

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 - Aug. 2023

RELEVANT COURSEWORK: MACHINE LEARNING (CSE-546), COMPUTER VISION (CSE-455), DEEP ROBOTIC LEARNING (CSE-599G),

APPLIED PARALLEL COMPUTING (ME-574)

National Institute of Technology

Kurukshetra, India

B.TECH IN MECHANICAL ENGINEERING - GPA 9.14/10

Jul. 2013 - Jun. 2017

Skills

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|----------------------|--|
| Programming | Python, MATLAB, C, SQL, C++, Linux, CUDA, 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 - Present

- 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) (Research work submitted to ICCV 2023)
- 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.
- Accurately annotated human detection bounding boxes on the *Wilderness Search and Rescue Dataset (WiSARD)* using Supervisely, driving the development of robust computer vision models for precise human detection and tracking to help in search and rescue missions.

Experience

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. Conducted research on DOC thermal mapping to optimize 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. (Skills: Python Multiprocessing, OpenCV)

UNIVERSITY OF WASHINGTON

Feb 2022

- Built a computer vision library in C and exposed its functionality through an API, enabling seamless integration with Python scripts, for low-level (Image Filtering, Edge Detection), mid-level (Optical Flow), and high-level (Object Detection, Image Segmentation) vision tasks.

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

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