Ansh Bhansali

anshbhansali5@gmail.com | +1 (217) 402-1894 | Portfolio | GitHub | LinkedIn | Summer 2026 Internship

EDUCATION

University of Illinois Urbana-Champaign, IL, USA — Aug 2025 – Aug 2026
Master's in Autonomy and Robotics
Coursework: Humanoid Robots, Computer Vision, Safe Autonomy, Control Systems

SKILLS

- **Languages:** Python, C++, Rust
- **Robotics:** ROS2, SLAM, MoveIt, Sensor Fusion (Kalman Filters), Motion Planning (RRT, A*), Control Barrier Functions
- **AI/ML:** Computer Vision (OpenCV, YOLO), PyTorch, TensorFlow, Reinforcement Learning (PPO)
- **Simulation & Design Tools:** Gazebo, MuJoCo, PyBullet, NVIDIA Isaac Sim, AirSim, KiCad, Altium Designer, Fusion 360

EXPERIENCE

Electronics Engineering Intern - Dimension Six Technologies, Mumbai, IN — May 2024 – May 2025
Project: STM32-Based Autonomous E-Bike Control System

- Enhanced **STM32** firmware with a novel power management algorithm, increasing e-bike range by 40%.
- Designed and routed a 4-layer PCB in **KiCad** for a custom **ESC**, reducing power losses by 15% under peak load.
- Deployed an IoT solution using **ESP32S3** and **RFID** for remote monitoring and secure automated payments.

Robotics Research Intern - Indian Institute of Technology, Bombay, Mumbai, IN — Jan 2024 – June 2024
Project: SLAM-based Autonomous Military Robot

- Developed **SLAM**-based autonomous robot in **ROS2**, achieving **95%** navigation accuracy in dynamic environments.
- Improved localization by **20%** via IMU, GPS, and RGB-D camera sensor fusion.
- Trained and integrated a **YOLOv3** model for real-time human detection and robust stair-climbing navigation.

PROJECTS

Humanoid Whole-Body Motion Planning *(Drake, MoveIt) (Github)*

- Implemented a motion planner for a humanoid URDF, optimizing trajectories for safe reaching tasks without loss of balance.
- Enforced **ZMP** and support polygon constraints, increasing successful manipulation task completions by **40%**.
- Reduced trajectory execution time by **15%** while ensuring static stability through efficient **trajectory optimization**.

Terrain-Aware Locomotion Pipeline *(ROS2, Gazebo, MoveIt) (Github)*

- Developed a **perception pipeline** for a quadruped using a depth camera to generate an elevation map for terrain analysis.
- Integrated a terrain classifier with a footstep planner in **MoveIt**, successfully navigating **95%** of the tested complex terrains.
- Demonstrated a gait strategy that reduced fall rates by **50%** compared to a baseline blind-walking controller on uneven surfaces.

RL Locomotion with Safety Layer *(PPO, Control Barrier Functions) (Github)*

- Trained a terrain-adaptive locomotion policy using **PPO** and integrated **CBF** as a real-time safety filter.
- Achieved zero-fall locomotion, with the CBF layer rejecting **99%** of unsafe actions proposed by the PPO policy.
- Maintained **90%** of the original PPO policy's traversal speed, demonstrating high efficiency with a verifiable safety guarantee.

VIO + Footstep Planner Fusion *(ROS2 Nav2, VINS-Fusion) (Github)*

- Integrated **VIO** with a quadruped footstep planner, enabling autonomous navigation in an unknown, GPS-denied environment.
- Implemented **drift correction strategies** that reduced localization error by **60%** compared to standalone VIO.
- Achieved a **98% task success rate** in navigating a complex obstacle course, demonstrating reliable localization and planning.

Quadruped Locomotion via PPO *(PyBullet, PPO, Python) (Github)*

- Trained a quadruped in PyBullet using PPO, designing **reward functions** to promote stable gait generation on irregular surfaces.
- Achieved a **30%** reduction in fall rate compared to baseline PID controllers when traversing uneven terrains.
- Improved the robot's forward velocity by **25%** while maintaining gait stability and minimizing energy consumption.

EMG-Controlled Prosthetic Arm *(ESP32, Python ML, Fusion 360) (YouTube)*

- Designed and built a prosthetic arm, programming an **ESP32**-based system to process **EMG signals** for fine-motor control.
- Developed a **Python XGBoost** model that achieved **96%** accuracy in real-time classification of 5 distinct hand gestures.
- Optimized the signal processing and classification pipeline with an end-to-end latency of under **100ms**.

AWARDS & ACHIEVEMENTS

- **Project Showcase, Cal Hacks (2025)** - Developed "GEST," a real-time, gesture-based teleoperation system for the **XLE** robot.
- **Finalists, Smart India Hackathon (2024) –** Presented a Ganga River water monitoring system for pollution prediction.