

Alok Raj

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Github Website

Alok Raj

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EDUCATION

- Indian Institute of Technology (ISM) Dhanbad** Dhanbad, India
Bachelors of Technology in Computer Science and Engineering; CGPA: 8.59 / 10.00 or 3.44 / 4.00
Class of 2026
- BR DAV Public School** Begusarai, India
High School(12th); Percentage: 97.2%
Class of 2022

PUBLICATIONS

- Search-TTA: A Multi-Modal Test-Time Adaptation Framework for Visual Search in the Wild** [Paper](#)
Derek Ming Siang Tan, Shailesh, Boyang Liu, **Alok Raj**, Qi Xuan Ang, Weiheng Dai, Tanishq Duhan, Jimmy Chiun, Yuhong Cao, Florian Shkurti, Guillaume Adrien Sartoretti
Accepted at the *Conference on Robot Learning (CoRL)* 2025
- GRIM: Task-Oriented Grasping with Conditioning on Generative Examples** [Paper](#)
Shailesh, **Alok Raj**, Nayan Kumar, Priya Shukla, Andrew Melnik, Michael Beetz, Gora Chand Nandi
Accepted at the *ICML Workshop on Building Physically Plausible World Models.* 2025

EXPERIENCE

- Samsung R&D Institute India-Bangalore** Bangalore, India
Research and Development Intern May 2025 - July 2025
 - Project:** Voice Biometrics for low-compute devices such as smart watches.
 - Description:**
 - Developed an on-device speaker verification system for low-compute devices, utilizing modern attention-based architectures.
 - Implemented model **quantization** and optimized the system for on-device authentication.
 - Hybrid inference architecture to infer on multiples devices based on device constraints.
- MARMoT Lab, NUS** Remote
Research Internship Under Prof. Guillaume A Sartoretti Feb 2025 - May 2025
 - Project:** Embodied Vision-Language Foundation Models for Visual Active Search.
 - Description:**
 - Adapted VAS/PSVAS frameworks & developed a **novel** Dijkstra-based evaluation method incorporating model predictions & exploration penalties.
 - Implemented & evaluated meta-learning based **Test-Time Adaptation (TTA)**, improving Out-of-Distribution performance.
 - Conducted experiments (iNaturalist dataset, Nvidia RTX 5000) comparing against baselines.
- Center of Intelligent Robotics, IIIT Allahabad** Remote
Research Internship Under Prof. G.C. Nandi & Andrew Melnik Dec 2024 - May 2025
 - Project:** Task-Oriented Grasping using Generative conditioning (GRIM Framework)
 - Description:**
 - Developed key components of the **GRIM memory creation pipeline**, involving single-view 3D hand-object reconstruction by prompting foundation models (VLMs, **Genie (Text-to-3D)**).
 - Engineered the **hybrid alignment strategy** for matching retrieved memory instances to scene objects, utilizing **DINOv2 PCA features** for coarse alignment and **ICP** with Chamfer distance for refinement.
 - Enabled robust, training-free task-oriented grasping by transferring grasp poses from aligned, generatively-created 3D examples to novel scene objects.
- Clutterbot Technologies** Bangalore, India
Machine Learning Intern May 2024 - July 2024
 - Project:** Addressed challenge of limited labeled data via Self-Training with Distillation and Curriculum Learning.
 - Description:**
 - Self-Training, using Co-DETR, to expand the dataset with unannotated images.
 - Curriculum learning trained DAMO-YOLO-M, distilled to DAMO-YOLO-Tiny for robot deployment.
 - Improved mAP50 from 34% to 42% and evaluated performance with TIDE.
 - Deployed on robot using Nvidia DeepStream and integrated with ROS2.

- **NVCTI, IIT(ISM)**
 - *Minor in Product Development Internship*
 - **Project:** Automating the process of road-marking with Computer Vision and Robotics.
 - **Description:**
 - Designed a lane detection algorithm to guide the robot on roads.
 - Created a robot prototype for testing of effective lane following and spraying mechanism.

Dhanbad, India
Feb 2024 - April 2025

SELECTED PROJECTS

- **Mobile-Swarm-Navigation** [\[video folder\]](#) [\[code\]](#)
 - *Inter-IIT Tech Meet 13.0 - BharatForge* Nov 2024 - Dec 2024
 - **Project:** Create a Centralised Intelligence for Dynamic Swarm Navigation.
 - Scalable ROS2 based robot swarm for autonomous exploration and navigation in a dynamic environment.
 - Dynamic environmental mapping with Instance Segmentation and Stereo Depth.
 - Database management system for task allocation for the swarm with LLM based interactive search.
- **Autonomous Driving NXP-B3RB Buggy** [\[link\]](#)
 - *NXP-AIM Self Driving Car Design Challenge: Under Prof. Subhrangsu Mandal* Aug 2024 - Oct 2024
 - Developed an autonomous driving system, for a B3RB-buggy, achieving a 1:42 (min:sec) track time.
 - Integrated LiDAR and camera for lane detection, obstacle avoidance, and traffic sign recognition.
 - Trained YOLOv5s, optimized with INT8 quantization for NPU, achieving real-time 7 Hz inference.
- **Hologlyph Bots** [\[video\]](#) [\[code\]](#)
 - *E-Yantra 2023* Aug 2023 - Jan 2024
 - Designed holonomic drawing robots, developing PID control with inverse kinematics on an ESP-32 (Micro-ROS).
 - Simulated and deployed the 3-bot swarm, using an overhead camera with Aruco detection for pose tracking.

SKILLS

- **Programming:** C++ , Python, MATLAB, Linux, Git, SSH
- **Simulation/Visualization:** Isaac Gym, Gazebo, RViz, Mujoco, Sapien, Open3D
- **Frameworks/Libraries:** ROS/ROS2, RViz, PyTorch, OpenCV, Matplotlib

RELEVANT COURSEWORK

- **Mechatronics:** Engineering Mechanics, Mechanical Measurements, Analog Interface Electronics
- **Computer Science:** Reinforcement Learning, Self-Supervised Learning, Convolutional Neural Networks, Transformers, Data Structure & Algorithm

HONORS AND AWARDS

- 6th Position: InterIIT Tech Meet 13.0 for Righbettelabs
- Winner: NXP-AIM Regional Finale and Finalist: Grand Finale
- 3rd Position: Robowars(BattleBots) at TechKriti 2024 (Annual Tech Fest of IIT Kanpur)
- 3rd Position: Robowars(BattleBots) at Concetto 2024 (Annual Tech Fest of IIT Dhanbad)
- Received the Excellent Academic Performance Award (AISSCE 2022).

EXTRA-CURRICULAR ACTIVITIES

- **Club Coordinator:** RoboISM - The official Robotics and AI club of IIT ISM Dhanbad.
- **Joint Event Coordinator:** NVCTI - The innovation cell of IIT ISM Dhanbad.