# 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 1<sup>st</sup> 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

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

1<sup>st</sup> 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<sup>†</sup>, Y. Lee<sup>†</sup> 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

RIENCE 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 (★ 3.3k+\*)

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)

<sup>\*</sup>The number of stars a repository has on github.com/carpedm20

**BEGAN in PvTorch** (★ 200+)

Apr 2017

Implemented BEGAN: Boundary Equilibrium Generative Adversarial Networks (Berthelot et, al. 2017)

**DiscoGAN in PyTorch** (★ 500+)

Mar 2017

Implemented Learning to Discover Cross-Domain Relations with Generative Adversarial Networks (Kim et, al. 2017)

Simulated+Unsupervised learning in TensorFlow (★ 300+)

Jan 2017

Implemented Learning from Simulated and Unsupervised Images through Adversarial Training (Shrivastava et, al. 2016)

Pixel Recurrent Neural Networks (★ 300+)

Jul 2016

Implemented Pixel Recurrent Neural Networks (Oord et, al. 2016)

**Deep Visual Analogy-Making in TensorFlow (★** 200+)

Feb 2016

Implemented Deep Visual Analogy-Making (Reed et, al. 2015)

RL Normalized Advantage Functions in TensorFlow (★ 100+)
Implemented Continuous Deep Q-Learning with Model-based Acceleration Learning (Gu et, al. 2016)

Jul 2016

**Dueling Network in TensorFlow (★ 1k+)** 

Jul 2016

Implemented Dueling Network Architectures for Deep Reinforcement Learning (Wang et, al. 2015)

**Deep Q-network in TensorFlow (★ 1.3k+)** 

Jun 2016

Implemented Human-Level Control through Deep Reinforcement Learning (Vinyals et, al. 2015)

Asynchronous Advantageous Actor-Critic in TensorFlow

Jun 2016

Implemented Asynchronous Methods for Deep Reinforcement Learning (Mnih et, al. 2016)

Neural Variational Inference for Text Processing in TensorFlow (★ 400+) Implemented Neural Variational Inference for Text Processing (Miao et, al. 2015)

May 2016

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)

Character-Aware Neural Language Models in TensorFlow (  $\bigstar$  500+)

Feb 2016

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

**End-To-End Memory Networks in TensorFlow** (★ 500+) Implemented End-To-End Memory Networks (Sukhbaatar et, al. 2015)

Dec 2015

**ETC Pointer Network in TensorFlow (★** 100+)

Jan 2017

Implemented Learning to Discover Cross-Domain Relations with Generative Adversarial Networks (Kim et, al. 2015)

**Neural Turing Machine in TensorFlow (★** 700+)

Dec 2015

Implemented Neural Turing Machine (Graves et, al. 2014) in TensorFlow

**Reverse Engineering**, LINE, KakaoTalk, Between, Ndrive, and Korail (★ 600+)

Aug 2014

Reverse engineered 5 commercial services including 2 mobile messengers, LINE and KakaoTalk and wrote python libraries

REFERENCES

NLP

Joseph J. Lim

**John Wu** Group Leader

Assistant Professor

Scientific Data Management Group

Department of Computer Science University of Southern California

Lawrence Berkeley National Laboratory

Email: lim@csail.mit.edu

Email: kwu@lbl.gov

Phone: +1 (640) 353-6737

Phone: +1 (510) 486-6609

Jaesik Choi

Alex Sim

Associate Professor

Senior Computing Engineer

School of Electrical and Computer Engineering Ulsan National Institute of Science and Technology Scientific Data Management Group Lawrence Berkeley National Laboratory

Email: jaesik@unist.ac.kr

Email: asim@lbl.gov

Phone: +82 (010) 7216-9768

Phone: +1 (510) 495-2290