HOANG ANH JUST

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EDUCATION

Virginia Polytechnic Institute and State University, Blacksburg, VA — Fall 2021 - Present
Doctor of Philosophy in Computer Engineering

- **Advisor**: Prof. Ruoxi Jia

Gettysburg College, Gettysburg, PA — Fall 2017 - Spring 2021
Bachelor of Science in Computer Science and Mathematics

- **GPA**: 4.1/4.3 **CS GPA**: 4.1/4.3 **MATH GPA**: 4.1/4.3

FOCUS AREAS

Data {Valuation, Selection, Quality, Efficiency, Synthetis, Curation}

RESEARCH EXPERIENCE

Virginia Tech Graduate Research Assistent — Fall 2021 - Present
Mentor: Prof. Ruoxi Jia

Paper Title: Get more for less: Principled Data Selection for Warming Up Fine-Tuning in LLMs

- Developed a scalable data selection method to *pre-fine-tune* a pretrained large language model (LLM) by selecting (unlabeled) data that can shift the source distribution to better align with the target distribution.
- Published at the International Conference on Learning Representations (ICLR), 2024

Paper Title: Performance Scaling via Optimal Transport: Enabling Data Selection from Partially Revealed Sources

- Proposed a performance estimator for a model trained on any data composition given only sample information and a scaling law to predict performance on larger scales, which effectively finds the optimal composition of data sources for any target data size.
- Published at the Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS), 2023
  - ASR Data Selection from Multiple Sources: A Practical Approach on Performance Scaling
    Extension of performance scaling method to automatic speech recognition (ASR) data.
  - Published at the 3rd Efficient Natural Language and Speech Processing (ENLSP-III) Workshop @ NeurIPS, 2023
- Project in **collaboration with Amazon** and **deployed in Amazon's** products.

Paper Title: NARCISSUS: A Practical Clean-Label Backdoor Attack with Limited Information

- Launched an efficient (poisoning 0.5% of the target class and 0.05% of the entire training dataset) and stealthy (hard to detect) backdoor attack, which requires only knowledge of the target class to successfully deploy the attack.
- Published at the ACM Conference on Computer and Communications Security (CCS), 2023

Paper Title: PRIVMON: Real-Time Platform-Agnostic Privacy Leakage Detection for Machine Learning Models

- Established an efficient real-time detection system to membership inference attacks which prevents attackers from inferring sensitive data used for model training.
- Published at the International Symposium on Research in Attacks, Intrusions and Defenses (RAID), 2023

Paper Title: 2D-Shapley: A Framework for Fragmented Data Valuation Algorithms

- Proposed a novel, efficient approach to fine-grained data analysis, which valuates the quality of each feature of each data point with theoretical grounding.
- Published at the International Conference on Machine Learning (ICML), 2023

Paper Title: LAVA: Data Valuation without Pre-Specified Learning Algorithms

- Introduced an efficient data quality valuation method through adopting a modified class-wise Wasserstein distance, which is robust to noisy, mislabeled, and poisoned data without requiring any model training.
- Published at the International Conference on Learning Representations (ICLR), (Spotlight), 2023

Paper Title: ModelPred: A Framework for Predicting Trained Model from Training Data

- Developed a set-function based neural network which can predict model weights from the training dataset of any size. This method enables efficient applications for data valuation, data selection, or data memorization, which requires multiple model re-trainings.
- Published at the IEEE Conference on Secure and Trustworthy Machine Learning (SatML), 2023

Paper Title: Label-Only Model Inversion Attacks via Boundary Repulsion

- Designed a novel practical model inversion attack which recovers sensitive data by accessing only labels of the model output without additional information.
- Published at the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022

Intermediate Research in Mathematics, Gettysburg College January 2020 - May 2021
Mentor: Prof. Béla Bajnok
Paper Title: On perfect bases in finite Abelian groups

- Proved that for sets of size greater than 3, there are no perfect restricted 2-basis in $\mathbb{Z}_n$. Showed that for only sets of size smaller equal to 3 there exists a perfect restricted 2-basis in $\mathbb{Z}_n$, proving by contradiction knowing that $\mathbb{Z}_n$ is closed under both addition and subtraction.
- Published at Involve, a Journal of Mathematics: 12/2022

CURRENT PROJECTS

- Enhancing LLM Reasoning through a Perspective Debiasing Framework
  In Submission
- Data-Centric Human Preference Optimization with Rationales
  In Submission
- Evaluating Critical Thinking in Large Language Models
  In Submission
- Searching for Model's Knowledge Loss After Unlearning
  In Submission
- Data Curation with Synthetic Data Generation
  In Progress
- Real-Time Contribution Measurement of Pretraining Data to Model's Output
  In Progress

