

Sai Anuroop Kesanapalli

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EDUCATION

M.S., University of Southern California

August 2022 - May 2024

Major: Computer Science

CGPA: 3.85/4

B. Tech., Indian Institute of Technology Dharwad

July 2017 - June 2021

Major: Computer Science and Engineering

CPI: 8.86/10

SKILLS

Python, PyTorch, NumPy, pandas, scikit-learn, NLTK, HuggingFace, Matplotlib, C++, C, GDB, Bash, Linux, Linux4Tegra, macOS, Weenix OS, HTML, CSS, Git, L^AT_EX, MATLAB

WORK EXPERIENCE

1 YEAR 3 MONTHS

MACHINE LEARNING SOFTWARE INTERN (Full-time)

DeGirum Corp., Santa Clara

Summer Internship

May 2023 - August 2023

- Developed an ONNX OCR pipeline with pre/post-processor modules compatible with edge-hardware [OCR].
- Worked on a NumPy-only implementation of the forward pass of some vision-based PyTorch operators such as Conv2D, MaxPool, among others, and published as a PyPI package [beaverpy].

PROJECT ASSOCIATE - I (Full-time)

Indian Institute of Science, Bangalore

Advisor: Prof. Yogesh Simmhan

August 2021 - July 2022

- Contributed to a research project on optimizing performance of deep learning workloads on edge-GPUs [1, 3, 4], and a review of systems research into training deep learning models on edge hardware [2].
- Developed a comprehensive instrumentation harness that profiled various system and workload parameters such as CPU, GPU and RAM utilization, average and instantaneous power.
- Implemented and automated large-scale training runs of several deep learning models such as ResNet-18, MobileNetV3, and LeNet-5, across 3 classes of Nvidia Jetson devices - AGX, NX, and Nano.
- The project made significant progress and led to several publications at top venues in less than a year. Received NSF Travel Grant to present [1] at SIGMETRICS @ ACM FCRC 2023 (core A*) at Orlando, FL.

PROJECTS (MULTIMODAL ML, NLP)

A comparison of shared encoders for multimodal emotion recognition [Multimodal ML] [Slides | Report | Code]

- Developed unimodal audio and vision, and multimodal emotion recognition pipelines by employing various classes of shared encoders – 2D CNNs (ResNet18, GoogLeNet, VGG16), 3D CNNs (Simple3D CNN, I3D), Transformers (ViT, VideoMAE).
- Tested our pipelines on a full-scale version of CREMA-D dataset. Presented a principled comparison of the performance of different pipelines and encoders, identified the achievements and shortcomings of these architectures, and discussed the implications.

Leveraging static analysis for evaluating code-generation models

[NLP] [Slides | Report | Code]

- Developed a pipeline that integrates static errors generated by linters (cppcheck, flake8) as feedback to improve the baseline code generation model (CodeLlama), and fine-tuned the model using DPO to enhance its ability to directly generate code with fewer errors.
- Demonstrated the effectiveness of both strategies in reducing frequency of static errors in generated code.

PROJECTS (COMPUTER VISION, ML THEORY, TIME SERIES ML)

beaverpy: An implementation of the forward pass of PyTorch operators using only NumPy

[CV] [Code]

Forward-Forward: Is it time to bid adieu to BackProp?

[CV] [Slides | Code]

Presentation on the Implicit Bias of SGD

[ML Theory] [Slides]

Notes on Rethinking Classic Learning Theory in Deep Neural Networks

[ML Theory] [Notes]

Store Sales - Time Series Forecasting

[Time Series ML] [Report | Code]

Credit Card Fraud Detection

[Time Series ML] [Poster | Report | Code]

PROJECTS (OPERATING SYSTEMS, DISTRIBUTED SYSTEMS, DATABASES, COMPUTER ARCHITECTURE, NETWORKS)

Implemented Procs, VFS, and VM kernel modules of Weenix OS	[OS] [CS 402, USC]
Implementation of Immediate Files in Minix OS	[OS] [Report Code]
Heterogeneity-Aware Hashing	[Distributed Systems] [Slides Report Code]
Buffer Manager for PF Layer of ToyDB	[DB] [Report Code]
Processor Simulator for ToyRISC	[Computer Architecture] [Code]
TCP Congestion Control	[Networks] [Report Code]

RESEARCH EXPERIENCE

COURSE PRODUCER (*Part-time*)

Advisor: Prof. Vatsal Sharan

University of Southern California, Los Angeles

August 2023 - Present

CP for [CSCI 699] Theory of Machine Learning and [CSCI 567] Machine Learning. Graded assignments, held discussion sessions, and scribed lectures.

