Aadhar **Chauhan**

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Education

University of Washington   *Seattle, WA, USA*

M.S. in Data Science (Mechanical Engineering) - GPA 3.86/4.0   *Sept. 2021 - Jun. 2023*

National Institute of Technology   *Kurukshetra, India*

B.Tech in Mechanical Engineering - GPA 9.14/10   *Jul. 2013 - Jun. 2017*

Skills

Programming	Python, MATLAB, C, SQL, Latex, C++
ML Frameworks	PyTorch, Tensorflow, Tensorboard, Keras, OpenCV, NumPy, Jax, Pandas, Matplotlib
Developer Tools	VS Code, PyCharm

Evidence of Excellence

- Developed and implemented a deep learning algorithm for sensor fusion using PyTorch ML framework to efficiently fuse misaligned thermal and visual images for image fusion, demonstrating proficiency in Python.

Experience

Control and Trustworthy Robotics Lab (CTRL)   *University of Washington, Seattle*

Research Assistant   *Jun 2022 - Present*

- Fused thermal and visual images (Multi-modal data) utilizing the autoencoder architecture in an unsupervised manner with mutual cross attention at the bottleneck, for human detection in search and rescue missions. (Skills: PyTorch, Python, Linux)
- Developed and implemented an end-to-end GAN-based pipeline with cross attention for fusing misaligned thermal and visual images, resulting in a 40% improvement in fusion quality over state-of-the-art methods. (Skills: PyTorch, Python, Azure ML) (Submitted to ICCV 2023)

Mahindra & Mahindra   *Mahindra Research Valley, Chennai*

Senior Research Engineer   *Aug 2017 - Jul 2021*

- Led the winter validation expedition of BS6 SUV in Manali, India, and successfully improved the regeneration interval by over 100km and enhanced fuel efficiency. Analyzed the collected data using Python and other tools and provided crucial inputs to strengthen the calibration.
- Devised a neural-network-based DOC (Diesel Oxidation Catalyst) plant model using PyTorch & researched DOC thermal mapping to control and optimize fuel required to regenerate the DPF to increase the fuel efficiency for the engine.
- Optimized the combustion parameters for Diesel Engines by working on the Design of Experiments (DOE) and achieved a 20% increase in exhaust gas temperature, effectively improving the efficiency of DPF (Diesel Particulate Filter) regeneration cycles.

Projects

3D-AI-Camera-Aided VTOL-Multirotor Vehicle Control and Landing with INSITU- a Boeing Company   *Jan 2022 - Jun 2022*

- Built an AI-camera(OAK-D) enabled controller with depth perception and object detection to land a multi-rotor VTOL (Vertical Take-off and Landing) vehicle into a moving confined space. Reduced latency for the integration of the multi-rotor VTOL vehicle and the AI camera by implementing multiprocessing, to run both systems concurrently. (Skills: Python Multiprocessing, OpenCV)

University of Washington   *Feb 2022*

- Developed a computer vision library based on language C for low-level, mid-level, and high-level vision challenges(Image processing, optical flow, ML, CNN)

ASL Detection and Letter Prediction   *Feb 2022*

- Developed a program to recognize hand gestures in 3D space using a single low-resolution camera to display American Sign Language (ASL) as English Letters in real-time.
- Trained the model on YOLO and used the trained model with OpenCV, to recognize the hand gesture and predict ASL letters.

Appointment Reservation System   *Nov 2022*

- Connected the application to a database server created with a Microsoft Azure account. Developed a CLI frontend for user input and efficiently managed the backend operations, including database connectivity and query execution, resulting in a functional and user-friendly vaccine scheduling system.)

Relevant Coursework

Courses	Machine Learning, Computer Vision, Deep Robotic Learning, Applied Parallel Computing

Publications

Drop to Idle Test (DTIT)

SAE Mobilus

- Shankar R., ***Chauhan A***., Krishnan N., and Chandrasekaran V., "Investigation of Temperature Distribution inside the Diesel Particulate Filter (DPF) during the Drop to Idle Test (DTIT) Performed at Steady-State and Worst-Case Driving Cycles," SAE Technical Paper 2021-01-0201, 2021