

Kartik Narayan

[LinkedIn](#) | [Github](#) | [Google Scholar](#)
<https://kartik-3004.github.io/portfolio/>

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Summary

I am a 3rd year Ph.D. student in the Computer Science Department at Johns Hopkins University. My current research interests lie in multimodal LLMs, agents, reasoning and video generation.

Education

Johns Hopkins University

Ph.D. Computer Science, Advisor: Dr. Vishal M. Patel

Baltimore, MD

2023 - Present

Indian Institute of Technology Jodhpur

Bachelors in Computer Science and Engineering

Jodhpur, India

2019 - 2023

Publications

- DeepMMSearch-R1: Empowering Multimodal LLMs in Multimodal Web Search**
Kartik Narayan, Yang Xu, Tian Cao, Kavya Nerella, Vishal M. Patel, Navid Shiee, Peter Gräsch, Chao Jia, Yinfei Yang, Zhe Gan
Under Review. [\[arXiv\]](#)
- FaceXFormer: A Unified Transformer for Facial Analysis**
*Kartik Narayan**, Vibashan VS*, Rama Chellappa, Vishal M. Patel
Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV 2025)
- SegFace: Face Segmentation of Long-Tail Classes**
Kartik Narayan, Vibashan VS, Vishal M. Patel
Association for the Advancement of Artificial Intelligence (AAAI 2025)
- DF-Platter: Multi-Face Heterogeneous Deepfake Dataset**
Kartik Narayan, Harsh Agarwal, Kartik Thakral, Surbhi Mittal, Mayank Vatsa, Richa Singh
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2023)
- FaceXBench: Evaluating Multimodal LLMs on Face Understanding**
Kartik Narayan, Vibashan VS, Vishal M. Patel
Under Review. [\[arXiv\]](#)
- PETALface: Parameter Efficient Transfer Learning for Low-resolution Face Recognition**
Kartik Narayan, Nithin Gopalakrishnan Nair, Jennifer Xu, Rama Chellappa, Vishal M. Patel
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2025) (Oral)
- FaceMoE: Mixture of Experts for Low-resolution Face Recognition**
Kartik Narayan, Vishal M. Patel
Under Review. [\[paper\]](#)
- Training-Free Stylized Abstraction**
Aiman Rahman*, *Kartik Narayan**, Vishal M. Patel
Under Review. [\[arXiv\]](#)
- TransFIRA: Transfer Learning for Face Image Recognizability Assessment**
Allen Tu, *Kartik Narayan*, Joshua Gleason, Jennifer Xu, Matthew Meyn, Tom Goldstein, Vishal M. Patel
Under Review. [\[arXiv\]](#)
- Investigating Social Biases in Multimodal LLMs**
Malsha Perera*, *Kartik Narayan**, Vishal M. Patel
2025 19th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2025).

9. **Improved Representation Learning for Unconstrained Face Recognition**
Nithin Gopalakrishnan Nair*, **Kartik Narayan***, Maitreya Suin, Ram Prabhakar, Jennifer Xu, Soraya Stevens, Joshua Gleason, Nathan Shindman, Rama Chellappa, Vishal M. Patel
2025 19th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2025).
10. **RestoreVAR: Visual Autoregressive Generation for All-in-One Image Restoration**
Sudarshan Rajagopalan, **Kartik Narayan**, Vishal M. Patel
Under Review. [[arXiv](#)]
11. **INFER: Implicit Neural Features for Exposing Realism**
Dhananjaya Jayasundara, **Kartik Narayan**, Vishal M. Patel
Under Review. [[paper](#)]
12. **Hyp-OC: Hyperbolic One Class Classification for Face Anti-Spoofing**
Kartik Narayan, Vishal M. Patel
2024 18th IEEE International Conference on Automatic Face and Gesture Recognition (FG 2024)
13. **DeePhyNet: Towards Detecting Phylogeny in Deepfakes**
Kartik Thakral, Harsh Agarwal, **Kartik Narayan**, Surbhi Mittal, Mayank Vatsa, Richa Singh
IEEE Transactions on Biometrics, Behavior, and Identity Science (T-BIOM)
14. **DeePhy: On Deepfake Phylogeny**
Kartik Narayan, Harsh Agarwal, Kartik Thakral, Surbhi Mittal, Mayank Vatsa, Richa Singh
2022 IEEE International Joint Conference on Biometrics (IJCB 2022)
15. **DeSI: Deepfake Source Identifier for Social Media**
Kartik Narayan, Harsh Agarwal, Surbhi Mittal, Kartik Thakral, Suman Kundu, Mayank Vatsa, Richa Singh
Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW 2022)
16. **Using Epidemic Modeling, Machine Learning & Control Feedback Strategy for Policy Management of COVID-19**
Kartik Narayan, Heena Rathore, Faycal Znidi
IEEE Access 10 (2022): 98244–98258
17. **Leveraging Ambient Sensing for the Estimation of Curiosity-Driven Human Crowd**
Anirban Das, **Kartik Narayan**, Suchetana Chakraborty
2022 IEEE International Systems Conference (SysCon 2022)

