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] <u>T. Kim</u>[†], 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 Big 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   Jan 2013 – Aug 2014
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
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
  • 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)

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[*]The number of stars a repository has on github.com/carpedm20

BEGAN in PyTorch (★ 200+)   Apr 2017
Implemented BEGAN: Boundary Equilibrium Generative Adversarial Networks (Berthelot et, al. 2017)

DiscoGAN in PyTorch (★ 600+)   Mar 2017
Implemented Learning to Discover Cross-Domain Relations with Generative Adversarial Networks (Kim et, al. 2017)

Simulated+Unsupervised learning in TensorFlow (★ 400+)   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)

PROGRAM INDUCTION

Reinforcement Learning Program Synthesis in TensorFlow   Dec 2017
Implemented Leveraging Grammar and Reinforcement Learning for Neural Program Synthesis (Under review, 2017)

Pointer Network in TensorFlow (★ 200+)   Jan 2017
Implemented Pointer Networks (Vinyals et, al. 2015)

Neural Turing Machine in TensorFlow (★ 700+)   Dec 2015
Implemented Neural Turing Machine (Graves et, al. 2014) in TensorFlow

RL

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

NLP

Neural Variational Inference for Text Processing in TensorFlow (★ 400+)   May 2016
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)

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

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
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