Aadhar **Chauhan**

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Education

University of Washington — *Seattle, WA, USA*

M.S. in Data Science (ME) - GPA 3.86/4.0 — *Sept. 2021 - Aug. 2023*

Relevant Coursework: Machine Learning (CSE-546), Computer Vision (CSE-455), Deep Robotic Learning (CSE-599G)

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, C++, Linux, CUDA, Docker, Bash, Git, ROS, Python Multiprocessing, Jupyter, Latex, CSS, HTML, Ruby
ML Frameworks	PyTorch, Tensorflow, Tensorboard, Keras, OpenCV, Pillow, NumPy, Jax, Pandas, Cvxpy, Matplotlib, Wandb, Azure ML
Deep Learning	Multi Head Attention (Transformer), Cross Attention, CNN, Hyperparameter Tuning, Transfer Learning, Reinforcement Learning

Research

Image Fusion for Misaligned Thermal and Visual Images — *University of Washington, Seattle*

Control and Trustworthy Robotics Lab (CTRL) — *Jun 2022 - Aug 2023*

- Achieved a remarkable **40% improvement** in fusion quality of **multimodal data** compared to existing methods by designing and implementing a comprehensive pipeline based on Generative Adversarial Networks (GANs) with cross attention to fuse misaligned thermal and visual images. (Skills utilized: PyTorch, Python, Azure ML, Image Processing, Data Processing, Data Cleaning)
- Developed a deep learning model using an autoencoder, with mutual cross attention, a mechanism that allows the model to focus on the most relevant features of different modalities, to fuse data from thermal and visual images for human detection in search and rescue missions.

Experience

Product Research Scientist — *Seattle, WA*

360 Impact Studio — *Oct 2023 - Present*

- Leading the development of an Android app for an Android AR device (RealWear), driving collaboration across a diverse team to seamlessly integrate advanced human detection algorithms. The resulting app significantly elevates search and rescue operations by integrating real-time video feeds from airborne drones into the AR interface. This innovation empowers officers with a comprehensive bird's-eye view, optimizing the efficiency of missing persons' location tracking.

Senior Research Engineer — *Mahindra Research Valley, Chennai*

Mahindra & Mahindra — *Aug 2017 - Jul 2021*

- Led a successful winter validation expedition of BS6 SUVs in Manali, India, resulting in a significant **improvement of over 100km (30%)** in regeneration interval and enhanced fuel efficiency. Analyzed collected data using Python and other tools, providing crucial inputs to strengthen calibration efforts. (Skills: Data Analysis)
- Developed a neural-network-based model for Diesel Oxidation Catalyst (DOC) plant using PyTorch. Optimized fuel consumption for DPF (Diesel Particulate Filter) regeneration, resulting in increased fuel efficiency for the engine.
- Utilized Design of Experiments (DOE) to optimize combustion parameters for Diesel Engines, achieving an **impressive 20% increase** in exhaust gas temperature. This optimization significantly improved the efficiency of DPF regeneration cycles, enhancing overall engine performance.

Projects

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

- Accomplished precise and time-sensitive landing of a multi-rotor VTOL vehicle into a moving confined space within 60 seconds of its detection via AI Camera. Engineered an AI Camera (OAK-D) enabled controller with depth perception and object detection. Reduced latency for the integration of the multi-rotor VTOL vehicle and the AI camera by implementing multiprocessing, to run both systems concurrently.

ASL Detection and Letter Prediction — *Feb 2022*

- Created a real-time program using a single low-resolution camera to recognize hand gestures in 3D space and display American Sign Language (ASL) letters as English letters. Trained the model on YOLO and employed OpenCV for accurate hand gesture recognition and prediction.

Appointment Reservation System — *Nov 2022*

- Implemented a robust and user-friendly vaccine scheduling system by integrating the application with a Microsoft Azure database server, enabling seamless connectivity. Developed a CLI frontend for user input and effectively managed backend operations, including database connectivity and query execution.

Publications

- ***Chauhan A***., Remy I., Broyls D., and Leung K. *"MISFIT-V: Misaligned Image Synthesis and Fusion using Information from Thermal and Visual"*, arXiv preprint, 2023
- 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 Mobilus, 2021