Research Experience

Apple Inc.

Ph.D. Research Intern

Seattle, WA

Summer 2025

- Multimodal LLMs for knowledge-intensive and information seeking questions
- Equipping MLLMs with web-search agent and enabling MLLM reasoning for web-search calls.
- Incentivizing MLLM for self-correction and self-verification after initial response.

Johns Hopkins University

Research Assistant, Vision and Image Understanding Lab advised by Dr. Vishal M. Patel

Baltimore, Maryland

2023 - Present

- Leading research efforts for the IARPA BRIAR grant, focusing on face recognition in extreme scenarios.
- Worked on designing a multi-task model for multiple face analysis tasks.
- Evaluated Multimodal LLMs on face understanding, and explored future directions such as SFT and tools use.
- Currently working on video diffusion models for physics-aware video generation.
- Tackling fundamental issues in T2V models such as text-rich video generation.

Indian Institute of Technology Jodhpur

Student Researcher, IAB Lab advised by Prof. Richa Singh and Prof. Mayank Vatsa

Jodhpur, India

2022 - 2023

- Worked on deepfake video generation, with a special emphasize on multi-face, low-resolution, and occluded videos.
- Introduced the concept of phylogeny (evolution) in deepfake video generation by sequentially swapping multiple faces.
- Developed the DeSI algorithm, capable of detecting deepfake videos on the Twitter platform and predicting their spread.

Academic Services

- **Invited Reviewer:** CVPR, ICCV, ECCV, AAAI, NeurIPS, ICLR, TPAMI, WaCV, IJCB, TIFS, TBIOM, IJCV, PR

Skills Summary

- **Programming:** Python, C/C++
- **ML/DL:** PyTorch, TensorFlow, Keras, OpenCV, Sklearn, Numpy, Pandas, Matplotlib
- **Development:** HTML, CSS, React.js, Node.js, Bootstrap, Firebase, MongoDB, ReactNative
- **Tools:** Docker, Kubernetes, GIT, AWS

Teaching Experience

Teaching Assistantship: Assisted in teaching by conducting weekly lab sessions, holding special doubt-clearing sessions, preparing quizzes, and grading assignments for the following courses:

- Deep Learning [*Spring 2023*]
- Introduction to Machine Learning [*Fall 2022*]
- Pattern Recognition and Machine Learning [*Spring 2022*]

Co-curricular Activities

- **Internship Head, CSE at the placement cell of IIT Jodhpur** [*2021 - 2022*]
Coordinated with companies to invite them for campus internships and placements.
- **Head of technical events in Prometeo, IIT Jodhpur** [*2021 - 2022*]
Led a team of 50+ students to organize technical competitions, attracting over 1,500 participants from across India.
- **Secretary of PHEME, The IITJ Newsletter Club** [*2020 - 2021*]
Managed a club of 80+ members responsible for creating newsletters, reports, conducting surveys, etc.
- **Student Guide at Student Wellbeing Committee, IITJ** [*2020 - 2023*]
Mentored 10 freshmen from diverse backgrounds to support their transition into college, guiding them in both academic and non-academic pursuits.