Sai Anuroop Kesanapalli

J N Tata Scholar | USC Viterbi | IISc | IIT Dharwad

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Education

M.S., University of Southern California — August 2022 - May 2024 (Exp.)
Major: Computer Science — CGPA: 3.83/4

B. Tech., Indian Institute of Technology Dharwad — July 2017 - June 2021
Major: Computer Science and Engineering — CPI: 8.86/10

Skills

Languages	Python, C++, C, Bash, HTML
Libraries	PyTorch, NumPy, pandas, scikit-learn, NLTK, Matplotlib, CSS
Tools	Git, LaTeX, MATLAB, GDB
OS	Linux, Linux4Tegra, macOS, Weenix OS

Work Experience

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.

MACHINE LEARNING SOFTWARE INTERN *(Full-time)* — **DeGirum Corp.**, Santa Clara
Summer Internship — May 2023 - August 2023

- Developed an ONNX OCR pipeline with pre and post-processor modules compatible with edge-hardware [OCR Deep Dive].
- 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].

Research Experience

COURSE PRODUCER *(Part-time)* — **University of Southern California**, Los Angeles
Advisor: Prof. Vatsal Sharan — August 2023 - Present

CP for CSCI 699: Theory of Machine Learning and CSCI 567: Machine Learning. Grade assignments, hold discussion sessions, and scribe lectures into LaTeX.

RESEARCH ASSISTANT *(Part-time)* — **University of Southern California**, Los Angeles
Advisor: Prof. Vatsal Sharan — March 2023 - August 2023

Contributed to an open source project on tensor decomposition methods [Orth-ALS], and worked on a faster C++ implementation of a random forest based anomaly-detection algorithm [PIDForest].

UNDERGRADUATE RESEARCHER *(B. Tech. Project)* — **Indian Institute of Technology Dharwad**
Advisor: Prof. B. N. Bharath — August 2020 - June 2021

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

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.

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.
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.
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.
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.

Projects

A comparison of shared encoders for multimodal emotion recognition (2D/3D CNN, ViT)	[Slides | Report | Code]
Leveraging static analysis for evaluating code-generation models (CodeLlama)	[Slides | Report | Code]
Implemented `Procs`, `VFS`, and `VM` kernel modules of Weenix OS	[CS 402, USC]
beaverpy: An implementation of the forward pass of PyTorch operators using only NumPy	[Code]
Added new functionality for Orthogonalized ALS to Tensor Toolbox for MATLAB	[Code]
Forward-Forward: Is it time to bid adieu to BackProp?	[Slides | Code]
Presentation on the Implicit Bias of SGD	[Slides]
Store Sales - Time Series Forecasting	[Report | Code]
Heterogeneity-Aware Hashing	[Slides | Report | Code]
Credit Card Fraud Detection	[Poster | Report | Code]
Implementation of Immediate Files in Minix OS	[Report | Code]
Buffer Manager for PF Layer of ToyDB	[Report | Code]
Processor Simulator for ToyRISC	[Code]
TCP Congestion Control	[Report | Code]

Coursework

Graduate: Computational Perspectives on the Frontiers of Machine Learning, Machine Learning, Deep Learning and its Applications, Applied Natural Language Processing, Multimodal Probabilistic Learning of Human Communication, Operating Systems, Analysis of Algorithms

Undergraduate: Mathematics for Data Science, Artificial Intelligence, Pattern Recognition & Machine Learning, Software Engineering, Distributed Systems, Databases & Information Systems, Compilers, Computer Networks, Computer Architecture, Digital Systems, Design & Analysis of Algorithms, Data Structures & Algorithms, Elementary Algebra & Number Theory, Graph Theory & Combinatorics, Numerical Analysis, Linear Algebra, Ordinary Differential Equations, Calculus, Electricity & Magnetism, Quantum Physics, Economics