ABHISHEK REDDY MALREDDY

+1 479-329-4842 | linkedin.com/in/abhishekmalreddy/ | abhishekreddym18@gmail.com

EDUCATION

CARNEGIE MELLON UNIVERSITY **GPA: 4.0/4.0** Pittsburgh, PA

Master of Science in Artificial Intelligence Engineering - Materials Science and Engineering Dec 2025

Selected Coursework: Computer Vision, Systems and Tool Chains for AI Engineers, Trustworthy AI, Machine Learning, Learning for 3D Vision, Deep Learning, Methods of Computational Materials Science.

NATIONAL INSTITUTE OF TECHNOLOGY CALICUT Calicut, India

Bachelor of Technology in Mechanical Engineering May 2022

SKILLS

Programming: Python, SQL, Git, C, C++, Golang.

Machine Learning: PyTorch, PyTorch3D, TensorFlow, Pyspark, Transformers, Reinforcement Learning, GNNs, LLMs, RAG.

Software: Apache Spark, FastAPI, PostgreSQL, Vector DB, AWS, GCP, Docker, LaTeX.

PROFESSIONAL EXPERIENCE

VIGILANT INC. Remote, USA

Artificial Intelligence Engineering Intern Jun 2025 – Aug 2025

- Designed and deployed a FastAPI microservice for the GENIE ML-Deduplicator, enabling real-time processing of incoming alerts through ingestion, deduplication, and health monitoring endpoints.
- Built a multi-stage deduplication pipeline combining static filters, transformer embeddings, DBSCAN clustering, and semantic similarity checks, integrated with Postgres, pgvector, and PostGIS to ensure high-quality, unique alerts.
- Automated embedding workflows with Hugging Face models and containerized the system with a multi-stage Dockerfile, delivering reproducible, cloud-ready deployments for scalable production use.

MOBILITY RESEARCH (IIIT-H Affiliated) Hyderabad, India

Research Assistant **Advisor: Dr. Girish Varma** May 2023 – Jun 2024

- **IDD-AW : Robust Semantic Segmentation for Autonomous Driving in Adverse Conditions:**
  - Developed the large-scale IDD-AW dataset (5000 RGB-NIR images) for semantic understanding of Indian driving scenes under adverse weather (rain, fog, snow, lowlight).
  - Introduced the novel "Safe mIoU" metric to enhance safety evaluation of segmentation models by penalizing critical misclassifications overlooked by traditional mIoU.
  - Built SB3-based reinforcement learning models in SUMO to optimize lane selection and vehicle-to-vehicle communication, reducing emergency vehicle traversal times and surpassing human traffic strategies.
- **Published** "Idd-AW: A Benchmark for Safe and Robust Segmentation of Drive Scenes in Unstructured Traffic and Adverse Weather" in the Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), Jan. 2024.

ACADEMIC PROJECTS

Machine Learning Based Characterization of Chemical Ordering in High Entropy Oxides (CMU) May 2025 – Present

Advisor: Dr. Simon Gelin

- Train and evaluate equivariant ML models (e.g., Allegro, NequIP) for atomic-scale energy and force prediction to accelerate materials discovery.
- Perform Monte Carlo simulations to equilibrate HEO-J14 configurations across temperatures and assess chemical ordering.

TrackAnything: Multi-modal Promptable Tracking in 3D (CMU) Jan 2025 – Apr 2025

- Developed an ML model to generate 3D bounding boxes from text prompts (e.g., “walking between parked vehicles”) and video, enabling scenario mining in autonomous driving with the Argoverse 2 dataset.
- Integrated LiDAR, map, and vehicle pose data using a transformer-based architecture inspired by PromptTrack.
- Enhanced scenario mining for self-driving applications by improving object tracking accuracy in urban environments.

Real-time Pedestrian Detection and Safety Alert System (CMU) Jan 2025 – Apr 2025

- Designed a real-time pedestrian detection and safety alert system using NVIDIA Jetson Nano, with YOLO & MobileNet SSD models trained on CityPersons and Caltech datasets.
- Optimized edge AI inference with quantization, pruning, and TensorRT, leveraging DeepStream for urban traffic safety.
- Developed an intelligent safety alert mechanism that triggers audio-visual alerts when pedestrians enter the road during restricted signals and flashes warning signals for speeding vehicles at red lights in real-time.

Smart City Sensor Network Anomaly Detection (CMU) Sep 2024 – Dec 2024

- Designed a graph neural network to model relationships across IoT sensors (traffic, air quality, and energy meters) for anomaly detection in urban infrastructure.
- Detected spatio-temporal anomalies like faulty sensors and abnormal traffic surges, improving smart city reliability.