

KartEEK Gandiboyina

Champaign, IL | gkartEEK99@gmail.com | +1-4479026750 | Portfolio: muralikartEEK7.github.io | Github: muralikartEEK7

Summary

Robotics & Computer Vision Engineer with 4+ years of industry experience building production-grade perception, SLAM, and manipulation systems. Deep expertise in 3D Gaussian Splatting, 6-DoF pose estimation, real-time object detection, and ROS-based autonomy stacks. Proven track record: 2 patents filed (USPTO & JPO), IROS 2026 publication, and industry collaborations with JAXA and Georgia Tech. MS in Autonomy & Robotics (GPA 3.89), UIUC.

Skills

Computer Vision & Perception: 3D Gaussian Splatting (3DGS), NeRF, SLAM, 6-DoF Pose Estimation, Object Detection (Detectron2, YOLOv7/v8), Point Cloud Processing, Optical Flow, Structure-from-Motion, SAM/SAM2, Visual Odometry

Robotics & Autonomy: ROS/ROS2, MPC, PID, Min-Snap Trajectory Planning, VIO (Basalt), Quadrotor Control, Robotic Manipulation, Bin Picking, AirSim, MuJoCo, MetaWorld, Gym AI

Machine Learning: PyTorch, JAX, CNNs, Transformers, VAEs, Diffusion Models, GNNs, World Models (DreamerV3), Actor-Critic RL, SAC, Imitation Learning (Dagger), LLMs, VLMs, VLAs, Foundational Models

Languages & Tools: Python, C++, Docker, Linux, Git, VOXL 2

Experience

Robotics Engineer | Rational CyPhy Inc Feb 2026 – Present

- Architected a resilient autonomy stack for NASA-aligned wildfire-suppression UAVs on the VOXL 2 platform, targeting reliable BVLOS operation in GPS-denied, high-interference environments.
- Fused Basalt VIO with GPS for robust state estimation; designed seamless sensor failover to sustain stable flight under degraded conditions.
- Deployed real-time 3D Gaussian Splatting (3DGS) for aerial environment reconstruction and surveillance, delivering high-fidelity situational awareness to emergency responders.
- Prototyped self-organizing multi-drone sensing architectures to maintain mission continuity during comms/GPS outages.

Graduate Research Assistant | Prof. Sayan Mitra | Coordinated Science Laboratory at UIUC Sept 2025 – Jan 2026

- Trained a DreamerV3 World Model on Crazyflie FPV data to learn a compact latent space where, given the current frame and action, the model predicts the next latent state and future observations; used the learned world model for imagination-based policy training without direct environment interaction.
- Built a 6-DoF pose estimation pipeline using 3DGS-generated synthetic FPV datasets (10k frames) and a fine-tuned U-Net, achieving sub-centimeter positional accuracy in sim-to-real transfer.
- Developed an actor-critic policy (using PPO) within the latent world model for vision-based autonomous navigation, increasing successful waypoint completion from 70 % to 95 % in simulation trials
- Designed min-snap trajectory planners with velocity and acceleration limits using differential flatness, reducing planning time by 30 % and enabling agile quadrotor maneuvers in cluttered environments

R&D Robotics Engineer | Konica Minolta – Tokyo, Japan July 2021 – Aug 2024

- Engineered a structured-light point cloud sensing device achieving **0.99 IoU** on 1 cm² items at 0.05 m range under <10 Lux enabling bin picking of highly reflective industrial components.
- Built an auto-annotation pipeline (SAM, Detectron2, YOLOv7) that reduced manual labeling time by >80%, accelerating object detection model training cycles across multiple product lines.
- Developed a language-conditioned multi-task RL framework (SAC + Dagger) with Georgia Tech; improved zero-shot task success rates by **200%** and enabled rapid skill transfer via natural language goal specification.
- Collaborated with JAXA to design a vision-based 6-DoF grasping system for multi-limbed robots aboard the International Space Station, optimized for microgravity manipulation.
- Filed **2 patents** in computer vision and robotic grasping (USPTO & JPO).

Machine Learning Intern | Philips Innovation Campus – Bangalore, India April 2020 – July 2020

- Developed a 3D residual U-Net region-proposal network for pulmonary nodule detection on 888 CT scans (LUNA16); achieved a **FROC score of 0.914**, surpassing the baseline by 8%.

Projects

Autonomous Drone Racing | UIUC DroneRacer-MPC-Vision.git

- Implemented MPC & PID spline tracker for autonomous gate navigation; achieved a Tier-1 race record of **50.13 seconds**.

- Deployed NanoSAM with a keypoint detector for misaligned gate correction, reaching a positional prediction error of **0.05 m**.
Stack: Python, NeRF, AirSim, MPC, PID, Trajectory Planning, State-Space Estimation.

VLM4Autonomy | UIUC

VLM4Autonomy-.git

- Fused SAM2, optical flow, and VLMs for real-time object tracking and ego-vehicle motion estimation; integrated YOLOv8 and Structure-from-Motion for spatial grounding. *Stack: Python, VLM, SAM2, YOLOv8, Visual Odometry, SpatialBot.*

Volatility-Aware Stock Prediction via Transformer-VAE-Flow | UIUC

VAE-Stock-Predictor.git

- Built a Transformer-VAE with RealNVP normalizing flows conditioned on VIX for synthetic financial time-series generation; achieved **Wasserstein Distance of 0.0629**. *Stack: PyTorch, VAE, RealNVP, Transformers.*

Patents & Publications

FalconTrack: Photorealistic Auto-Labeled Perception and Physics-Aware Vision-Based Aerial Tracking

IROS 2026

- Developed a unified 3DGS-based simulator that automates 6-DoF pose and mask labeling (10k images in <20 min), enabling zero-shot sim-to-real aerial tracking with **100% success** on high-speed trajectories.

Learning Data Generation Support Device, Movement Controller, and Article Acquisition System

US: 20250336175

- Co-invented an automated data generation framework to eliminate manual labeling bottlenecks for complex 3D pick-and-place robotics in bulk manufacturing.

Component Posture Information Acquiring Device and Posture Determination Method

JPO: 2023-060687

- Invented a vision-based sensing system using ROI determination and feature extraction for accurate component posture estimation during robotic pick-and-place.

Education

University of Illinois Urbana-Champaign | MS in Autonomy & Robotics | GPA: 3.89/4.0

Aug 2024 – Dec 2025

- **Coursework:** Deep Learning for Graphs, Computer Vision, Safe Autonomy, Deep Generative Models

Indian Institute of Technology Kharagpur | B.Tech in Electrical Engineering | GPA: 3.48/4.0

Aug 2017 – May 2021

- **Coursework:** Deep Learning, Machine Learning, Embedded Systems, Control Systems