

# Vaishnavi Khindkar

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## EDUCATION

**Carnegie Mellon University, School of Computer Science (Robotics Institute)** Aug 2025 - Dec 2026  
*Master of Science in Computer Vision* GPA 4.11/4  
• Relevant Coursework: Advanced Computer Vision (16-820), Learning for 3D Vision (16-825), Robot Learning (16-831), Robot Localization & Mapping (16-833), Visual Learning & Recognition (16-824), Deep Learning Systems (10-714).

## TECHNICAL SKILLS

**Programming:** Python (3.x), Modern C++ (14, 17, 20), MATLAB, SQL, C, R, Octave, Core Java  
**ML / CV:** Machine Learning, Deep Learning, Computer Vision, 3D Vision, Multimodal Learning, Object Detection  
**Frameworks and Tools:** PyTorch, TensorFlow, AWS, NVIDIA Triton, Linux, Git, LaTeX, Jupyter Notebook, OpenCV, Docker  
**Domains:** Generative Modeling & Sampling, 3D & 4D Scene Understanding, Video Generative AI, Object-Centric & Spatial Representations, World Models, Autonomous Driving, Robotics

## EXPERIENCE

**Sync Labs** San Francisco Bay Area, CA  
*Machine Learning Engineering Intern* May 2026 - Present

- Building production-scale video generative AI and lip-sync pipelines, including shot-level video/audio decomposition, multilingual workflows, and scalable inference orchestration.

**Carnegie Mellon University, Machine Learning Department** Pittsburgh, PA  
*Graduate Research Fellow (Advisor: Prof. [Andrej Risteski](#))* May 2026 - Present

- Studying reward-tilted sampling: principled lift-and-tilt methods for steering generative models toward target distributions under complex, indefinite rewards.

**Carnegie Mellon University, Robotics Institute** Pittsburgh, PA  
*Research Assistant (Advisor: Prof. [Fernando De la Torre](#))* Aug 2025 - Present

- Developed the first framework using foundation generative models (Imagen-3) for systematic diagnosis of aerial object detectors, enabling fine-grained failure analysis and up to 11% AP50 performance improvement.

**Product Labs (Bhashini, Government of India)** Hyderabad, India  
*Applied AI Researcher* Oct 2024 - Jul 2025

- Containerized OCR models with Docker and deployed via NVIDIA Triton, achieving real-time latency (0.11s printed, 0.051s handwritten) across 22 Indian languages.

**CVIT, IIT Hyderabad** Hyderabad, India  
*Jr. Research Scientist (Advisors: Prof. [C. V. Jawahar](#), Prof. [Vineeth N. Balasubramanian](#), Prof. [Chetan Arora](#))* Aug 2020 - Sep 2024

- Led research on reason-enriched pedestrian intent estimation (MindRead, IROS 2024), creating the PIE++ dataset and achieving +5.6% accuracy and +7% F1 over baselines.
- Developed ILLUME, a self-attention-based adaptive object detection framework (WACV 2022) with improved structural attention and state-of-the-art domain adaptation performance.

**Barclays** Pune, India  
*Software Developer* Aug 2018 - Oct 2020

- Developed Contacts application using Spring Boot and AngularJS, improving user experience and reducing system errors.

## SELECT PUBLICATIONS AND PATENTS

- Diagnosing Aerial-View Object Detectors with Foundational Image Generative Models [\[Link\]](#)  
Panev S., Jeon M., Khindkar V., Deshpande A., de Melo C.M., Hu S., Chakraborty S., De la Torre F. (**ECCV 2026**)
- Can Reasons Help Improve Pedestrian Intent Estimation? A Cross-Modal Approach [\[Link\]](#)  
Khindkar V., Balasubramanian V.N., Arora C., Subramanian A., Jawahar C.V. (**IROS 2024**)
- To miss-attend is to misalign! Residual Self-Attentive Feature Alignment for Adapting Object Detectors [\[Link\]](#)  
Khindkar V., Balasubramanian V.N., Arora C., Saluja R., Subramanian A., Jawahar C.V. (**WACV 2022**)
- GAMMA: Generative Augmentation for Attentive Marine Debris Detection [\[Link\]](#)  
Khindkar V., Khindkar J. (**arXiv 2022**)
- System and method for detecting object in an adaptive environment using a machine learning model  
Khindkar V., Balasubramanian V.N., Arora C., Subramanian A., Jawahar C.V. (**US Patent 2023**)

## SELECT PROJECTS

- **Slot4D: Learning Object Slots for 4D Reconstruction** - *CMU Capstone (Advisor: Prof. [Laszlo A. Jeni](#))*  
Implementing an object-centric 4D reconstruction pipeline using slot attention to decompose dynamic scenes into per-object latent slots from multi-view video.
- **Cross-Resolution Gaussian Splatting for Hybrid Resolution Photography** - *(Advisor: Prof. [Shubham Tulsiani](#))*  
Designed a cross-resolution 3D Gaussian Splatting pipeline that fuses heterogeneous image sources, incorporating detail-preserving denoification for high-fidelity reconstruction.
- **Generalizable Single-View Holistic Robot Pose Estimation** - *(Advisor: Prof. [Jun-Yan Zhu](#))*  
Designed a single-view robot pose and keypoint estimation pipeline with synthetic-to-real transfer and domain randomization for unseen robot types.

## ACADEMIC SERVICE & VOLUNTEERING

**Reviewer:** CVPR 2025, ECCV 2024, CVPR 2023, ECCV 2022, WACV 2022    **Mentor:** AI4ALL Changemakers in AI (2022)  
**Teaching:** CV tutorials for IISc-TalentSprint Exec. M.Tech    **Organizer:** Hour of Code (Intl. Coding Week)