JUSTIN S. KANG

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I am a hardworking and effective researcher with a strong quantitative background. I have a diverse skill set and enjoy finding creative solutions to problems in deep learning. My most recent work (below), approaches explaining LLMs with ideas from information theory and signal processing.

PUBLICATIONS AND PRE-PRINTS

Learning to Understand: Identifying Interactions via the Mobius Transforms

Justin Singh Kang, Y.E. Erginbas, L. Butler, R. Pedarsani, K. Ramchandran

- Submitted for publication, 2024. Pre-print available.

Learning a 1-Layer Conditional Generative Model in Total Variation

A. Jalal, Justin Singh Kang, A. Uppal, K. Ramchandran, and E. Price

- Presented at NeurIPS, 2023.

The Fair Value of Data Under Heterogeneous Privacy Constraints in Federated Learning

Justin Singh Kang, R. Pedarsani and K. Ramchandran

- Presented at NeurIPS Federated Learning@FM, 2023. TMLR, 2024.

Efficiently Computing Sparse Fourier Transforms of q-ary Functions

Justin Singh Kang*, Y. E. Erginbas*, A. Aghazadeh and K. Ramchandran

- Presented at IEEE ISIT, 2023. *=equal contribution.

Scheduling versus Contention for Massive Random Access in Massive MIMO Systems

Justin Singh Kang and W. Yu

- Published in IEEE Transactions on Communications, Sep 2022.

Minimum Feedback for Collision-Free Scheduling in Massive Random Access

Justin Singh Kang and W. Yu

- Published in IEEE Transactions on Information Theory, Dec 2021.
- Winner of the prestigious 2024 IEEE ITSoc & ComSoc Joint Paper Award.

WORK EXPERIENCE

Student Researcher
Google

📅 May 2024 – August 2024　　📍 Mountain View, California

Designing explainable embeddings of programs for Google cloud platforms. Enabling optimized routing and performance prediction while maintaining human understanding. My research is part of the Google Cloud Systems Research Group (SRG), led by Prof. David Culler.

Research and Development Engineering Intern
Intel

📅 April 2017 – August 2018　　📍 Vancouver, Canada

Design and optimization of error correction for SSD controllers using information theory, error coding theory and architectural improvements. Research resulted in US Patent 11146289B2.

SKILLS

Languages: Python, MATLAB, Git, LaTeX, (hardware) SystemVerilog, UVM
Domains: Machine Learning, Data Science, Explainabile AI, Data Valuation

EDUCATION

PhD in EECS
With Prof. Kannan Ramchandran
GPA: 4.0, Berkeley Graduate Fellow
UC Berkeley, 2021-present

MASc Electrical Engineering
With Prof. Wei Yu
GPA: 4.0, Canadian Graduate Scholarship
University of Toronto, 2021

BASc Engineering Physics
GPA: 91.1%, Activities: President of Engineering Physics Student Association
University of British Columbia, 2019

SELECTED AWARDS

- IEEE Information Theory Society and Communication Society Joint Paper Award, 2024
- Meta AI-BAIR Grant, 2023
- Berkeley Graduate Fellowship, 2021
- NSERC CGS-D (3rd nationally in area), 2021
- Trek Execellence Scholarship (5x), 2014-19
- Bycast Award, Entrepreneurship, 2018
- Donald J. Evans Scholarship (2x), 2017-18

PROJECTS

Efficient Machine Unlearning
Meta-BAIR Program, Sep 2023 – present

- Developing new tools for unlearning algorithms, which are used to remove traces of data that was originally in the training set.
- Exploiting embedding geometry to understand which points are more or less important to unlearn.

Fitness Tracking with Machine Vision
Jan 2018 – Apr 2019

- Entrepreneurial project on training a neural network model to classify 11 different exercises from video inputs.
- Awarded $10,000+ in grants, resulted in a short-lived start-up.