Research Cambridge 방문교수
- 2006, 2007, 2008 여름, Microsoft Research Cambridge, IBM T.J. Watson, Bell Labs 연구 인턴쉽
- 2003 겨울, Microsoft Research Redmond 방문연구원
- 2003년 8월 서울대학교 수학과 학부 졸업
- 1996년 서울과학고등학교 졸업
- 1995년 국제 수학올림피아드(IMO) 금메달

Members

Ph.D. Candidates

이동현	신중보	김세광	최병진	황용근	이환희
곽희영	김양훈	원승필	윤현구	김준영	강태관

M.S. Candidates

이민우 김용일 이윤형 배현경

Recent Accomplishments

- **Top Journals & Conferences** : published more than 30 papers at world best journals and conferences since 2009 including IEEE PAMI, IEEE Transactions on Information Theory, IEEE/ACM Transactions on Mobile Computing, SIAM Journal on Computing, SIDMA, ICML, NIPS, UAI, AAAI, SIGMETRICS, INFOCOM, ICDE, and ICDM.
- Honor Prizes, The 18th and 19th Samsung Electronics Humantech Thesis Prize (advisor), 2012 and 2013

Research Topics

Machine Translation with Deep Learning (DL)

We are currently developing a multi-lingual word embedding for Korean, English and Chinese, that can assist sentence sequence based LSTM-RNN deep learning machine translation structure to capture the meaningful elements efficiently. The goal of this study is to introduce the word representation that captures similar semantic/grammatical features among different languages. This is a joint work with Samsung Advanced Institute of Technology.

Question and Answer system with DL

Question answering system has long been considered a primary objective of artificial intelligence. The advancement of the QA system has attracted huge interests from the academic and industry community these days. We have been working on developing ranking algorithms that can select the best answer among the candidates. We also investigate the human-like QA system that generates answers in the natural language form in aligning with the given context. Furthermore, our research aims to fully incorporate an external knowledge to the QA system for integrating deep neural network-based model and human-generated expertise knowledge-base.

Context Aware Dialogue System DL

There has been growing interest in human-like dialogue system such as Apple Siri, Google Assistant and other intelligence assistant services. However, current chat-bots tend to be incapable of recognizing the emotion or context of utterances, often causing irritation and inconvenience. To overcome these difficulties, we are developing a Deep Learning-based dialogue model that can understand varying emotions and longitudinal context from dialogues. This is a joint work with Social Computing Lab at KAIST

Speech Recognition system with DL

As Deep Neural Networks (DNNs) have led to significant improvements in Automatic Speech Recognition (ASR), we currently study on developing the ASR system further using additional modalities such as text or image. To increase the recognition accuracy, we do research on combining the ASR system with a Language Model that can evaluate the naturalness of a sentence. It can help the model choose a more plausible sentence between the sentences having similar pronounce. Furthermore, we study on effectively extracting and combining the information from additional modalities in the ASR systems.

Deep Learning for Logical Inference

In contrast to ground-breaking achievements of current deep learning in recognition domains, a growing body of literature suggests that deep models cannot extend rules in logical inference tasks for test instances that follow a distinct distribution from training data. Unless deep models can do such logical inference, designing mathematical solvers that can handle variables within an unprecedented range, developing context-aware question and answering machines that track relevant sentences within the evolving dialogue, and implementing high-level code processors that understand user-defined algorithms written by programming language would be impossible. The goal of this research is to make neural networks do systematic, i.e., rule-based, generalization via combining learned rules, rather than mimic training data distribution. This is a joint work with Samsung Research Funding & Incubation Center for Future Technology.

