James Seale Smith

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RESEARCH FOCUS

I want to build vision and language systems which learn from data that is from multiple sources and distributions. I am specifically focused on solutions which **reduce re-training** and/or **protect data privacy**. To work towards this goal, I look at problems such as: **lifelong/continual learning**, **knowledge distillation**, **federated learning**, and **low-label classification**.

EDUCATION

PhD in Machine Learning, Georgia Institute of Technology (current)
Advisor: *Dr. Zsolt Kira*
Enrolled: August 2018 | Expected Graduation Date: December 2023

Master of Science in Electrical Engineering, Auburn University (May 2018)
Bachelor of Electrical Engineering, Auburn University (May 2017)

CURRENT PROJECT

Rehearsal-Free Continual Learning of Vision + Language Models

- **Motivation**: How can we continuously update large-scale, pre-trained V+L models to *adapt after deployment* by learning novel data *without destroying existing knowledge*?
- **Impact:** 1) Only train on new data to save drastic compute/memory costs (i.e., no re-training on old data); 2) Protects data privacy by not storing old data; 3) Multi-modal approach to unify vision and text

SELECTED PUBLICATIONS

[1] **James Smith** et al. "CODA-Prompt: COntinual Decomposed Attention-based Prompting for Rehearsal-Free Continual Learning", *arXiv preprint arXiv: 2211.13218*, 2022. [Paper]

[2] **James Smith** et al. "ConStruct-VL: Data-Free Continual Structured VL Concepts Learning", *arXiv preprint arXiv: 2211.09790*, 2022. [Paper]

[3] Paola Cascante-Bonilla, Leonid Karlinsky, **James Smith**, Yanjun Qi, Vicente Ordonez "On the Transferability of Visual Features in Generalized Zero-Shot Learning", *arXiv preprint arXiv: 2211.12494*, 2022. [Paper]

[4] **James Smith***, Junjiao Tian*, Zsolt Kira. "FedFOR: Stateless Heterogeneous Federated Learning with First-Order Regularization", *arXiv preprint arXiv:2209.10537*, 2022. [Paper]

[5] **James Smith**, Junjiao Tian, Yen-Chang Hsu, Zsolt Kira. "A Closer Look at Rehearsal-Free Continual Learning", *arXiv preprint arXiv:2203.17269*, 2022. [Paper]

[6] Yen-Chang Hsu, **James Smith**, Yilin Shen, Zsolt Kira, Hongxia Jin. "A Closer Look at Knowledge Distillation with Features, Logits, and Gradients", *arXiv preprint arXiv:2203.10163*, 2022. [Paper]

[7] Mayank Lunayach, **James Smith**, Zsolt Kira. "Lifelong Wandering: A realistic few-shot online continual learning setting", *CVPR Workshop on Continual Learning*, 2022. [Paper]

[8] **James Smith**, Zachary Seymour, Han-Pang Chiu. "Incremental Learning with Differentiable Architecture and Forgetting Search", *International Joint Conference on Neural Networks (IJCNN)*, 2022. **(oral)** [Paper]

[9] **James Smith**, Yen-Chang Hsu, Jonathan Balloch, Yilin Shen, Hongxia Jin, Zsolt Kira. "Always Be Dreaming: A New Approach for Data-Free Class-Incremental Learning", *International* [Paper] [Code]

*Equal Contribution

Conference on Computer Vision (ICCV), 2021. **(25.9% acceptance rate)**

[10] **James Smith**, Cameron Taylor, Seth Baer, Constantine Dovrolis. "Unsupervised Progressive Learning and the STAM Architecture", *International Joint Conference on Artificial Intelligence (IJCAI)*, 2021. **(13.9% acceptance rate)** [Paper] [Code]

[11] **James Smith**, Yen-Chang Hsu, Jonathan Balloch, Zsolt Kira. "Memory-Efficient Semi-Supervised Continual Learning: The World is its Own Replay Buffer", *International Joint Conference on Neural Networks (IJCNN)*, 2021. **(oral)** [Paper] [Code]

[12] **James Smith**, Bo Wu, Bogdan Wilamowski. "Neural Network Training with Levenberg–Marquardt and Adaptable Weight Compression", *IEEE Transactions on Neural Networks and Learning Systems*, 30(2), 580-587, 2019. [Paper]

RELEVANT EXPERIENCE

Georgia Tech Atlanta, GA — Since Aug 2018
Graduate Research Assistant, College of Computing

MIT-IBM Watson AI Lab Cambridge, MA — Since May 2022
Research Intern, PhD

SRI International Princeton, NJ — May 2021 – Aug 2021
Computer Vision Research Intern, PhD

Radiance Technologies Huntsville, AL — May 2018 – Aug 2018
Machine Learning Intern

Auburn University Auburn, AL — May 2017 – May 2018
Graduate Research Assistant, Department of Electrical and Computer Engineering

Naval Research Laboratories Washington, DC — May 2015 – Aug 2015
Research Intern

HONORS & AWARDS

NSF Graduate Research Fellowship Program Honorable Mention — 2018
Alton B. Zerby and Carl T. Koerner National Outstanding Electrical and Computer Engineering Student Award, L.A. Alumni Chapter IEEE/HKN **(one of two nationwide recipients)** — 2018
President's Award, Samuel Ginn College of Engineering **(single recipient)** — 2017
ECE Outstanding Student of the Year, Auburn University **(single recipient)** — 2017

SERVICE & LEADERSHIP

Leadership

Co-organizer of Continual Causality Bridge Program at AAAI 2023 — 2022-2023
Board Member of ContinualAI — 2022
Co-host of ContinualAI Weekly Seminar Series — 2022
Co-organizer of Georgia Tech ML PhD Student Seminar Series — 2020-2022

Mentoring

Mayank Lunayach (MS) — Jan 2021 – Present
Yash Jakhotiya (MS) — Jan 2022 – Present
Vyshnavi Gutta (MS) — August 2022 – Present