

Vignesh Vembar Manikantan

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Education

International Institute of Information Technology Hyderabad

Expected July 2027

B.Tech in Electronics and Communication Engineering

Hyderabad, IN

- **Relevant Coursework:** Robotics: Planning and Navigation, Robotics Dynamics and Control, Mobile Robotics, Mechatronic System Design, Statistical Methods in AI, Introduction to NLP, Data Structures and Algorithms, Probability and Random Processes, Linear Algebra

Experience

Robotics Research Center, IIITH

Jan 2025 – Present

Undergraduate Researcher

Hyderabad, IN

- Working on Bi-manual Manipulation and Grasping advised by **Prof. K. Madhava Krishna**.
- First author of publications at **ICRA 2026** and **CoRL 2026 (Under Review)** with **Md Faizal Karim** and **Ayush Kaura**.
- Working on a funded project from DRDO with real world deployment deliverables.

Robotics Research Center, IIITH

Apr 2026 – Present

Systems Administrator

Hyderabad, IN

- Administered a **10-server** Linux compute cluster supporting **40+** robotics researchers.
- Managed centralized authentication (FreeIPA), user provisioning, GPU software stacks and storage.
- Performed hardware upgrades, server monitoring, backup management and system recovery.

Team Brahmand, IIITH

June 2024 – Nov 2025

Structural Team Lead (CANSAT Team)

Hyderabad, IN

- Led the structural subsystem for IIIT Hyderabad's official CANSAT team to place in the top 15 out of 80+ teams from universities all over India.
- Designed, built, and tested mechanical systems including a parachute deployment mechanism and a control moment gyroscope.
- Coordinated subsystem integration and ensured structural reliability under launch and descent conditions.

Teaching

International Institute of Information Technology Hyderabad

Jan 2026 – Mar 2026

Teaching Assistant, Introduction to Robotics: Perception and Planning

Hyderabad, IN

- Led tutorials, conducted lectures and supported instruction for a cohort of **80+** second-year students.
- Designed and evaluated assignments on transforms, localization, local and global planning.
- Mentored student projects on applying concepts using the ROS stack.

IIITH Robotics Summer School

May 2026 – Jun 2026

Instructor and Organizer

Hyderabad, IN

- Taught and mentored **40+ students** during a **4-week** intensive robotics onboarding program.
- Developed lectures, assignments and hands-on labs covering robotics fundamentals.
- Guided student projects involving ROS2, motion planning, perception and manipulation.

Publications

PartialBiGrasp: Inferring Hidden Local Geometry for Bimanual Grasping from Partial Views | Under Review at CoRL 2026

[Website](#)

- Proposed the first dual-arm grasp generation framework for single-view partial point clouds.
- Developed hierarchical global-local occupancy networks for grasp synthesis and refinement.
- Introduced occupancy-guided sampling to infer hidden geometry and reduce collisions.
- Validated on simulation and deployed on a heterogeneous xArm7 + Lite6 platform.

DAGDiff: Guiding Dual-Arm Grasp Diffusion to Stable and Collision-Free Grasps | ICRA 2026

[Website](#)

- Developed an end-to-end diffusion model for coordinated dual-arm grasp generation.
- Introduced force-closure and collision-aware classifier guidance during diffusion.
- Generated physically feasible grasp pairs without heuristic grasp pairing pipelines.
- Demonstrated improved grasp success on simulation and real robotic platforms.

Projects

Dual-Arm Robotics Real-World Setup | *Python, PyBullet, Open3D*

[GitHub](#)

- Built a modular perception-to-execution pipeline for a real-world xArm7/xArm6 dual-arm grasping setup with Dynamixel grippers and Intel RealSense RGB-D cameras.
- Integrated remote SAM segmentation, ArUco-based camera-to-world calibration, and a grasp-model server to generate pointcloud-based grasps, then executed synchronized dual-arm pick primitives with collision checking.

Inverse Kinematics for Underactuated 5-DOF Manipulator | *Python*

[GitHub](#)

- Developed a Jacobian-based IK solver with damped least squares for a 5-DOF underactuated manipulator.
- Handled infeasible targets via task-space projection and analyzed manipulability using Jacobian singular values.

LG-DimABSA: Language-Grounded Dimensional ABSA | *PyTorch, Transformers*

[GitHub](#)

- Designed a structured pipeline for aspect-opinion extraction and valence-arousal sentiment regression.
- Combined rule-based parsing with transformer models, evaluating against end-to-end baselines.

Hyperbolic Geometry for Hierarchical Representation Learning | *Geometric ML*

- Studied hyperbolic embeddings (Poincaré ball) for representing hierarchical data with exponential capacity.
- Derived Riemannian gradients and analyzed curvature-induced effects on optimization and representation learning.

Technical Skills

Languages: Python, C++, C, MATLAB

Frameworks & Tools: Pytorch, Isaac Gym, Docker, Git, uv, pixi, Typst, LaTeX

Core Areas: Robotics, Machine Learning, Computer Vision

Specializations: Robotic Manipulation, Grasping, Motion Planning

Achievements

- Research List 2025