

Haekyu Park

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My research focuses on **democratizing artificial intelligence (AI)** – helping people more easily access, learn, and understand AI technologies. Specifically, I design and build **interactive visual tools** to help people easily **interpret, explore, and apply AI** to many important domain problems. My long-term goal is to cultivate an AI ecosystem where people of diverse backgrounds, skill sets, and domains would work harmoniously to invent the next AI-powered innovations.

Education	Ph.D., Computer Science Georgia Institute of Technology, Atlanta, GA Advisor: Dr. Polo Chau	Aug 2018 - Present
	B.S., Computer Science and Engineering Seoul National University, Seoul, Republic of Korea Graduated with honors (Cum Laude)	Mar 2012 - Aug 2017
Research Experience	Data Science Intern NVIDIA, Austin, TX Mentor: Bartley Richardson, Brad Rees, Joe Eaton Internship results are integrated into NVIDIA RAPIDS team's cybersecurity use case notebook , presented at KDD 2019 NVIDIA RAPIDS tutorial .	May 2019 - Aug 2019
	Graduate Research Assistant Georgia Institute of Technology, Atlanta, GA	Aug 2018 - Present
	Undergraduate Research Assistant Seoul National University, Seoul, Republic of Korea	June 2016 - Aug 2017
Honors and Awards	"Thank a Teacher" Award Center for Teaching & Learning (CTL), Georgia Institute of Technology	2019
	WiML Travel Funding \$550 Travel Funding for Women in Machine Learning Workshop, co-located with NeurIPS	2019
	Amazon AWS Research Grant Co-PIs: Nilaksh Das, Scott Freitas, Duen Horng Chau Funded \$5,000 in AWS cloud credits	2018
	National Scholarship For Science and Engineering Merit-based	2015
Publications	Massif: Interactive Interpretation of Adversarial Attacks on Deep Learning Nilaksh Das*, Haekyu Park* , Zijie J. Wang, Fred Hohman, Robert Firstman, Emily Rogers, Duen Horng Chau Extended Abstracts; ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020. *Authors contributed equally. [PDF]	
	CNN 101: Interactive Visual Learning for Convolutional Neural Networks Zijie J. Wang, Robert Turko, Omar Shaikh, Haekyu Park , Nilaksh Das, Fred Hohman, Minsuk Kahng, Duen Horng Chau Extended Abstracts; ACM Human Factors in Computing Systems (CHI). Honolulu, HI, USA, 2020. [PDF]	

Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations
Fred Hohman, [Haekyu Park](#), Caleb Robinson, Duen Horng Chau
IEEE Transactions on Visualization and Computer Graphics (TVCG). 2020.
[\[PDF\]](#) [\[Demo\]](#)

Visual Analytics for Interpretability on Deep Neural Networks
[Haekyu Park](#), Fred Hohman, Nilaksh Das, Caleb Robinson, Duen Horng Chau
Women in Machine Learning Workshop (WiML), 2019.
[\[PDF\]](#) [\[Poster\]](#)

MLsplot: A Framework for Interactive Experimentation with Adversarial Machine Learning Research
Nilaksh Das, Siwei Li, Chanil Jeon, Jinho Jung, Shang-Tse Chen, Carter Yagemann, Evan Downing, [Haekyu Park](#), Evan Yang, Li Chen, Michael Kounavis, Ravi Sahita, David Durham, Scott Buck, Duen Horng Chau, Taesoo Kim, Wenke Lee
Knowledge Discovery and Data Mining (KDD) Workshop - Project Showcase, 2019.
[\[PDF\]](#)

NeuralDivergence: Exploring and Understanding Neural Networks by Comparing Activation Distributions
[Haekyu Park](#), Fred Hohman, Duen Horng Chau
Poster, IEEE Pacific Visualization Symposium (PacificVis), 2019.
[\[PDF\]](#) [\[Demo\]](#)

SIDE: Representation Learning in Signed Directed Networks
Junghwan Kim, [Haekyu Park](#), Ji-Eun Lee, and U Kang
The Web Conference (WWW), 2018.
[\[PDF\]](#) [\[Website\]](#)

A Comparative Study of Matrix Factorization and Random Walk with Restart in Recommender Systems
[Haekyu Park](#), Jinhong Jung, and U Kang
IEEE Big Data, 2017.
[\[PDF\]](#) [\[Website\]](#)