TEACHING EXPERIENCE

The Bradley Department of Electrical and Computer Engineering, Virginia Tech Fall 2021 - Fall 2022
Graduate Teaching Assistant

Mathematics Department, Gettysburg College Fall 2018 - Spring 2021
Peer Learning Associate

Computer Science Department, Gettysburg College Fall 2018 - Spring 2021
Teaching Assistant and Grader

WORK EXPERIENCE

Musselman Library, Gettysburg College May 2019 - July 2019
Digital Scholarship Summer Fellow **Supervisor**: R. C. Miessler

- Created the Augmented Reality College tour for mobile application that recognizes the College buildings, shows historical facts about the campus and provides archival photos of the buildings.
- Developed in Unity with Wikitude SDK to support object recognition and image recognition.
- Presented at the Digital Scholarship Student Symposium at Lafayette College: 06/2019.

IT Department, Gettysburg College May 2018 - July 2019
Digital Technology Student Fellow **Supervisor**: Eric Remy

- Created the Virtual Tour of the Lincoln Cemetery in Gettysburg in Virtual Reality in Unity.
- Designed the 3D model of the Lincoln Cemetery using Blender.

- Created the 3D model of the Lincoln Cemetery using drone photogrammetry and PIX4D.
- Presented the project at the Annual Meeting of the Pennsylvania Geographical Society at Villanova University: 11/2018.

PUBLICATIONS

- Get more for less: Principled Data Selection for Warming Up Fine-Tuning in LLMs
  Feiyang Kang, Hoang Anh Just, Yifan Sun, Himanshu Jahagirdar, Yuanzhi Zhang, Rongxing Du, Anit Sahu, Ruoxi Jia
  International Conference on Learning Representations (ICLR), 2024
- Performance Scaling via Optimal Transport: Enabling Data Selection from Partially Revealed Source
  Feiyang Kang*, Hoang Anh Just*, Anit Sahu, Ruoxi Jia
  Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS), 2023
- NARCISSUS: A Practical Clean-Label Backdoor Attack with Limited Information
  Yi Zeng*, Minzhou Pan*, Hoang Anh Just, Lingjuan Lyu, Meikang Qiu and Ruoxi Jia
  ACM Conference on Computer and Communications Security (CCS), 2023
- PRIVMON: Real-Time Platform-Agnostic Privacy Leakage Detection for Machine Learning Models
  Myoengseob Ko, Xinyu Yang, Zhengjie Ji, Hoang Anh Just, Peng Gao, Ruoxi Jia
  International Symposium on Research in Attacks, Intrusions and Defenses (RAID), 2023
- 2D-Shapley: A Framework for Fragmented Data Valuation
  Liu Zhihong*, Hoang Anh Just*, Xiangyu Chang, Xi Chen, Ruoxi Jia
  International Conference on Machine Learning (ICML), 2023
- LAVA: Data Valuation without Pre-Specified Learning Algorithms
  Hoang Anh Just*, Feiyang Kang*, Tianhao Wang, Yi Zeng, Myeongseob Ko, Ming Jin and Ruoxi Jia
  International Conference on Learning Representations (ICLR), 2023 (Spotlight)
- ModelPred: A Framework for Predicting Trained Model from Training Data
  Yingyan Zeng, Tianhao Wang, Si Chen, Hoang Anh Just, Ran Jin, Ruoxi Jia
  IEEE Conference on Secure and Trustworthy Machine Learning (SatML), 2023
- Label-Only Model Inversion Attacks via Boundary Repulsion
  Mostafa Kahla, Si Chen, Hoang Anh Just, Ruoxi Jia
  IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2022
- On perfect bases in finite Abelian groups
  Béla Bajnok, Connor Berson and Hoang Anh Just
  Involve, a Journal of Mathematics, 12/2022
- Opponent Hand Estimation in the Game of Gin Rummy
  Peter Francis*, Hoang Anh Just*, Todd Neller
  AAAI Conference on Artificial Intelligence (AAAI), 2021

SERVICE

Reviewer CVPR 2023, NeurIPS 2023-2024, ENLSP 2023, ICLR 2023-2025, ICML 2024

ACADEMIC HONOR AND AWARD

Virginia Tech College of Engineering Fellowship Spring 2023
Pi Mu Epsilon Mathematics Society Membership Spring 2021-Present
Phi Betta Kappa Honor Society Membership Fall 2020-Present
J. Roger Musselman Award, Provost, Gettysburg College Fall 2020
Paul Mugabi Problem Solving Award, Department of Mathematics, Gettysburg College Fall 2019, Fall 2020