

SAMUEL STEVENS

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RESEARCH INTERESTS

I am broadly interested in foundation-scale models in natural language processing and computer vision. My work is often cross-disciplinary; I combine alternative fields such as cryptography or evolutionary biology with these large, pre-trained models.

EDUCATION

Ohio State University

Ph.D. in Computer Science & Engineering

Advisor: Professor Yu Su

August 2021 - Present

Columbus, OH

Ohio State University (3.93 GPA)

Honors B.S. in Computer Science & Engineering, *Summa Cum Laude*

Honors Research Distinction in Computer Science & Engineering

German Minor

August 2017 - May 2021

Columbus, OH

SELECTED PUBLICATIONS & PREPRINTS

SALSA FRESCA: Angular Embeddings and Pre-Training for ML Attacks on Learning With Errors

Samuel Stevens, Emily Wenger, Cathy Yuanchen Li, Niklas Nolte, Eshika Saxena, Francois Charton, and Kristin Lauter

ePrint Preprint, 2024

- Improves ML attack cost on Learning With Errors by $250\times$ through modeling improvements.

BioCLIP: A Vision Foundation Model for the Tree of Life

Samuel Stevens, Jiaman Wu, Matthew J Thompson, Elizabeth G Campolongo, Chan Hee Song, David Edward Carlyn, Li Dong, Wasila M Dahdul, Charles Stewart, Tanya Berger-Wolf, Wei-Lun Chao and Yu Su

arXiv Preprint, 2023

- Trains and evaluates a CLIP model on 10M image-text pairs for use in ecology and biology.

Memorization for Good: Encryption with Autoregressive Language Models

Samuel Stevens and Yu Su

arXiv Preprint, 2023

- Proposes a novel symmetric encryption algorithm based on language model memorization.

An Investigation of Language Model Interpretability via Sentence Editing

Samuel Stevens and Yu Su

EMNLP BlackboxNLP Workshop: Analyzing and Interpreting Neural Networks for NLP, 2021

- Finds that BERT's attention weights correlate well with human rationales.

RESEARCH EXPERIENCE

Meta

May 2023 - August 2023

Research Scientist Intern, supervised by Kristin Lauter and Francois Charton *Seattle, WA*

- Implemented and validated simpler architecture for the ongoing SALSA project.
- Continued part-time from August 2023 to December 2023.

Self-Attention Interpretability in Sequence Classification

October 2019 - April 2021

Undegraduate Honors Research Thesis

Columbus, OH

- Fine-tuned pre-trained language models on existing sequence classification task.
- Analyzed trends in the attention maps of BERT-based models to quantify differences in interpretability.
- Identified literature gap (no large-scale quantitative measurement of BERT’s interpretability on sequence level classification) and designed experiments leading to a baseline result.

OTHER PUBLICATIONS & PREPRINTS

MMMU: A Massive Multi-Discipline Multimodal Understanding and Reasoning Benchmark for Expert AGI

Xiang Yue, Yuansheng Ni, Kai Zhang, Tianyu Zheng, Ruoqi Liu, Ge Zhang, **Samuel Stevens**, Dongfu Jiang, Weiming Ren, Yuxuan Sun, Cong Wei, Botao Yu, Ruibin Yuan, Renliang Sun, Ming Yin, Boyuan Zheng, Zhenzhu Yang, Yibo Liu, Wenhao Huang, Huan Sun, Yu Su, Wenhui Chen

arXiv Preprint, 2023

A Simple Interpretable Transformer for Fine-Grained Image Classification and Analysis

Dipanjoyoti Paul, Arpita Chowdhury, Xinqi Xiong, Feng-Ju Chang, David Carlyn, Samuel Stevens, Kaiya Provost, Anuj Karpatne, Bryan Carstens, Daniel Rubenstein, Charles Stewart, Tanya Berger-Wolf, Yu Su, Wei-Lun Chao

To appear in ICLR, 2024

Mind2Web: Towards a Generalist Agent for the Web

Xiang Deng, Yu Gu, Boyuan Zheng, Shijie Chen, **Samuel Stevens**, Boshi Wang, Huan Sun and Yu Su

NeurIPS, 2023 (**Spotlight**)

SalsaBot: Towards a Robust and Generalizable Embodied Agent

Chan Hee Song, Jiaman Wu, Ju-Seung Byeon, Zexin Xu, Vardaan Pahuja, Goonmeet Bajaj, **Samuel Stevens**, Ziru Chen and Yu Su

4th Embodied AI Workshop, CVPR 2023

Roll Up Your Sleeves: Working with a Collaborative and Engaging Task-Oriented Dialogue System