RESEARCH ASSISTANT (*Part-time*)

Advisor: Prof. Vatsal Sharan

University of Southern California, Los Angeles

March 2023 - August 2023

Contributed to Tensor Toolbox, an open source project on tensor decomposition methods for MATLAB, by adding a new functionality for Orthogonalized ALS [Orth-ALS], and worked on a faster C++ implementation of a random forest based anomaly-detection algorithm [PIDForest].

UNDERGRADUATE RESEARCHER (*B. Tech. Project*)

Advisor: Prof. B. N. Bharath

Indian Institute of Technology Dharwad

August 2020 - June 2021

Worked on Federated Algorithms with Bayesian [5] and Exponential Weighted Average approaches [Report | Code].

PUBLICATIONS

1. Prashanthi S.K, Sai Anuroop Kesanapalli, and Yogesh Simmhan. "Characterizing the Performance of Accelerated Jetson Edge Devices for Training Deep Learning Models". In: SIGMETRICS '23. Orlando, Florida, United States: Association for Computing Machinery, 2023, pp. 37–38. doi: [10.1145/3578338.3593530](https://doi.org/10.1145/3578338.3593530).
2. Prashanthi S. K, Aakash Khochare, Sai Anuroop Kesanapalli, Rahul Bhope, and Yogesh Simmhan. "Don't Miss the Train: A Case for Systems Research into Training on the Edge". In: 2022 IEEE International Parallel and Distributed Processing Symposium Workshops (IPDPSW). 2022, pp. 985–986. doi: [10.1109/IPDPSW55747.2022.00157](https://doi.org/10.1109/IPDPSW55747.2022.00157).
3. Prashanthi S.K, Sai Anuroop Kesanapalli, and Yogesh Simmhan. "Characterizing the Performance of Accelerated Jetson Edge Devices for Training Deep Learning Models". In: Proc. ACM Meas. Anal. Comput. Syst. 6.3 (2022). doi: [10.1145/3570604](https://doi.org/10.1145/3570604).
4. Prashanthi S. K, Sai Anuroop Kesanapalli, Aakash Khochare, and Yogesh Simmhan. "Characterizing the Performance of Deep Learning Workloads on Accelerated Edge Computing Devices". In: 28th IEEE International Conference on High Performance Computing, Data & Analytics Student Research Symposium (HiPC SRS). 2021, [Poster].
5. Sai Anuroop Kesanapalli and B. N. Bharath. "Federated Algorithm with Bayesian Approach: Omni-Fedge". In: ICASSP 2021 - 2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP). 2021, pp. 3075–3079. doi: [10.1109/ICASSP39728.2021.9413571](https://doi.org/10.1109/ICASSP39728.2021.9413571).

AWARDS & ACHIEVEMENTS

- 2024 Gift Award and Travel Grant by Tata Education and Development Trust for studies abroad.
- 2023 J N Tata Endowment Scholarship for the higher education of Indians, for the year 2023-24.
- 2023 NSF Travel Grant for attending SIGMETRICS, co-located with ACM FCRC 2023, Orlando, FL.
- 2020 AP grade for exceptional performance twice: CS 405 B. Tech. Project - CSE on Federated Learning in Autumn 2020-21, and CH 301 Environmental Studies in Spring 2019-20, during B. Tech. at IIT Dharwad.
- 2017 IIT JEE (Advanced) All India Rank 8682 among ~171,000 candidates.
- 2016 Telangana State Rank 1 among ~700,000 candidates in first year and under top ten ranks in second year TSBIE Intermediate Public Examination.
- 2014 Certificate of Merit from CBSE Delhi, for outstanding performance and for obtaining Grade A1 in all the five subjects in Secondary School Examination.