Hritam Basak

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Industrial Experience

Applied Scientist Intern (X2) — California, USA

Amazon — *June, 2025 – Present || May. 2024 – Oct. 2024*

- Worked on image-guided 3D generation using Gaussian Splatting using 3D and 2D Diffusion priors. [IROS'25]
- Generated 3D assets used for VLM-based articulated object understanding and manipulation.
- Researching on Vision-Language Action (VLA) models for 3D affordance estimation and manipulation. Work to be submitted to CVPR'26.
- Collaborated on uncertainty-guided 6-DoF pose estimation for robotics. [CVPR'25]

Data Scientist — Mumbai, India

Tata Neu — *Jun. 2021 – Jul. 2022*

- Engineered a visual search engine for fashion recommendations using RCNN for foreground extraction and pre-trained ResNet for feature extraction, achieving over 96% accuracy.
- Developed an automated human-in-the-loop system to annotate Tata Group's native 20M+ fashion image dataset.
- Designed a promotion recommendation algorithm for 80M customer groups employing Churn and CLTV, and collaborative filtering.

Research Experience

Graduate Research Assistant — New York, USA

Stony Brook University – Advisor: Dr. Zhaozheng Yin — *Aug. 2023 – Present*

- Developed a novel Dynamic 4D Gaussian Splatting with Diffusion guidance and dual-depth supervision for Surgical Scene Reconstruction. [MICCAI'25]
- Proposed the first VLM-based Semi-supervised Domain Adaptation paradigm, along with a novel dynamic class-balancing loss (DyCE) for semantic segmentation. [CVPR'25]
- Devised an episodic learning paradigm for unlearning domain-specific features followed by learning domain-agnostic ones for domain adaptation. [ECCV'24]
- Developed robust and adaptive Generative Latent Search (GLS) for semi-supervised domain-adaptive semantic segmentation. [MICCAI'24]
- Proposed novel semi-supervised algorithm by utilizing pseudo-labels in contrastive learning, which outperformed state-of-the-art methods by ∼5% DSC score. [CVPR'23]
- Participated in medical applications of computer vision encompassing semi-supervised and self-supervised learning using very few annotations (≤10%). [MICCAI'23]

Research Intern — Zurich, Switzerland

ETH Zurich – Advisor: Dr. Luc Van Gool — *May 2020 – Aug 2020*

- Collaborated on cross-image pixel contrast project to enforce pixel embeddings belonging to the same semantic class to be more similar than embeddings from different classes. [ICASSP'23]
- Guided a team of 5 undergraduate students to execute cross-image context mining for label-efficient semantic segmentation employing neural co-attention.
- Composed over 1000 lines in the ContrastiveSeg repository for understanding contextual dependencies among pixels.

Research Intern — Paris, France

Sorbonne University – Advisor: Dr. Daniel Racoceanu — *Nov 2019 – Mar 2020*

- Engaged with a team of 2 Postdocs and 3 Ph.D. students, utilizing Deep Learning techniques for clustering and segmentation of densely packed cells.
- Designed a MATLAB toolbox for tracking of NPC cells in culture medium with an accuracy of 93%. [SIRS'20]
- Coordinated with Paris Brain Institute to analyze the brain activity of human vs. non-human primates with segmentation IoU of 80%.

Research Interests

Broad interest: Generative Models, 3D Vision, Multimodal Understanding, VLM, Medical Image Analysis

Specific interest: Diffusion Models, 3D Vision & Robotics, Manipulation, RL, Domain Adaptation

Education

Stony Brook University — New York, USA
Doctor of Philosophy (Ph.D.) in Computer Science | *Grade* : 3.89/4 — *Aug. 2022 – Jan. 2026 (expected)*

Jadavpur University — Kolkata, India
Bachelor of Engineering in Electrical Engineering | *Grade* : 8.9/10 — *Jul. 2017 – May 2021*