Lingbo Mo, Shijie Chen, Ziru Chen, Xiang Deng, Ashley Lewis, Sunit Singh, **Samuel Stevens**, Chang-You Tai, Zhen Wang, Xiang Yue, Tianshu Zhang, Yu Su, and Huan Sun

SIGDIAL, 2023

Bootstrapping a User-Centered Task-Oriented Dialogue System

Shijie Chen, Ziru Chen, Xiang Deng, Ashley Lewis, Lingbo Mo, **Samuel Stevens**, Zhen Wang,

Xiang Yue, Tianshu Zhang, Yu Su and Huan Sun
1st Proceedings of Alexa Prize TaskBot, 2022

arXivEdits: Understanding the Human Revision Process in Scientific Writing
Chao Jiang, Wei Xu and **Samuel Stevens**
EMNLP, 2022

ENGINEERING EXPERIENCE

SpaceX (Starlink) May 2021 - August 2021
Hardware Test Associate Engineer *Seattle, WA*

- Refactored legacy code leading to \$66K expected annual savings and 25% increase in first-pass yield.
- Developed data visualization for micropositioner actuator repeatability during testing.
- Developed thermal camera testing prototype, reducing test time from over 30 minutes to 30 seconds.

Microsoft May 2020 - August 2020
Software Engineering Intern *Seattle, WA (Remote)*

- Developed new Power BI feature to improve customers' ability to diagnose data-refresh problems.
- Ramped up quickly in a 100 million-line C++ codebase to begin delivering value immediately.

TicketBay January 2018 - August 2020
Lead Developer *Columbus, OH*

- Collaborated with OSU students to develop a mobile app for students to buy and sell football tickets.
- Facilitated the transfer of \$165K worth of tickets between more than 7K customers.
- Led system architecture decisions in order to balance ease of development and system performance.

GE Aviation May 2018 - August 2018
Digital Technology Intern *Cincinnati, OH*

- Built an end-to-end testing solution to automate QA testing of customer-facing web application.
- Integrated test solution with existing CI/CD pipeline, leading to improved product quality with no additional developer work.

The Ohio State University May 2018 - November 2019
Lead Developer *Columbus, OH*

- Developed a webapp to distribute rich media content to support a professor's research.
- Managed 2 student developers in multiple time zones with agile methodology.

GE Aviation May 2017 - August 2017
INTERalliance Intern *Cincinnati, OH*

- In-sourced customer-facing search, targeting \$300K in savings and 40K customers.
- Led MongoDB integration, giving customers access to previously unsearchable documents.

AWARDS

1st Alexa Priza Taskbot Challenge: 3rd Place

2021-2022

“The challenge is focused on developing agents that assist customers in completing tasks requiring multiple steps and decisions. It’s the first conversational AI challenge to incorporate multimodal (voice and vision) customer experiences.”

- Developed internal dashboard to support bug-fixes in near-real time.
- Designed and implemented automated test suite using fuzzy matching to support dynamic chatbot responses and improve deployment speed and quality.

Hack OHI/O: Awarded 3rd Place

2021

“A 48 hour hackathon that attracts over 800 participants annually for a full weekend of coding, building, learning, networking, and innovation”

- Developed an optimal trick-or-treating route planner using OpenStreetMap data and quadrees to maximize predicted candy per mile walked.

Hack OHI/O: Awarded Best UI/UX and People’s Choice

2020

- Developed a web-based, voice-powered, natural language code editor to convert natural, spoken language into Python code in real time.
- Fine-tuned pretrained transformer models and developed a custom parser to convert natural language to structured code.

Hack OHI/O: Awarded Best Hack

2019

- Developed an accessibility-focused text extraction app for visually impaired users.
- Used Tesseract OCR to extract text from images to provide content in a variety of accessible formats.

Brain Health Hack: Awarded Best Project at Large

2018

“Teams of future scientists, clinicians, engineers and coders compete to create tools that enable better care, more powerful research, or rather empower patients to live independent and productive lives”

- Developed a Android and iOS Parkinson’s Disease tracking app to improve effectiveness of medication.
- Used device accelerometers to measure a user’s tremors to improve effectiveness of medication.

Hack OHI/O: Awarded Best Software Hack

2017

- Developed an iOS social media trend aggregator in 24 hours to aggregate trending topics on Twitter and Instagram.

ADDITIONAL INFO

OSU Club Powerlifting

August 2021 - Present

OSU Club Water Polo

August 2017 - Present

· Club Risk Manager

August 2020 - May 2021

Study abroad in Dresden, Germany

June 2019 - August 2019

· Awarded Huntington International Fellowship
Cincinnati Marathon Finisher

May 2023