

# Vishwesh Vhavle

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Google Scholar |  vishweshvhavle | 

I work at the intersection of 3D Computer Vision, Robotics, and Computer Graphics. I am interested in leveraging their interplay, along with representation learning, to advance methodologies across these domains.

## EDUCATION

<b>Indraprastha Institute of Information Technology, Delhi</b> <i>Bachelor of Technology, Computer Science Engineering</i> Coursework: Computer Vision, Computer Graphics, Reinforcement Learning, Machine Learning, Distributed Systems	<b>2020 – 2024</b> <b>GPA: 8.0/10.0</b>
<b>Indian School Muscat, Oman</b> <i>Science Stream, CBSE Board, Senior Secondary School</i>	<b>2008 – 2020</b> <b>Grade: 94.4%</b>

## PUBLICATIONS

- **Vishwesh Vhavle**, Hiteshi Jain, and Avinash Sharma. Camera3DMM: Leveraging Perspective Camera for Estimating Parametric 3D Head Models. *SIGGRAPH Asia Technical Communications*, 2025.
- **Vishwesh Vhavle**. PinTags: A Visual Fiducial Marker System for Logistics. *NCVPRIPG*, 2025.
- **Vishwesh Vhavle\*** and Jatin Sharma\*. Alfred: Open-Source Autonomous Mobile Robot Platform with Augmented Physical Testbed. *I-SMAC*, 2024.

## EXPERIENCE

<b>Research Fellow</b> – <i>3DVisLab, Indian Institute of Technology, Jodhpur</i>	<b>Jul 2025 – Current</b>
• Developing learning frameworks for arbitrary mesh triangulations for local-global geometric processing.	
• Working on improving human head mesh registration, detail-preserving deformations, and local template-based editing through surface geometry learning.	
• Applying discretization-agnostic frameworks to FMCW LiDAR data with doppler velocity information.	
<b>3D Computer Vision Research Intern</b> – <i>Mercedes-Benz Research &amp; Development, India</i>	<b>Sep 2024 – Jul 2025</b>
• Developed a synthetic data generation pipeline to generate photorealistic images using morphable face avatars textured with 3D Gaussian Splatting for pre-training foundation models for driver monitoring systems.	
• Worked on Parametric Human Head Reconstruction from commodity monocular images with extreme camera distortions. ( <b>Patent Filed</b> and <b>Technical Communications Paper Accepted at SIGGRAPH Asia 2025</b> )	
<b>Robotics Research Assistant</b> – <i>Infosys Centre for Artificial Intelligence, IIIT Delhi</i>	<b>May 2022 – Jun 2024</b>
• Developed an Open-Source Autonomous Mobile Robot (AMR) platform including the firmware, control system, perception, SLAM, navigation, and path-planner.	
• Designed a motion-capture facility for comprehensive AMR testing and Sim-to-Real transfer of Deep-RL policies trained using ROS and Gazebo framework.	
• Developed a framework for data-driven Trajectory Prediction of traffic agents using PyTorch, and deployed it on the autonomous vehicle project at IIIT Delhi.	

## PROJECTS

<b>Camera3DMM: Perspective-Aware 3D Head Reconstruction</b> 	<b>May 2025 – Aug 2025</b>
• Developed perspective-aware 3D human head reconstruction framework jointly estimating FLAME parameters and camera intrinsics from single RGB images.	
• Achieved 22% improvement in mesh reconstruction quality over state-of-the-art baselines	
• This work was published at <b>SIGGRAPH Asia Technical Communications 2025</b> .	
<b>PinTags: Visual Fiducial Marker System for Logistics</b> 	<b>June 2024 – Aug 2024</b>
• Designed high-capacity visual fiducial marker system supporting 32,768 unique tags using color-coded circular sectors in LAB color space for robust detection across lighting conditions.	
• Implemented detection pipeline with 2x faster detection than AprilTags while maintaining competitive accuracy.	
• This work was published at <b>NCVPRIPG 2025</b> .	

