

# Hrithik Ravi

hrithikravi007@gmail.com | <https://github.com/hrithikravi> | Work Eligibility: US Citizen

## EDUCATION

### University of Michigan

B.S.E. in Computer Science and Engineering (Minor in Mathematics)

M.S. in Elec. and Comp. Engineering (focus in Machine Learning, GPA: 4.0/4.0)

Ann Arbor, MI

(Aug. 2019 – April 2023)

(Aug. 2023 – Dec. 2024)

## PUBLICATIONS

### The Implicit Bias of Gradient Descent on Separable Multiclass Data

Hrithik Ravi, Clayton Scott, Daniel Soudry, Yutong Wang

NeurIPS 2024

## RESEARCH EXPERIENCE

### Michigan AI Laboratory – Research Assistant

Ann Arbor, MI

Analysis of Chain of Thought Reasoning in LLMs – Advised by Ambuj Tewari

(June 2025 – present)

- ❖ Designed setup to probe reasoning limitations of (non-thinking) frontier LLMs on synthetic, verifiable NLP reasoning tasks.
- ❖ Conducted experiments demonstrating poor OOD generalization abilities of base models.
- ❖ Devised approach to distill reasoning skills from thinking models into non-thinking models in-context (“in-context distillation”).
- ❖ Analyzing surprising brittle generalization of SFT-based post-training compared to our in-context strategy.
- ❖ Preparing paper.

### Michigan AI Laboratory – Research Assistant

Ann Arbor, MI

Mechanistic Interpretability to Debias VLMs – Advised by Rada Mihalcea

(Dec. 2024 – May 2025)

- ❖ Researched cheap and interpretable inference-time steering approaches to debias OpenAI CLIP.
- ❖ Implemented linear probing and Contrastive Activation Addition (CAA).
- ❖ Identified that observed bias was primarily an artifact of strict scoring metrics, leading to negative but conclusive results.

### University of Michigan EECS – Student Researcher

Ann Arbor, MI

Generalization Theory for Deep Learning – Advised by Clayton Scott

(Aug. 2023 – May 2024)

- ❖ Surveyed theoretical literature on the “implicit bias” hypothesis, which attributes generalization of overparameterized neural nets to (S)GD’s implicit bias towards simple solutions.
- ❖ Identified gap in literature – multiclass results were sparse and limited to cross-entropy loss.
- ❖ Generalized a seminal binary result to the multiclass setting using a unified theoretical framework.
- ❖ Validated theorems using experiments to demonstrate first ever multiclass implicit bias effect for losses apart from cross-entropy.
- ❖ Published findings at NeurIPS 2024.

## WORK EXPERIENCE

### Google DeepMind – Open Source Developer

Remote

Artificial Intelligence – Multimodal Michelangelo Benchmark

(May 2025)

- ❖ Designed synthetic multimodal long-context eval. Proposal accepted to DeepMind Summer of Code (5% acceptance rate).
- ❖ Withdrew from program to focus on research more closely relevant to my interests.

### University of Michigan – Computer Science Graduate Student Instructor (TA)

Ann Arbor, MI

EECS 281: Data Structures and Algorithms

(Aug. 2023 – Dec. 2024)

- ❖ Received full tuition waiver to teach undergraduates foundations of data structures and algorithms.
- ❖ Held lectures, office hours to walk through example problems and to help students implement and debug C++ project solutions.

### UofM Transportation Research Institute – Temp. ML Research Engineer

Ann Arbor, MI

Computer Vision and Sensor Fusion – 3D Object Detection for Self-Driving Cars

(May 2023, June – Aug 2023: part-time)

- ❖ Implemented a CV 3D IOU algorithm in OpenCV to evaluate accuracy, and safety of Detectron2 ML object detection model.
- ❖ Designed the algorithm to penalize false negatives harshly resulting in a model optimized for maximal passenger safety.
- ❖ Implemented a sensor fusion algorithm in MATLAB to provide a 360° view and enable safe path-planning in self-driving cars.
- ❖ Used Hungarian algorithm to fuse LIDAR and camera tracks, programmatically adding new tracks and discarding stale ones.

### Amazon Web Services – Software Engineering Intern

Herndon, VA

Security and Networking; Time-series Analysis for Predictive Managed Scaling

(June 2023 – Sept. 2023)

- ❖ Built an iptables firewall with a token-bucket algorithm to fortify DNS servers against request floods, ensuring QoS for 3MN clients per region.
- ❖ Leveraged AWS Python API to implement an ML time-series pipeline in AWS Forecast, S3 to predict city-wide electricity consumption.

## **Amazon Web Services – Software Engineering Intern**

*Austin, TX*

*Full-Stack Mobile and Web Development for Supply Chain Analytics*

*(May 2022 – Aug. 2022)*

- ❖ **Mobile:** Built notification UI in React Native, Typescript; backend in Expo, Firebase, Apple Notification Service, and NodeJS.
- ❖ **Web:** Developed interface to configure analytics, implementing frontend in React, backend in Kotlin and AWS DynamoDB.

## **Icuro Inc. – Machine Learning Intern**

*Santa Clara, CA*

*Natural Language Processing (NLP) – Market Sentiment Analysis*

*(July 2021 – Sept. 2021)*

- ❖ Fine-tuned GPT-3 to analyze sentiment towards Amazon consumer product reviews in key aspects (“comfort”, “quality”, etc.).

## **AI, ML, AND CS PROJECTS**

---

- ❖ **LLMs** – Built full LLM pipeline (data, large GPT model, self-supervised pretraining, LoRA finetuning) in PyTorch. *March 2025*
- ❖ **AI** – Enhanced Sakana AI Scientist with RAG-based experiment reproduction from user-uploaded research papers. *Feb. 2025*
- ❖ **ML** – Trained CNN in PyTorch to extract goals from soccer footage, creating engaging highlight reels for viewers. *Aug. 2024*
- ❖ **Embedded Systems** – Built wireless gesture-controlled Glove, demoed “Hot or Cold” hidden object detection game. *Aug. 2022*
- ❖ **OS** – Implemented full-fledged OS kernel in C++. *Jan. – May. 2022*

## **TECHNICAL SKILLS**

---

*ML Stack:* Python, PyTorch, NumPy, Pandas, SQL, OpenCV, OpenAI API, Aider AI Agent, MATLAB, Matplotlib

*Languages, Libraries, Toolkits:* C, C++, JavaScript, TypeScript, Java, React, NodeJS, ARM, STM32, Linux, Bash