Arjun Murali

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Education

BITS Pilani, Hyderabad Campus Aug 2023 – May 2027
B.E. Electronics and Instrumentation (CGPA: 8.23/10) *Hyderabad, India*

Minor: Robotics and Automation (GPA: 9/10)

Selected Works

DexLite: Dexterous Grasp Synthesis Nov 2025 – Dec 2025

- Developed a generative pipeline inspired by *Dex1B*, leveraging a CVAE architecture to synthesize diverse Shadow Hand configurations from object point clouds.
- Engineered a dual-purpose architecture capable of expanding existing datasets with unbiased diversity or synthesizing dexterous grasps for novel, unseen objects.
- Achieved a 79% success rate in physics-based lifting simulations conducted in MuJoCo.

F1TENTH Autonomous Racing (Team PulpFriction) Aug 2025 – Dec 2025

- Secured **2nd Place Overall** at the 26th Roboracer Competition, IIT Bombay, competing against several teams in high-speed autonomous maneuvering.
- Developed an autonomous racing stack utilizing Model Predictive Contouring Control (MPCC) for time-optimal trajectory following and dynamic obstacle avoidance.
- Generated globally optimal racing lines to maximize velocity profiles while maintaining traction.

Dual-Arm Grasp Dataset Generator May 2025 – Aug 2025

- Developed a dataset generation pipeline for dual-arm robotic manipulation in cluttered environments, extending the GraspNet-1B dataset for bimanual grasp pairs.
- Engineered a geometric collision pruning system to filter viable workspace configurations, synthesizing collision-free grasp pairs from single-view RGB-D data.
- Implemented force-closure verification to ensure grasp stability across diverse geometries.

Go2 Quadruped Locomotion Control Jan 2025 – Apr 2025

- Implemented a control pipeline for the 12-DOF Unitree Go2 using the **Genesis** physics engine, leveraging **RSL-RL** for high-fidelity reinforcement learning.
- Trained a PPO-based policy across parallelized GPU environments to achieve stable walking, jumping and base height control.
- Tested the system by modelling action latency and controlling through teleoperation.

Beetle – Autonomous Research Testbed Aug 2024 – Nov 2024

- Designed and assembled a robust 60kg payload skid-steer AGV powered by an NVIDIA Jetson AGX Xavier, serving as a platform for heavy-duty autonomy research.
- Integrated a comprehensive sensor suite (Intel T265, D435, 2D LiDAR) to establish a versatile testbed for evaluating diverse SLAM and path planning architectures.
- Implemented LiDAR SLAM and RGB-D SLAM pipelines with dynamic path planning algorithms.

Positions of Responsibility

President – Automation and Robotics Club, BITS Hyderabad Apr 2025 – Present

- Leading one of the largest technical clubs on campus, managing a team of 60+ active members and mentoring junior projects.
- Spearheaded educational initiatives by organizing hands-on workshops on Computer Vision, CAD, and Embedded Systems, impacting over 150 students.
- Liaised with faculty and external organizations to secure funding and resources for student-led research initiatives.