<b>Alfred: Autonomous Mobile Robot Platform</b> 	<b>Feb 2023 – May 2024</b>
<ul style="list-style-type: none"> <li>Designed and manufactured an open-source UGV platform equipped with Velodyne VLP-16 LiDAR, NVIDIA AGX Orin, Intel NUC, and RealSense camera.</li> <li>Developed comprehensive robotics stack including UGV firmware, control system, perception, SLAM, navigation, and path-planning.</li> <li>This work was published at <b>I-SMAC 2025</b>.</li> </ul>	
<b>Motion Capture Testbed for Simulated Robotics</b> 	<b>Mar 2023 – May 2024</b>
<ul style="list-style-type: none"> <li>Developed a 200 m<sup>2</sup> UGV test facility with 6 ceiling-mounted cameras and NVIDIA Jetsons for real-time tracking.</li> <li>Implemented novel camera-LiDAR cross-calibration technique and optimized image processing pipeline for 22 FPS trajectory detection.</li> <li>Achieved average tracking error of less than 2 cm, enabling effective Sim-to-Real transfer of Deep-RL policies.</li> </ul>	
<b>Solid Texture Synthesis</b> 	<b>Oct 2023 – Dec 2023</b>
<ul style="list-style-type: none"> <li>Implemented non-parametric texture optimization approach for synthesizing solid textures from 2D exemplars.</li> <li>Developed end-to-end rendering pipeline using OpenGL and C++ with integrated histogram matching.</li> </ul>	
<b>Navigation and Exploration through Deep RL</b> 	<b>Nov 2023 – Dec 2023</b>
<ul style="list-style-type: none"> <li>Implemented TD3 policy gradient algorithm for model-free, off-policy online reinforcement learning.</li> <li>Deployed on Turtlebot 3 with ROS2 and Gazebo, achieving autonomous navigation using VLP-16 LiDAR point-clouds.</li> </ul>	
<b>Cylindrical Manipulator with Linear Gripper</b> 	<b>Aug 2023 – Oct 2023</b>
<ul style="list-style-type: none"> <li>Developed a 3-DOF cylindrical manipulator with position control for package manipulation sorting.</li> <li>Implemented the perception stack with object pose estimation using data from Intel Realsense RGBD camera.</li> </ul>	
<b>Autonomous Central Navigation for Multi-Agent Robotics</b> 	<b>Sep 2021 – Feb 2022</b>
<ul style="list-style-type: none"> <li>Built four ATMega-based robots with package drop manipulators and ARuCo marker-based tracking system.</li> <li>Developed central visual navigation system with multi-agent path planning using A* algorithm.</li> </ul>	
<b>Birds-Eye View Registration from Dash-Cam Footage</b>	<b>Apr 2021 – May 2023</b>
<ul style="list-style-type: none"> <li>Implemented an image processing pipeline for Argoverse 2's stereo camera dataset with camera extrinsics calibration.</li> <li>Developed vanishing-point detector for Direct-Linear Transform and integrated fine-tuned Mask R-CNN for road segmentation.</li> </ul>	
<b>Content-Based Image Retrieval for Indian Foods</b>	<b>Apr 2023 – May 2023</b>
<ul style="list-style-type: none"> <li>Fine-tuned ResNet-50 model on custom Indian Foods dataset created through web-scraping for feature encoding.</li> <li>Implemented efficient similarity search using cosine similarity across cached image encodings.</li> </ul>	

## AWARDS & ACHIEVEMENTS

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- 2025: First Runners-Up** of the 3D Gaussian Splatting Challenge at **3DGS Workshop, SIGGRAPH Asia 2025**
- 2024:** Bachelor Thesis Project selected as **Best BTP in the Engineering Track** for the Class of 2024 at **IIIT Delhi**
- 2023: Top-Up Fellowship** by **ARTPARK IISc Bangalore**
- 2023: Summer Undergraduate Research Fellowship** by **IIIT Delhi**
- 2022:** Seed Funded ₹7,00,000 from **the Government of India** under the Nidhi-Prayas Scheme
- 2021: Finalist** at **Flipkart's GRiD 3.0 Robotics Competition**
- 2021:** Granted **50% Merit Scholarship** by **IIIT Delhi**

