

DASARI RAJ VAMSI

Guntur, India | +91 8310514825 | dasarirajvamsi@gmail.com | imt_2022035@iiitm.ac.in | [linkedin.com/in/rajvamsi-dasari9880/](https://www.linkedin.com/in/rajvamsi-dasari9880/) | <https://github.com/rajvamsi12>

RESEARCH PROFILE

Integrated B.Tech + M.Tech student in Information Technology at ABV-IIITM Gwalior with research experience spanning autonomous driving, safe learning-based control, imitation learning, and computer vision. Experienced in real-to-simulation systems, behavioral cloning, neural control barrier functions, and safety-critical autonomous systems. Co-author of two research papers under review and seeking PhD opportunities in autonomous robotics, reinforcement learning, imitation learning, and learning-based control.

RESEARCH INTERESTS

Autonomous Driving • Safe Reinforcement Learning • Learning-Based Control • Imitation Learning • Control Barrier Functions • Computer Vision • Deep Learning • Robotics • Vision Transformers

EDUCATION

Integrated B.Tech + M.Tech in Information Technology CGPA: 8.73/10 (90th Percentile) Nov 2022 – April 2027

ABV–Indian Institute of Information Technology and Management (IIITM), Gwalior

Relevant Coursework: Machine Learning • Artificial Intelligence • Data Mining • Computer Vision • Optimization Techniques • Linear Algebra • Probability & Statistics • Calculus • Modelling & Simulation • Operating Systems • Computer Networks • Software Engineering

RESEARCH EXPERIENCE

Research Intern, University of Virginia

May 2026 – Present

Project: Neural Integral Control Barrier Functions for Safe Control of Unknown Nonlinear Systems | [GitHub](#)

- Co-authored an ACC paper on Neural ICBFs for unknown nonlinear systems with input constraints, resolving 28 reviewer comments spanning theory, experiments, and implementation.
- Implemented the complete Neural ICBF safety filter from scratch: learned dynamics (Neural ODE), an imitation-learned policy, learned barriers, autodiff Lie derivatives, and a QP-based input-constrained safety filter.
- Derived a closed-form exponential tracking-error bound showing that the integral control law tracks the imitation-learned policy, and formalized the safe-set formulation and approximation guarantees used throughout the manuscript.
- Designed a forward-invariance-aware rollout labeling scheme that relabeled 28.95% of training samples as unsafe, eliminating input-constraint violations in closed loop (0.80% → 0.00%).
- Extended the method to agile racing on a 6-D dynamic bicycle model of an F1TENTH car (tire-force saturation, steering slew limits, motor lag), training a Neural ODE with 8.5 cm median 1 s rollout error and barrier networks labeled with a 22-maneuver escape-set analysis.
- Built a per-step QP safety filter enforcing tire-grip and actuator constraints, running in 7–8 ms per step on a single CPU core.
- Reduced crashes and off-track runs from 12/200 to 0/200 on held-out layouts at 4.0 m/s ($p = 0.0005$) while keeping ~84% success; an analytical HOCBF-QP baseline failed in 29–35% of runs.
- Identified why one-step barrier QPs fail near the grip limit (front-tire saturation reverses the assumed steering response) and developed a sampling-based predictive safety filter reaching 90–93% success with zero crashes at 6 m/s.

Research Intern, IHUB Data, IIT Hyderabad (Sponsored project at ABV-IIITM Gwalior) Dec 2024 – Nov 2025

Project: Behavior-Conditioned Safety-Aware Synthetic Scenario Generation for Indian Traffic

- Developed a real-to-simulation pipeline converting real Gwalior traffic trajectories into CARLA Town10HD environments through multi-region coordinate transformations.
- Designed spawn correction and density adjustment algorithms to generate collision-free simulation initialization.
- Implemented TTC-based collision avoidance with emergency braking and lateral maneuver strategies.
- Trained a **SegFormer-B1 behavioral cloning model** using approximately **66,000 image-command pairs**.
- Achieved test RMSE of **0.6876 m/s** for velocity prediction and **4.89°/s** for steering prediction while analyzing performance across different driving maneuvers.
- Integrated PID-based longitudinal and lateral controllers for stable autonomous execution inside CARLA.

