

EDUCATION

Carnegie Mellon University, Pittsburgh, PA | Masters of AI Engineering, Energy Science | CGPA: 3.92/4.0 Dec 26
Courses: Machine Learning, Deep Learning, Toolchains for AI Engineers, Energy Conversion, Supply, Transport, Storage
NSUT, Delhi, India | Bachelor of Technology in Electrical Engineering, Minor- ML and Data Science | CGPA: 8.04/10

SKILLS

Tools & Frameworks | Python, SQL, MATLAB, JavaScript/TypeScript

Cloud & Database | Azure, AWS, GCP, Postgres, DBMS, Docker

ML/DL | PyTorch, TensorFlow/Keras, scikit-learn; CNNs/Transformers, time-series modeling, anomaly detection, RAG, forecasting

EXPERIENCE

 **Carnegie Mellon University** | Pittsburgh, PA | **Graduate Research Assistant - Prof. Christopher McComb** Sep 25 - present
Boeing Project (MCP Agent Development)

- Building modular Model Context Protocol (MCP) servers (TiGL, SU2, pyCycle) to enable AI-agent-driven aircraft design (geometry to CFD to propulsion simulation).
- Designing containerized, reproducible tool-calling systems with schema validation, session isolation, and deterministic outputs, a composable AI infrastructure that allows LLM agents to orchestrate simulation workflows.

AI Coach (AWS + Slack Integrated AI Agent)

- Built and deployed an audio-text multi-agent system to AWS for structured team decision-making, Designed RESTful Slack integration enabling real-time conversational agent workflows.

 **Gentari, Petronas** | Gurgaon, India | **Senior Data Scientist** Oct 24 - July 25

Collaboration with Microsoft

- Identified frequent knowledge-retrieval delays; architected and launched a private RAG chatbot with FAISS and a local Llama 3.2 LLM, cutting API spend and accelerating analyst response time, while mentoring two interns.
- Led a Team (Microsoft project) to develop a solar forecasting framework. Trained models on an Azure pipeline to improve power and revenue forecasts using TFT and Deep MNC.
- Challenged third-party solar forecasts; engineered and productionized a Bi-Directional LSTM with novel exogenous features, surpassing vendor accuracy and yielding around \$1M in annual savings.

 **Gentari, Petronas** | Gurgaon, India | **Data Scientist** July 23 - Oct 24

- Designed a custom penalty-based loss function to reduce vendor penalties, leveraging weather forecast data.
- Automated power injection uploads to government portals for all 40 solar and wind plants via Selenium, saving 100 man-hours weekly.
- Developed and deployed an LSTM model to detect fault potential in inverters at company solar sites.
- Formulated a Gradient Boost Regressor for the costing team based on historical data to estimate site costs before setup.

 **Netaji Subhas University of Technology** | Delhi, India | **Research Assistant** Aug 22 - June 23

- Converted raw vibration signals to time-frequency spectrograms using complex frequency b-spline and trained an NFNet (Normalizer-Free ResNet) classifier with Adaptive Gradient Clipping (AGC) for stable training without normalization layers.
- Achieved ~98.7% validation accuracy on CWRU and 95.7% on IMS datasets; reduced training time versus ResNet baselines.

 **Indian Institute of Technology Kharagpur** | Kharagpur, West Bengal | **Research Intern** May 22 - Nov 22

- Built an end-to-end vision-based autonomous car prototype (IR camera, Hough-based traffic sign detection, Raspberry Pi 4 + Arduino motor control via PWM) running a fine-tuned ResNet18, reaching 99.57% validation accuracy on sign detection.
- Red-teamed adversarial robustness (FGSM, BIM, PGD, etc. perturbations), observing large accuracy drops, then designed a structure-based self-supervised defense using multi-view augmentations to recover robustness (avg accuracy score = 0.995).

RESEARCH PUBLICATIONS

- Structure-Based Learning for Robust Defense Against Adversarial Attacks in Autonomous Driving Agents, 7th International Conference on Computer Vision & Image Processing (CVIP 2022), Springer ([link](#))
- An NFNet-based approach for enhanced bearing fault classification using vibrational signal analysis, 14th International Conference on Computing, Communication & Networking Technologies (ICCCNT 2023), IEEE ([link](#))
- TransForm-Motor: A Vision Transformer-based Transfer-Learning Framework for Bearing Fault Detection using Vibrational-Signals, 11th International Conference on Advancements in Engineering and Technology (ICAET) (accepted)

ACHIEVEMENTS

IIT, Ropar Hackathon 21 | Agri.AI provides Indian farmers a one-stop solution for farming. Secured 1st place out of 110 teams
IAF Benevolent Scholarship 19 | Received National Scholarship from Indian Air Force for excellence in Academics.

CMU PROJECTS

- **Grid-Scout** - A web app tool that recommends optimal U.S. sites for large data centers by co-optimizing grid congestion headroom, clean energy proximity, reliability, and emissions impact. (made for RWE, based on synthesized data)
- **Real-Time ML Pipeline (GCP, Spark, PostgreSQL)** - Built a GCP-deployed pipeline with PostgreSQL + PySpark for scalable feature engineering and value prediction. Streamed signals via Pub/Sub and deployed with Docker + Kubernetes.