

# 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,  $\text{\LaTeX}$ , MATLAB, GDB

**OS** Linux, Linux4Tegra, macOS, Weenix OS

## WORK EXPERIENCE

**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].

**PROJECT ASSOCIATE - I (RESEARCH ENGINEER) (Full-time)**

**Indian Institute of Science**, Bangalore

*Advisor: Prof. Yogesh Simmhan*

August 2021 - July 2022

Worked on performance characterization of Nvidia Jetson edge-accelerators on deep learning workloads [1, 3, 4], a review of systems research into training deep learning models on the edge hardware [2], and also on a Federated Learning project involving dataset condensation as a subroutine.

## 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, a doctoral-level course, offered in Fall 2023, and CSCI 567: Machine Learning, offered in Spring 2024. I assist in grading homeworks, and help with scribing lectures into  $\text{\LaTeX}$ .

**RESEARCH ASSISTANT (Part-time)**

**University of Southern California**, Los Angeles

*Advisor: Prof. Vatsal Sharan*

March 2023 - August 2023

Contributed to an open source project [Tensor Toolbox] on tensor decomposition methods, 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 [Report | Code] approaches.

## 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.

2014 Recipient of Meritorious Student, School Topper and Star of Stars awards, St. Michael's School, Secunderabad.

## PUBLICATIONS

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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).

## PROJECTS

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A multimodal architecture with shared encoder that uses spectrograms for audio <sup>1</sup>	<a href="#">[Slides]</a>   <a href="#">Report</a>   <a href="#">Code</a>
Leveraging static analysis for evaluating code-generation models	<a href="#">[Slides]</a>   <a href="#">Report</a>   <a href="#">Code</a>
Implemented Procs, VFS, and VM kernel modules of Weenix OS	<a href="#">[CS 402, USC]</a>
beaverpy: An implementation of PyTorch operators using only NumPy	<a href="#">[Code]</a>
Forward-Forward: Is it time to bid adieu to BackProp?	<a href="#">[Slides]</a>   <a href="#">Code</a>
Presentation on the Implicit Bias of SGD	<a href="#">[Slides]</a>
Notes on Rethinking Classic Learning Theory in Deep Neural Networks	<a href="#">[Notes]</a>
Store Sales - Time Series Forecasting	<a href="#">[Report]</a>   <a href="#">Code</a>
Heterogeneity-Aware Hashing	<a href="#">[Slides]</a>   <a href="#">Report</a>   <a href="#">Code</a>
Credit Card Fraud Detection	<a href="#">[Poster]</a>   <a href="#">Report</a>   <a href="#">Code</a>
Implementation of Immediate Files in Minix OS	<a href="#">[Report]</a>   <a href="#">Code</a>
Buffer Manager for PF Layer of ToyDB	<a href="#">[Report]</a>   <a href="#">Code</a>
Processor Simulator for ToyRISC	<a href="#">[Code]</a>
TCP Congestion Control	<a href="#">[Report]</a>   <a href="#">Code</a>

## COURSEWORK

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<b>Graduate:</b>	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
<b>Undergraduate:</b>	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

## INTERESTS

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MLOps, Edge-GPU Performance Characterization, Systems for ML, Statistical Machine Learning, Deep Learning Theory, Natural Language Processing, Federated Learning, and Operating Systems.

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<sup>1</sup>Work in progress