

Yash Kumar Sahu

Research Assistant, Indian Institute of Science

Bengaluru, India

✉ yashkumars@iisc.ac.in
🌐 www.yashkumarsahu.com

Education

- 2023 – 2024 **Masters Thesis**, Indian Institute of Science (IISc)
Advisor: Prof. Pradipta Biswas and Prof. Sadagopan Narasimhan
Title: Comparative Study on Image Translation GANs for Object Detection in Low-Resource Domains (presented at ICVTTS 2024, see Publications)
- 2019 – 2024 **Bachelors & Masters in Computer Science**,
Indian Institute of Information Technology, Design and Manufacturing (IIITDM), Kancheepuram
Advisor: Prof. Sadagopan Narasimhan; **GPA:** 8.44/10.0 (3.65/4.0) (**Top 5%** in class)

Selected Honors and Awards

- ICRA 2024 **RoboMaster University Sim2Real Challenge** (by Tsinghua University) | Yokohama, Japan | [[More Info.](#)]
○ Awarded 3rd prize globally, competing among 30+ teams (1st ever Indian team to reach finals).
- RoboCup 2023 **Autonomous Robot Manipulation Challenge** (by MathWorks) | Bordeaux, France | [[More Info.](#)]
○ Ranked 4th globally and 3rd in classification accuracy among 10+ countries in the finals.
- RoboWars 2023 **IIITDM Technical Festival** (sponsored by IEEE) | Chennai, India | [[More Info.](#)]
○ Awarded 2nd prize inter-university in the finals competing in a physical battle against 12 robots.
- ERC 2022 **European Rover Challenge** (by European Space Agency (ESA)) | Krakow, Poland | [[More Info.](#)]
○ Ranked 6th globally at the 2022 remote edition world finals featuring 50+ teams from 10+ countries.

Publications

- Under Review **Improving MR Interaction through GenAI**
Yashaswi Sinha, Atharva Rege, [Yash Kumar Sahu](#), Rubini M, Himanshu Vishwakarma, Pradipta Biswas
- Hugging Face **Synthetic Tools Dataset via Diffusion Models** [[Dataset](#)]
[Yash Kumar Sahu](#)*, Yashaswi Sinha*, Himanshu Vishwakarma, Arushi Khokhar, Pradipta Biswas
Open-source dataset: 37,000 images spanning 16 hand tool classes (Under Review)
- ICRA 2025 **Blind Tactile Exploration for Surface Reconstruction**
Yashaswi Sinha*, Soumojit Bhattacharya*, [Yash Kumar Sahu](#), Pradipta Biswas
IEEE International Conference on Robotics and Automation
- ACM IUI 2025 **Diffuse Your Data Blues: Augmenting Low-Resource Datasets via User-Assisted Diffusion**
Yashaswi Sinha, [Yash Kumar Sahu](#)*, Shravan Shanmugam*, Abhishek Mukhopadhyay, Pradipta Biswas
Proceedings of the 30th International Conference on Intelligent User Interfaces (Accept. Rate 25%)
- ICVTTS 2024 **Comparative Study on Image Translation GANs for Object Detection in Low-Resource Domains**
[Yash Kumar Sahu](#), Abhishek Mukhopadhyay, Gyanig Kumar, Pradipta Biswas
IEEE International Conference on Vehicular Technology and Transportation Systems (Accept. Rate 30%)
- CICT 2023 **Vision-Based Object Sorting in Dynamic Environments using YOLO for RoboCup ARM Challenge**
[Yash Kumar Sahu](#), Radhika Mittal, Deep Patel, Chayan Maiti, M Sreekumar
IEEE International Conference on Information Communication Technology (h5-index: 27)

* Denotes equal contribution

Research Experiences

- 2023 – Present **Intelligent Inclusive Interaction Design (I3D) Lab** [[More Info.](#)], Indian Institute of Science
Research Assistant | Advisor: Prof. Pradipta Biswas
- Image Editing via Diffusion* ○ Compositing object images onto diverse backgrounds along with surface material transfer.
○ Mask-guided latent and activation alignment for regional and feature-level identity-preservation.
○ Improved classification by 11% with 67% less data compared to traditional augmentations.
- Scene Understanding* ○ Learning scene-conditioned object placement with a Conditional VAE.
○ Encoded latent vectors fused with scene context to generate placement heatmaps.

