Taehoon Kim

https://carpedm20.github.io/

INTERESTS

Program Induction, Reasoning, Reinforcement Learning

EDUCATION

Ulsan National Institute of Science and Technology (UNIST)

Mar 2011 - Aug 2015

- B.S. in Computer Science and Engineering
- Cumulative GPA: 3.73 / 4.30 (Magna Cum Laude)
- Graduated with Outstanding Graduate Award (ranked 1st out of 509 undergraduates)

HONORS & AWARDS

Best Paper Award, International Conference on Big Data Intelligence and Computing (DataCom) 2015

Outstanding Graduate Award, UNIST, 2015

Dean's List, UNIST, 2013, 2014

Finalist, International Student Cluster Challenge, International Conference on Supercomputing (ICS), 2014

Finalist, Asia student Supercomputing Challenge (ASC), 2014

Finalist, Korea Whitehat Hacking Competition, 2014

3rd place (\$ 8,000 as awards), Korea Whitehat Hacking Competition, 2013

1st place (\$ 1,000 as awards), The Catholic University of Korea Hacking Competition, 2013

Finalist, Asia student Supercomputing Challenge (ASC), 2013

SCHOLARSHIP

Academic Performance Scholarship, UNIST, 2011 – 2015

Global Scholarship for Undergraduate Research Opportunities Program (UROP), UNIST, 2015

National Science and Technology Scholarship, Korean Student Aid Foundation, 2013

PUBLICATIONS

- [5] T. Kim[†], Y. Lee[†] and J. Lim, Teaching Machines to Understand Visual Manuals via Attention Supervision for Object Assembly, Work in progress, 2017
- [4] <u>T. Kim</u>, J. Choi, D. Lee, A. Sim, C. A. Spurlock, A. Todd, K. Wu, Predicting Baseline for Analysis of Electricity Pricing, In *International Journal of Biq Data Intelligence* (**IJBDI**), 2016
- [3] J. Lee, K. Lee, C. Han, <u>T. Kim</u>, and S. Chong, Resource-efficient Mobile Multimedia Streaming with Adaptive Network Selection, In *IEEE Transactions on Multimedia*, 2016
- [2] <u>T. Kim</u> and J. Choi, Reading documents for bayesian Online Change Point Detection, In *Empirical Methods in Natural Language Processing* (**EMNLP**), 2015
- [1] <u>T. Kim</u>, D. Lee, J. Choi, A. Spurlock, A. Sim, A. Todd, K. Wu, Extracting Baseline Electricity Usage Using Gradient Tree Boosting, In *International Conference on Big Data Intelligence and Computing* (**DataCom**), 2015, **Best Paper Award**

RESEARCH EXPERIENCE

University of Southern California, Los Angeles, USA

Jan 2017 - Present

Visiting Researcher (Advisor: Prof. Joseph J. Lim)

• Developed attention-based agents which are guided by step-by-step visual instructions to solve hierarchical tasks such as assembling IKEA furniture. Trained agents with self-supervision and semi-supervised learning to achieve generalization of unseen shapes and colors [5].

Lawrence Berkeley National Laboratory, Berkeley, USA

Jul 2015 - Aug 2015

Research Intern (Advisors: John Wu, Alex Sim)

• Developed baseline models of electricity usage data to find reference usage patterns for different household groups. Used gradient boosting algorithm to capture differences of daily peak usages between groups and analyzed baseline of each group by controlling highly correlated features [1, 4].

Statistical Artificial Intelligence Lab, UNIST, South Korea

Sep 2014 – Sep 2015

Research Intern (Advisor: Prof. Jaesik Choi)

• Improved Bayesian changepoint detection models by incorporating external information implicitly written in texts. Incorporated documents as a conditional variable of changepoint prior so that model learns a generative model of texts which represents a relation between textual features and change of data [2].

Mobile Smart Networking Laboratory, UNIST

Research Intern (Advisor: Prof. Kyunghan Lee)

• Implemented algorithm for mobile video streaming with context-aware scheduling and caching [3].

INDUSTRY EXPERIENCE

Devsisters, Seoul, South Korea

Apr 2016 - Present

Jan 2013 – Aug 2014

XPERIENCE Research Engineer

- Developed framework for automatic game balancing with deep reinforcement learning including Double Q-learning, Dueling Network, and Prioritized Replay Memory.
- Implemented generative adversarial networks and multi-speaker speech synthesis models.
- Worked as a substitute for mandatory military service.

Vingle, Seoul, South Korea

Software Engineer

Oct 2015 – Apr 2016

- Developed system for personal push notification and statistical data visualization of user retention.
- Worked as a substitute for mandatory military service.

Moloco, California, USA

Oct 2014 – Jan 2015

Software Engineering Intern

- Implemented prediction models that target advertisements of mobile application based on purchase history.
- Developed online data visualization with a large-scale database using cache and query optimization.

NAVER Labs, Seoul, South Korea

Jul 2014 - Aug 2014

Software Engineering Intern

• Developed front-end and back-end of web application for cloud comments.

TALKS

DEVIEW 2016 & **2017**, Seoul, South Korea

2016, 2017

- Multi-Speaker Speech Synthesis with Attention-Based Deep Learning.
- How to build a Framework for Automatic Game Balancing with Deep Reinforcement Learning.

NAVER Clova AI, Seoul, South Korea

2017

• Recent Advancement of Deep Reinforcement Learning from Multi-Agent to Meta-Learning.

