# Dr. Gaurav Kumar Nayak

Webpage
Google Scholar
Linkedin

**Email** : gauravkumar.nayak@mfs.iitr.ac.in
**Mobile** : +91-9717418215


## Work Experience (Academic)

**Indian Institute of Technology Roorkee** — Roorkee, India
*Assistant Professor* — *Apr 2024 – Present*
*Mehta Family School of Data Science and Artificial Intelligence*

**University of Central Florida (UCF)** — Florida, USA
*Post-Doctoral Scholar, Center for Research in Computer Vision* — *Jan 2023 – Mar 2024*
*Supervisor: Dr. Mubarak Shah*

## Education

**Indian Institute of Science (IISc)** — Bangalore, India
*Ph.D., Computational and Data Sciences* — *2017 – 2022*
*Thesis title: Data-efficient Deep Learning Algorithms for Computer Vision Applications*
*Supervisor: Dr. Anirban Chakraborty*

**Jawaharlal Nehru University (JNU)** — New Delhi, India
*M.Tech, Computer Science and Technology* — *2015 – 2017*
*Supervisor: Dr. R. K. Agrawal*

**Vellore Institute of Technology (VIT)** — Tamil Nadu, India
*B.Tech, Computer Science and Engineering* — *2009 – 2013*
*Supervisor: Dr. Swathi J. N.*

## Publications

- Jeffrey A. Chan Santiago, Praveen Tirupattur, **Gaurav Kumar Nayak**, Gaowen Liu, and Mubarak Shah, *MGD$^3$: Mode-Guided Dataset Distillation using Diffusion Models*, *Accepted in* International Conference on Machine Learning (**ICML**), 2025. [Core A*]

- **Gaurav Kumar Nayak**, Inder Khatri, Shubham Randive, Ruchit Rawal, and Anirban Chakraborty, *DAD++: Improved Data-free Test Time Adversarial Defense*, in **Neurocomputing** Journal, 2025. [Core A*]

- Nyle Siddiqui, Florinel Alin Croitoru, **Gaurav Kumar Nayak**, Radu Tudor Ionescu, and Mubarak Shah, *DLCR: A Generative Data Expansion Framework via Diffusion for Clothes-Changing Person Re-ID*, in IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2025. [Core A]

- M Yashwanth, **Gaurav Kumar Nayak**, Arya Singh, Yogesh Simmhan, and Anirban Chakraborty, *Adaptive Self-Distillation for Minimizing Client Drift in Heterogeneous Federated Learning*, in Transactions on Machine Learning Research (**TMLR**), 2024. [Core A*]

- Parth Parag Kulkarni, **Gaurav Kumar Nayak**, and Mubarak Shah, *CityGuessr: City-Level Video Geo-Localization on a Global Scale*, in European Conference on Computer Vision (**ECCV**), 2024. [Core A*]

- Gustavo García, Alejandro Aparcedo, **Gaurav Kumar Nayak**, Tanvir Ahmed, Mubarak Shah, and Mengjie Li, *Generalized deep learning model for photovoltaic module segmentation from satellite and aerial imagery*, in Elsevier Journal of Solar Energy, 2024.

- **Gaurav Kumar Nayak**, Inder Khatri, Ruchit Rawal, and Anirban Chakraborty, *Data-free Defense of Black Box Models against Adversarial Attacks*, *Accepted* in IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (**CVPRW**) on Fair, Data-efficient, and Trusted Computer Vision (TCV), 2024

- **Gaurav Kumar Nayak**, Ruchit Rawal, Inder Khatri, and Anirban Chakraborty, *Robust Few-Shot Learning without using any Adversarial Sample*, in IEEE Transactions on Neural Networks and Learning Systems (**TNNLS**) 2023. [Core A*]

- M Yashwanth, **Gaurav Kumar Nayak**, Harsh Rangwani, Arya Singh, R. Venkatesh Babu, and Anirban Chakraborty, *Minimizing Layerwise Activation Norm Improves Generalization in Federated Learning*, in IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2024. [Core A]

- Vicente Vivanco Cepeda, **Gaurav Kumar Nayak**, Mubarak Shah, *GeoCLIP: Clip-Inspired Alignment between Locations and Images for Effective Worldwide Geo-localization*, in Neural Information Processing Systems (**NeurIPS**) 2023. [Core A*]

- **Gaurav Kumar Nayak**, Ruchit Rawal, and Anirban Chakraborty, *DE-CROP: Data-efficient Certified Robustness for Pretrained Classifiers*, in IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2023. [Core A]

- Indu Joshi, Priyank Upadhya, **Gaurav Kumar Nayak**, Peter Schüffler, and Nassir Navab, *DISBELIEVE: Distance Between Client Models is Very Essential for Effective Local Model Poisoning Attacks*, in **MICCAI** Workshop on Distributed, Collaborative and Federated Learning (DeCaF), 2023.