- 3D Surface Reconstruction** ○ Performed surface reconstruction using actor-critic reinforcement learning for tactile exploration.
○ Enhanced reconstruction by registering tactile & photogrammetry point clouds using RANSAC.
○ Achieved 91% IoU with 1mm precision for surface coverage of convex objects with sharp edges.
- Image Translation** ○ Compared GANs and Diffusion models in translating synthetic & simulated to realistic images.
○ Utilized these translated images for data augmentation to increase dataset diversity.
○ Achieved FID 50.0, with 14% F1 and 56% mAP@50 boost on datasets limited under 1000 images.
- 2023 - 2024 **Centre for AI, IoT and Robotics (CAIRO), IIITDM** | Research Intern | Advisor: **Prof. Sreekumar M**
○ Implemented path planning, depth estimation for efficient searching and pick-place by a robotic arm.
○ Developed software for autonomous pick and place of a 7-DoF Franka Emika Panda using MATLAB.
○ Performed object detection and classification using custom trained YOLO on RGB and depth images.
- 2023 **Mobile Robotics Lab, Indian Institute of Science** | Research Intern | Advisor: **Prof. Debasish Ghose**
○ Implemented 3D path planning for drones using Corridor-based planning (Corridrones).
○ Designed layered architecture for navigation, incorporating A*, Dijkstra's, & RRT algorithms.
○ Developed cloud server architecture that reduced memory usage by 37% and enabled scalability.
- 2022 **Smart Manufacturing Lab, IIITDM** | Research Intern | Advisor: **Prof. Senthilkumaran K**
○ Developed a full-stack PyQt GUI for collaborative 3D printing using two 4-DoF robotic arms.
○ Supported synchronized multi-arm motion with real-time pose and print progress display.
○ Mapped G-code coordinates to robot extruder poses for alternate layer printing by each arm.
- 2021 **Department of Computer Science, IIITDM** | Research Intern | Advisor: Prof. Ram Prasad Padhy
○ Simulated traffic scenarios for autonomous navigation of self-driving cars using Autoware.AI.
○ Developed a ROS-Gazebo bridge for physics simulation integration with Autoware.AI.

Talks

- 2024 **Hands on Object Detection and CNNs**, Talent Sprint, Indian Institute of Science, Bengaluru
- 2024 **Paper Presentation**, *IEEE ICVTTS 2024*, Amrita Vishwa Vidyapeetam, Bengaluru
- 2023 **Paper Presentation**, *IEEE CICT 2023*, IIITDM Jabalpur
- 2022 **Practical Robotics with ROS**, *4 Lecture Series*, IIITDM Kancheepuram

Corporate Experiences

- 2022 – 2023 **Hyper Horizon** [[More Info.](#) ↗] | Robotics Software Intern (Autonomous Undersea Systems Division)
○ Crafted navigation software in C++ and Python for an Autonomous Underwater Vehicle (AUV).
○ Deployed the ROS integrated robot in Indian water bodies for stealth monitoring operations.
○ Built a full-stack PyQt mission planner for sensor telemetry monitoring and mission deployment.
○ Configured 3D localization with sensor fusion of IMU, underwater depth SONAR, and GPS.

Leadership

- 2020 – 2022 **Mars Research Station (MaRS), IIITDM** | Software Development Team Lead
○ Co-founded the college's first rover club, winning the college's **Pioneering Spirit Award**.
○ Club recognised by the **Director of Indian Space Research Organization (ISRO) Satellite Centre**.
○ Spearheaded the software team to achieve top rankings in international rover competitions.

Skills

- **Languages & Libraries:** Python, Pytorch, OpenGL, OpenMP, PyBullet, PyQt, Bash, C/C++
- **Tools & Platforms:** Docker, Git, Linux, MATLAB, Nvidia Isaac Sim, ROS, ROS2

Volunteering

- 2021 – 2023 **National Cadet Corps (NCC)** | Senior Under Officer
○ Led university NCC wing among 400+ students in training for the nation's second line of defense.
○ Achieved best grades (**top 2%**) in the battalion for the second-highest level (B) training certification.
- 2022 – 2024 **Student Mentor** | Mars Research Station (MaRS), IIITDM
○ Guided 100+ students over two years in robotics, bridging simulation and real-world implementation.
○ Served as the official team mentor for ISRO's Rover Challenge, leading the team to secure 5th place nationally, competing against industry professionals and postgraduate experts.
○ Mentored team for a national competition, leading to team felicitation by the **Indian President**.