

Experience:

- ADAS/AI Engineer – Qualcomm technologies | July 2022 – Present**
 - Deep learning model integration and performance enhancement for ADAS system on Qualcomm Soc.
 - Tools and framework used: Pytorch, TensorFlow, onnx, NumPy, pandas, python scripting, python, matplotlib and C++.
- ADAS/AI Intern – Qualcomm technologies | May 2021 – August 2021**
 - Deep learning model integration, performance enhancement and sensor integration for perception system.
 - Tools and framework used: Pytorch, TensorFlow, NumPy, pandas, python scripting, python, matplotlib and C++.
- Graduate Teaching Assistant – Colorado State University | Jan 2021 – May 2021 | Jan 2022 – July 2022**
 - GTA for ECE 452 Computer Architecture and Organization taught by Dr Sudeep Pasricha consisting of 54 students.
 - This role includes preparing assignments, resolving doubts and queries of students, and grading. Tools used include C, C++, python, OpenMP.
- Graduate Research Assistant – Colorado State University | Sep 2019 – July 2022**
 - Optimizing Deep Learning models using Pruning, quantization, knowledge distillation, encoding and decoding on Jetson Orion, TX2 and PX2
 - Technologies used - Keras, TensorFlow, CUDA, and cluster environments.
- Co-Founder and Machine Learning Architect - Cambionix Innovations | Oct 2017 – Jun 2019**
 - Worked on Machine Automation and Industrial Automation. Designed and integrated innovative solution to enhance the performance of existing mechanical devices. Tools used include python, C++, OpenCV, TensorFlow and Keras.

Publication:

- A. Balasubramaniam**, F. Sunny and S. Pasricha. (2025) “UPAQ: A Framework for Real-Time and Energy-Efficient 3D Object Detection in Autonomous Vehicles”, *2025 Design, Automation & Test in Europe Conference & Exhibition (DATE)*, 2025
- F. Sunny, A. Shafiee, **A. Balasubramaniam**, M. Nikdast and S. Pasricha, "OPIMA: Optical Processing-in-Memory for Convolutional Neural Network Acceleration," in *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, vol. 43, no. 11, pp. 3888-3899, Nov. 2024
- A. Balasubramaniam**, F. Sunny and S. Pasricha, "R-TOSS: A Framework for Real-Time Object Detection using Semi-Structured Pruning," *2023 60th ACM/IEEE Design Automation Conference (DAC)*, San Francisco, CA, USA, 2023, pp. 1-6
- Balasubramaniam, S. Pasricha, “Object Detection in Autonomous Vehicles: Status and Open Challenges”, *arXiv [cs.CV]*. 2022.
- Abhishek**, K. Keshav, S. Gautham, D. V. R. R. Samuel, and S. R. Nair, "Low-cost ROS based semi-autonomous drone with position and altitude lock," 2017 IEEE ICPCSI, Chennai, 2017, pp. 2109-2112.
- Abhishek**, S. Gautham, D. Varun Rufus Raj Samuel, K. Keshav, U. P. Vignesh and S. R. Nair, "ROS based stereo vision system for autonomous vehicle," 2017 IEEE ICPCSI, Chennai, 2017, pp. 2269-2273.
- Abhishek Balasubramaniam**, Shyam Nair, Allen Frederick I. A. “Arachnidan 6 Wheeled All Terrain Explorer Equipped with a 7 DOF Robotic Arm”, 20st International Mars Society Convention, Mars Society, USA

Projects:

Object Detection Model Compression for Resource constraint platform: Recreated the SSD object detection model using TensorFlow and Keras. Worked on custom training, pruning, quantization and search algorithms for model compression. The mAP of base model is 0.70. The pruned model mAP is 0.66 with 30% reduction in model size.

ROS Based Stereo Vision System for Autonomous Navigation: A stereo vision-based autonomous navigation system using deep learning model for object detection and tracking using TensorFlow and Keras. Jetson TX2 was used for deploying and testing the model.

Unmanned aerial vehicle with position and altitude lock with GPS based navigation system: An ROS based drone with altitude and position lock in which we used neural network and fuzzy logic for controls. We used RPI and Arduino controller for controlling the drone's rotors. The drone can maintain a constant altitude during hovering and a constant position for monitoring or surveillance.

University Rover Challenge: Designed the technical aspects such as navigation, remote control, autonomous navigation, wireless communication, and perception of the prototype of a Martian rover for the competition “University Rover Challenge 2014”. We secured 10th place out of the 36 finalists, and secured 2nd place from India

Achievements:

Top 10 best engineering services start-up in India 2018 by Silicon India Magazine | 20th and 21st Mars Society Convention Track Speaker | 17th place in University Rover Challenge 2015 at Mars Society, USA | Finalist in “Robotryst 2013” competition conducted by Robosapiens at IIT Delhi

Education:

Colorado State University – PhD in Computer Engineering
Colorado State University – MS in Computer Engineering
Hindustan University – B. Tech in Mechatronics | 2013 – 2017

Technical Skills:

General-purpose programming:

C++, Java, Python, Python scripting, JavaScript, SystemC, bash scripting

Machine learning Packages / Libraries:

TensorFlow, PyTorch, CUDA, Keras, SciPy, scikit-learn, TensorRT, Cudnn, CUBLAS, Pycuda, OpenCV, PIL, Jupyter, Numpy, Pandas

Cloud platforms:

EC2, Lambda, SageMaker, Deep Learning AMI, Deep Learning Containers, Deep Lens, Elastic Inference. Azure, Paper Space, Google Collab, Digital Ocean, Oracle Cloud, RoboFlow.

Robotics Software and Hardware platform:

Software: Robot Operating System, Arduino, QT, MATLAB.

Platforms: Nvidia Jetson TX2, DrivePX2, Intel Tank, RPI, Arduino.

Communities:

ROS Community | Pycon India | Mars society | TensorFlow Community | Stack overflow