Talks and Presentations

Accelerated Data Science in the Classroom: Teaching Analytics and Machine Learning with RAPIDS
Polo Chau and [Haekyu Park](#)
Mar 2020, Talk, NVIDIA's GPU Technology Conference (GTC)

NeuralDivergence: Exploring and Understanding Neural Networks by Comparing Activation Distributions
Apr 2019, Poster Presentation, PacificVis

A Comparative Study of Matrix Factorization and Random Walk with Restart in Recommender Systems
Dec 2017, Oral Presentation, IEEE Big Data

Tutorial

RAPIDS and Cybersecurity: A Network Use Case 2019
Keywords: RAPIDS, NVIDIA, GPU-acceleration, Graph, Personalized Page Rank
Presented at [KDD 2019 NVIDIA RAPIDS tutorial](#) with the [cybersecurity use case notebook](#).

Teaching

Graduate Teaching Assistant Fall 2019
Georgia Institute of Technology, Atlanta, GA
Data and Visual Analytics (CSE 6242)
Designed homeworks, held weekly office hours, and mentored student team projects for 264 students.
Instructor: Polo Chau

Mentoring	Rob Firstman B.S. in Computer Science, Georgia Institute of Technology Visualization for deep learning interpretability	Fall 2019 - Present
	Robert Turko B.S. in Computer Science, Georgia Institute of Technology Visualization for machine learning education	Fall 2019 - Present
	Omar Shaikh B.S. in Computer Science, Georgia Institute of Technology Visualization for natural language processing	Fall 2019 - Present
Open-source Research Projects	<p>Summit: Scaling Deep Learning Interpretability by Visualizing Activation and Attribution Summarizations Interactive visualization that scalably summarizes what features a deep learning model has learned and how those features interact to make predictions. It was published at IEEE VIS (VAST), 2019. Fred Hohman, Haekyu Park, Caleb Robinson, Duen Horng Chau [Demo]</p> <p>MLsploit: A Framework for Interactive Experimentation with Adversarial Machine Learning Research User-friendly, cloud-based system that enables researchers and practitioners to rapidly evaluate and compare state-of-the-art adversarial attacks and defenses for machine learning (ML) models. It was published at a KDD 2019 Project Showcase.</p> <p>SIDE: Representation Learning in Signed Directed Networks General network embedding method that represents both sign and direction of edges in the embedding space. It was published at the Web Conference (WWW), 2018.</p> <p>A Comparative Study of Matrix Factorization and Random Walk with Restart in Recommender Systems We provide a comparative study of matrix factorization and RWR, which are the most representative recommender systems. It was published at IEEE Big Data, 2017.</p>	
Professional Service	<p>Reviewer WiML 2019 KDD 2019 ICML 2019</p> <p>Professional Membership The Institute of Electrical and Electronics Engineers (IEEE). Since 2019.</p>	
Projects	<p>RAPIDS and Cybersecurity: A Network Use Case Keywords: RAPIDS, NVIDIA, GPU-acceleration, Graph, Personalized Page Rank Presented at KDD 2019 NVIDIA RAPIDS tutorial with the cybersecurity use case notebook.</p> <p>Recommender System for Videos on Oksusu Application Keywords: Deep Learning, Sequence/Word Embedding, Approx. k-NN, Heterogeneous Features SK Telecom, Seoul, Republic of Korea</p> <p>A Fast Data Compression with Shared Virtual Memory in Heterogeneous System Architecture Keywords: OpenCL, GPGPU, SVM, HSA Undergraduate thesis</p> <p>Personalized Recommendation for Credit Card Rewards Keywords: Coupled Matrix Factorization, Time Series Data Hyundai Card, Seoul, Republic of Korea</p>	2019 2017 2017 2016

Skills

Programming Languages

Python, JavaScript, HTML, R, Matlab, Java, C, C++, Ocaml, Scheme

Machine Learning / Deep Learning / Data Science

TensorFlow, PyTorch, Keras, scikit-learn, OpenCV, Numpy, Pandas, SciPy, NetworkX

GPU-accelerated Data Science

cuGraph, cuDF, cuML, BlazingSQL, OpenCL

Data Visualization

D3.js, HoloViews, Matplotlib, WebGL, ggplot