SELECTED RESEARCH PROJECTS

M.Tech Thesis: Real2Sim Trajectory Style Transfer in CARLA | Advisor: Dr. Rahul Kala | [GitHub](#) | Dec 2025 – Present

- Built a **6-region calibrated real-to-sim pipeline** that maps left-hand Indian traffic into CARLA Town10HD with size-matched vehicle blueprints, enabling CARLA Autopilot benchmarking.
- Curated **5,212 valid scenarios** from 26,868 candidates across 6 manoeuvres, including vehicle following mined from leader-vehicle annotations.
- Rebuilt the replay with **time-synchronised PID** and road-aligned spawns, cutting tracking error from **5.9 m to under 0.3 m**.
- Developed an **offline collision predictor** that screens ~5k scenarios in about 2 minutes and **caught 20/20 failures** in CARLA validation.
- Recovered **653 scenarios** through size-compensating trajectory separation, giving **2,912 collision-free scenarios**. A multi-modal imitation-learning policy is in progress.

Continuous Sign Language Recognition using Deep Learning

- Developed a continuous sign language recognition pipeline using MediaPipe Holistic to extract 225 pose and hand landmark features per frame.
- Processed **2,703 video samples across 136 sentence classes** and trained BiLSTM and Transformer-based sequence models on fixed-length temporal sequences.
- Achieved **89.09% test accuracy** and **0.8593 BLEU score** with the Transformer, outperforming the BiLSTM baseline (78.93% accuracy).

PUBLICATIONS

- **GLAD-LAD: Gwalior Laneless Driving Large Altitude Dataset** **Co-author:** Under review at **Transportation Research Part C** | While in London do as the Gwaliorites do: Style Transfer of Trajectories across Traffic Domains in Real-to-Sim
- **While in London do as the Gwaliorites do: Style Transfer of Trajectories across Traffic Domains in Real-to-Sim** **Co-author:** Under review at the **17th World Symposium on the Algorithmic Foundations of Robotics (WAFR 2026)**

TECHNICAL SKILLS

Programming: Python • C • C++ • Java

Machine Learning & Deep Learning: PyTorch • TensorFlow • CNNs • Vision Transformers • Behavioral Cloning

Computer Vision: YOLO • YOLO-NAS • Object Detection • Image Segmentation • Image Classification

Autonomous Systems: CARLA • ROS • Gazebo • Trajectory Planning • PID Control • TTC Collision Avoidance

Data Science: NumPy • Pandas • Scikit-learn • Matplotlib • Jupyter Notebook • Linux

SCHOLASTIC ACHIEVEMENTS

- Got Awarded **BEST BTP(Btech Project)** of my year (2025)
- **AIR 2000 (Top 1 percentile)**, GATE Computer Science (2025)
- **99 Percentile (AIR 10,535)** in JEE Main among more than one million candidates (2022)

LEADERSHIP, SERVICE & OUTREACH

Class Representative, ABV-IIITM Gwalior (2022–Present)

- Elected representative for a batch of **120 students**.
- Coordinated communication between students, faculty, and administration.
- Managed academic scheduling, grievance resolution, and institute-wide coordination.

Teacher, Student Gyan Movement (2022-2023)

- Taught mathematics to underprivileged school students in Gwalior.
- Focused on conceptual understanding and confidence-building in STEM education.

Project & Contest Mentor, AASF Coding Club (2024-2025)

- Supervised machine learning mini-projects.
- Served as programming contest problem setter and editor.

Technical Team Member, Student Activity Council (Technical) (2023-2024)

- Organized institute-level technical events, workshops, and student initiatives.

Event Head (First Year)

- Led planning and execution of student events involving logistics, volunteer coordination, and public engagement.

LANGUAGES KNOWN

English • Hindi • Telugu • Kannada