## SKILLS

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- Languages:** C++, Python, Java, Bash (Shell), MATLAB, PHP, Elixir
- Tools:** OpenCV, NerfStudio, 3DGS, ROS1, ROS2, PyTorch, PCL, Docker, OpenGL, Open3D, Git, Linux, Windows
- Hardware:** Arduino, ATmega, ATTiny, Raspberry Pi, ESP8266
- Software:** Autodesk Fusion 360 (CAD, PCB), Blender, Unity, Adobe Creative Suite, Figma, Tinkercad

## TEACHING EXPERIENCE

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<b>Teaching Assistant – 3D Vision Summer School, IIIT Hyderabad</b>	<b>Summer 2023</b>
<ul style="list-style-type: none"> <li>Taught parametric models including FLAME and SMPL for 3D human and facial modeling applications.</li> <li>Instructed novel view synthesis algorithms including Neural Radiance Fields (NeRFs) and related 3D reconstruction techniques.</li> </ul>	

<b>Teaching Assistant, Computer Vision – IIIT Delhi</b>	<b>Jan 2024 – May 2024</b>
• Helped design course assignments, mentored course projects, and graded quizzes and assignments for 200 students (Undergraduate, Masters, and PhD).	
<b>Head Teaching Assistant, Computer Graphics – IIIT Delhi</b>	<b>Sep 2023 – Jan 2024</b>
• Conducted weekly labs for 90 students (Undergraduate, Masters, and PhD) using OpenGL in C++, helped design course assignments, mentored course projects, and graded quizzes, assignments, and course projects.	
<b>Teaching Assistant, Human Computer Interaction – IIIT Delhi</b>	<b>Sep 2022 – Jan 2023</b>
• Conducted weekly tutorials for 40 students to strengthen the concepts taught in class and graded assignments and course projects.	

## VOLUNTEER EXPERIENCE

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<b>Student Volunteer – SIGGRAPH Asia 2025</b>	<b>December 2025</b>
• Contributed 18 hours supporting technical programs including Computer Animation Festival, Technical Papers presentations, and Emerging Technologies exhibits.	
<b>Volunteer Teacher – IIIT Delhi</b>	<b>Summer 2023</b>
• Taught middle school students from underprivileged backgrounds, providing mentorship and personalized learning materials.	
<b>Founding Coordinator – International Relations Council, IIIT Delhi</b>	<b>Jun 2022 – May 2024</b>
• Created and led initiatives to foster an inclusive campus environment for international students.	
• Organized cross-cultural events and programs to promote understanding and equal participation opportunities.	

## LINKS

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- 🌐 <https://vishweshvhavle.github.io/>
- 🎓 <https://scholar.google.com/citations?user=kgTeR74AAAAJ&hl>
- /github <https://github.com/vishweshvhavle>
- linkedin <https://linkedin.com/in/vishweshvhavle>
  
- 1. 🌐 <https://pintag-review.github.io/PinTag/>
- 2. 🐧 <https://github.com/vishweshvhavle/alfred/>
- 3. 🔍 [https://drive.google.com/file/d/1VTPbL9K\\_0mTGgPaHCfnb2N\\_AGln1dtN9/view](https://drive.google.com/file/d/1VTPbL9K_0mTGgPaHCfnb2N_AGln1dtN9/view)
- 4. 🐧 <https://github.com/vishweshvhavle/solid-texture-synthesis>
- 5. 🐧 <https://github.com/vishweshvhavle/deep-rl-navigation>
- 6. 🎥 <https://youtu.be/to7IvqKXnhQ>
- 7. 📁 <https://drive.google.com/drive/folders/10-bGFo7b6reio7eZTLztf6eE0pG8L1za>
- 8. 🌐 <https://doi.org/10.1145/3757376.3771420>