Technical Skills

Languages: Python, MATLAB, Java, C/C++, SQL, JavaScript, HTML/CSS

Libraries: Pytorch, TensorFlow, OpenCV, Pandas, NumPy, Matplotlib

Selected Publications

- *H Basak*, Z Yin. SemiDAViL: Semi-supervised Domain Adaptation with Vision-Language Guidance for Semantic Segmentation, **CVPR, 2025** [Paper]
- M Li, X Yang, F Wang, *H Basak*, Y Sun, S Gayaka, M Sun, C Kuo. UA-Pose: Uncertainty-Aware 6D Object Pose Estimation and Online Object Completion with Partial References, **CVPR, 2025** [Paper]
- *H Basak*, Z Yin. D^4Recon: Dual-stage Deformation and Dual-scale Depth Guidance for Endoscopic Reconstruction, **MICCAI'25** [Paper]
- *H Basak*, H Tabatabaee, S Gayaka, MF Li, X Yang, CH Kuo, A Sen, M Sun, Z Yin. Enhancing Single Image to 3D Generation using Gaussian Splatting and Hybrid Diffusion Priors. **IROS'25** [Paper]
- *H Basak*, Z Yin. Forget More to Learn More: Domain-specific Feature Unlearning for Semi-supervised and Unsupervised Domain Adaptation, **ECCV, 2024** [Paper]
- *H Basak*, Z Yin. Quest for Clone: Test-time Domain Adaptation for Image Segmentation by Searching the Closest Clone in Latent Space, **MICCAI, 2024** [Paper]
- *H Basak*, Z Yin. Pseudo-label Guided Contrastive Learning for Semi-supervised Medical Image Segmentation, **CVPR, 2023** [Paper]
- *H Basak*, Z Yin. Semi-supervised Domain Adaptive Medical Image Segmentation through Consistency Regularized Disentangled Contrastive Learning, **MICCAI, 2023** [Early Accept: top 13%][Paper]
- *H Basak*, S Chattopadhyay, R Kundu, S Nag, R Mallipeddi. Ideal: Improved Dense Local Contrastive Learning For Semi-Supervised Medical Image Segmentation, **IEEE ICASSP, 2023** [Paper]
- *H Basak*, S Ghosal, R Sarkar. Addressing Class Imbalance in Semi-supervised Image Segmentation: A Study on Cardiac MRI, **MICCAI, 2022** [Paper]
- *H Basak*, R Bhattacharya, R Hussain, A Chatterjee. An Exceedingly Simple Consistency Regularization Method For Semi-Supervised Medical Image Segmentation, **IEEE ISBI, 2022** [Paper]
- *H Basak*, R Kundu, R Sarkar. MFSNet: A Multi Focus Segmentation Network for Skin Lesion Segmentation, **Pattern Recognition, Elsevier** [IF: 8.518] [Paper]
- *H Basak*, Singh PK, Ahmadian A, Ferrara M, Sarkar R. Fuzzy rank-based fusion of CNN models using Gompertz function for screening COVID-19. **Scientific reports, Nature** [IF: 5.516] [Paper]
- *H Basak*, R Hussain, A Rana. DFENet: A novel dimension fusion edge guided network for brain MRI segmentation. **SN Computer Science**. [IF: 1.55] [Paper]

Achievements/Awards

- **IEEE RAS Travel Award, 2025** for presenting work at IROS 2025 (Acceptance Rate $\sim$ 10%)
- **ECCV DEI Award, 2024** for presenting work at ECCV 2024 (Acceptance Rate $\sim$ 11%)
- **NIH Travel Grant, 2024** for presenting work at MICCAI 2024 (Acceptance Rate $\sim$ 15%)
- **IEEE SPS Scholarship, 2023 & 2024** for contributions in computer vision (Acceptance Rate $\sim$ 10%)
- **IEEE Travel Grant** for presenting work at IEEE ICASSP 2022 (Acceptance Rate $\sim$ 4%)
- **MICCAI STAR Award** for presenting work at MICCAI 2022 (Acceptance Rate $\sim$ 11%)
- **Gandhi Fellowship, 2021** by Primal Foundation India (Acceptance Rate $\sim$ 9%)
- **Charpak Fellowship, 2020** for Summer Research Internship in France (Acceptance Rate $\sim$28%)

Academic Services

- **Teaching Assistant**: CSE377: Medical Imaging, CSE214: Intro. to Data Structure
- **Reviewer**: CVPR, ECCV, MICCAI, ICASSP, IJCAI, TMI, TIP, TNNLS, TCSVT, Pattern Recognition