PyCon APAC 2016, Seoul, South Korea

2016

• Deep Convolutional GAN, Neural Turing Machine, Deep Q-learning and Visual Analogy.

TensorFlow Korea, Seoul, South Korea

2016

• End-to-End Memory Network and Asynchronous Advantageous Actor-Critic method.

LEADERSHIP

President of Computer Security Club, UNIST

2012 - 2013

- \bullet Led teams for domestic and international hacking competitions (\$ 9,000 as total awards).
- Participated in 3 international supercomputing challenges (3 Finalist awards).
- Reported vulnerabilities on 3 commercial mobile and web services.

PROJECTS

GENERATIVE

DCGAN in TensorFlow (★ 3.4k+*)

Jan 2016

Implemented Deep Convolutional Generative Adversarial Networks (Radford et, al. 2015) and web demo with *convnet.js* The code is referenced in more than 25 papers including:

- Improved Techniques for Training GANs (Salimans et, al. 2016) from OpenAI
- Least Squares Generative Adversarial Networks (Mao et, al. 2016)
- Semi-supervised learning with generative adversarial networks (Odena et, al 2016)

BEGAN in TensorFlow (★ 500+)

Apr 2017

Implemented BEGAN: Boundary Equilibrium Generative Adversarial Networks (Berthelot et, al. 2017) The code is used in the following papers:

- GANs Trained by a Two Time-Scale Update Rule Converge to a Nash Equilibrium (Heusel et, al 2017)
- MAGAN: Margin Adaptation for Generative Adversarial Networks (Wang et, al. 2017)

Multi-Speaker Speech Synthesis in TensorFlow (★ 100+)

Oct 2017

Implemented Deep Voice 2: Multi-Speaker Neural Text-to-Speech (Berthelot et, al. 2017)

^{*}The number of stars a repository has on github.com/carpedm20

BEGAN in PyTorch (★ 200+) Implemented BEGAN: Boundary Equilibrium Generative Adversarial Networks (Berthelot et, al. 2017)	Apr 2017
DiscoGAN in PyTorch (★ 600+) Implemented Learning to Discover Cross-Domain Relations with Generative Adversarial Networks (Kim e	Mar 2017 t, al. 2017)
Simulated+Unsupervised learning in TensorFlow (★ 400+) Implemented Learning from Simulated and Unsupervised Images through Adversarial Training (Shrivastav	Jan 2017 a et, al. 2016)
Pixel Recurrent Neural Networks (★ 300+) Implemented Pixel Recurrent Neural Networks (Oord et, al. 2016)	Jul 2016
Deep Visual Analogy-Making in TensorFlow (★ 200+) Implemented Deep Visual Analogy-Making (Reed et, al. 2015)	Feb 2016
Reinforcement Learning Program Synthesis in TensorFlow Implemented Leveraging Grammar and Reinforcement Learning for Neural Program Synthesis (Under revi	Dec 2017 iew, 2017)
Pointer Network in TensorFlow (★ 200+) Implemented Pointer Networks (Vinyals et, al. 2015)	Jan 2017
Neural Turing Machine in TensorFlow (★ 700+) Implemented Neural Turing Machine (Graves et, al. 2014) in TensorFlow	Dec 2015
Efficient Neural Architecture Search via Parameters Sharing in PyTorch Implemented Efficient Neural Architecture Search via Parameters Sharing (Gu et, al. 2018)	Feb 2018
Normalized Advantage Functions in TensorFlow (★ 100+) Implemented Continuous Deep Q-Learning with Model-based Acceleration Learning (Pham et, al. 2016)	Jul 2016
Dueling Network in TensorFlow (★ 1k+) Implemented Dueling Network Architectures for Deep Reinforcement Learning (Wang et, al. 2015)	Jul 2016
Deep Q-network in TensorFlow (★ 1.3k+) Implemented Human-Level Control through Deep Reinforcement Learning (Vinyals et, al. 2015)	Jun 2016
Asynchronous Advantageous Actor-Critic in TensorFlow Implemented Asynchronous Methods for Deep Reinforcement Learning (Mnih et, al. 2016)	Jun 2016
Neural Variational Inference for Text Processing in TensorFlow (★ 400+) Implemented Neural Variational Inference for Text Processing (Miao et, al. 2015) The code is used in the following papers: • Autoencoding Variational Inference For Topic Models (Srivastava et, al. 2017) • Neural Variational Inference For Topic Models (Srivastava et, al. 2016)	May 2016
Character-Aware Neural Language Models in TensorFlow (★ 500+)	Feb 2016

Implemented Character-Aware Neural Language Models (Kim et, al. 2016)

End-To-End Memory Networks in TensorFlow (★ 500+)

Dec 2015

Implemented End-To-End Memory Networks (Sukhbaatar et, al. 2015)

REFERENCES

PROGRAM INDUCTION

RL

NLP

Joseph J. Lim John Wu Assistant Professor Group Leader Department of Computer Science Scientific Data Management Group University of Southern California Lawrence Berkeley National Laboratory Email: lim@csail.mit.edu Email: kwu@lbl.gov

Jaesik Choi **Alex Sim**

Associate Professor Senior Computing Engineer School of Electrical and Computer Engineering Scientific Data Management Group Ulsan National Institute of Science and Technology Lawrence Berkeley National Laboratory Email: jaesik@unist.ac.kr

Email: asim@lbl.gov