# Kartik Narayan

LinkedIn | Github | Google Scholar
**https://kartik-3004.github.io/portfolio/**

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## Summary

I am a 2nd year Ph.D. student in the Computer Science Department at Johns Hopkins University. My research is primarily focused on computer vision and face analysis, with a particular emphasis on multimodal LLMs and video generation.

## Education

**Johns Hopkins University**                                                                 Baltimore, MD
*Ph.D. Computer Science, Advisor: Dr.Vishal M. Patel*                            *2023 - Present*

**Indian Institute of Technology Jodhpur**                                              Jodhpur, India
*Bachelors in Computer Science and Engineering*                                        *2019 - 2023*

## Publications

1. **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)

2. **SegFace: Face Segmentation of Long-Tail Classes**
   ***Kartik Narayan***, *Vibashan VS, Vishal M. Patel*
   Association for the Advancement of Artificial Intelligence (AAAI 2025)

3. **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)

4. **FaceXBench: Evaluating Multimodal LLMs on Face Understanding**
   ***Kartik Narayan***, *Vibashan VS, Vishal M. Patel*
   Under Review. [arXiv]

5. **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)

6. **FaceMoE: Mixture of Experts for Low-resolution Face Recognition**
   ***Kartik Narayan***, *Vishal M. Patel*
   Under Review. [paper]

6. **Training-Free Stylized Abstraction**
   *Aiman Rahman\*, **Kartik Narayan**\*, Vishal M. Patel*
   Under Review. [arXiv]

7. **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). [paper]

8. **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). [paper]

9. **RestoreVAR: Visual Autoregressive Generation for All-in-One Image Restoration**
   *Sudarshan Rajagopalan, **Kartik Narayan**, Vishal M. Patel*
   Under Review. [arXiv]

10. **INFER: Implicit Neural Features for Exposing Realism**
    *Dhananjaya Jayasundara, **Kartik Narayan**, Vishal M. Patel*
    Under Review. [paper]

11. **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)

12. **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)

13. **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)

14. **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)

15. **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

16. **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.** Seattle, WA
*Ph.D. Research Intern* *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** Baltimore, Maryland
*Research Assistant, Vision and Image Understanding Lab advised by Dr.Vishal M. Patel* *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 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** Jodhpur, India
*Student Researcher, IAB Lab advised by Prof.Richa Singh and Prof.Mayank Vatsa* *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, TPAMI, WaCV, IJCB, TIFS, TBIOM, IJCV, PR

## Skills Summary

- **Programming**: Python, C/C++, JavaScript

- **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.