- **Gaurav Kumar Nayak**, Ruchit Rawal, Rohit Lal, Himanshu Patil, and Anirban Chakraborty, *Holistic Approach to Measure Sample-level Adversarial Vulnerability and its Utility in Building Trustworthy Systems*, in IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (**CVPRW**) on Human-centered Intelligent Services Safety and Trustworthy (HCIS), 2022.

- **Gaurav Kumar Nayak**, Ruchit Rawal, and Anirban Chakraborty, *DAD: Data-free Adversarial Defense at Test Time*, in IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2022. [Core A]

- **Gaurav Kumar Nayak**, Konda Reddy Mopuri, Saksham Jain, and Anirban Chakraborty, *Mining Data Impressions from Deep Models as Substitute for the Unavailable Training Data*, in IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2021. [Core A*]

- **Gaurav Kumar Nayak**, Konda Reddy Mopuri, and Anirban Chakraborty, *Effectiveness of Arbitrary Transfer Sets for Data-free Knowledge Distillation*, in IEEE/CVF Winter Conference on Applications of Computer Vision (**WACV**), 2021. [Core A]

- **Gaurav Kumar Nayak**, Monish Keswani, Sharan Seshadri, and Anirban Chakraborty, *Beyond Classification: Knowledge Distillation using Multi-Object Impressions*, in British Machine Vision Conference (**BMVC**), 2021. [Core A]

- **Gaurav Kumar Nayak**, Het Shah, and Anirban Chakraborty, *Incremental Learning for Animal Pose Estimation using RBF k-DPP*, in British Machine Vision Conference (**BMVC**), 2021. [Core A]

- Sravanti Addepalli, **Gaurav Kumar Nayak**, Anirban Chakraborty, and R. Venkatesh Babu, *DeGAN: Data-enriching GAN for retrieving representative samples from a trained classifier*, in **AAAI** Conference on Artificial Intelligence, 2020. [Core A*]

- **Gaurav Kumar Nayak**, Saksham Jain, R. Venkatesh Babu, and Anirban Chakraborty, *Fusion of Deep and Non-Deep Methods for Fast Super-Resolution of Satellite Images*, in IEEE International Conference on Multimedia Big Data (**BigMM**), 2020.

- **Gaurav Kumar Nayak**, Konda Reddy Mopuri, Vaisakh Shaj, R. Venkatesh Babu, and Anirban Chakraborty, *Zero-Shot Knowledge Distillation in Deep Networks*, in International Conference on Machine Learning (**ICML**), 2019. [Core A*].

- **Gaurav Kumar Nayak**, Utkarsh Shreemali, R Venkatesh Babu, and Anirban Chakraborty, *Efficient Person Re-identification in videos using Sequence Lazy Greedy Determinantal Point Process (SLGDPP)*, in IEEE International Conference on Image Processing (**ICIP**), 2019. [Core B]

## Papers Under Review

- Jiaqi Xue, **Gaurav Kumar Nayak**, Mengxin Zheng, Lei Yang, Mubarak Shah, and Qian Lou, *TrojSSL: Accurate and Stable Trojan Attacks in Self-Supervised Learning*, Under review *in TMI Journal*.
- Rohit Gupta, Naveed Akhtar, **Gaurav Kumar Nayak**, Ajmal Mian, Mubarak Shah, *Query Efficient Cross-Dataset Transferable Black-Box Attack on Action Recognition*, Under review *in Neural Networks Journal*.

## Book Chapter

- Atmika Honnalgere, and Gaurav Kumar Nayak. *Classification of Normal Versus Malignant Cells in B-ALL White Blood Cancer Microscopic Images*, in **ISBI** C-NMC Challenge: Classification in Cancer Cell Imaging, 2019.

## Sponsored Research Projects

- **FIG Grant:** *Developing Generative AI strategies for Data Expansion and Data Completion on Computer Vision Tasks using Diffusion and LLMs*, PI: *Dr. Gaurav Kumar Nayak*, Funding - Rs. 20 lakhs by IIT Roorkee. (***Ongoing)***
- **US Grant:** *Geospatial Foundation Model using AI and ML*, PI: *Dr. Gaurav Kumar Nayak*, Funding - Rs. 50 lakhs by Graylark Technologies, Inc., United States Of America. (***Ongoing)***
- **Cisco Research (#89189875):** *Dataset Distillation in Videos*, PI: Mubarak Shah, Co-PI: **Dr. Gaurav Kumar Nayak**, Grant Awarded (100,000 USD)

## Work Experience (Industry)

**MyGuestHouse Accommodations Pvt. Ltd** — Noida, UP, India
***Software Engineer, Developer*** — *Jun 2013 - Oct 2014*

- Worked on Channel Manager Integration with major online travel tickets booking sites.
- Worked on Property Management System (PMS); Zend Framework, API development; Web Services based on OTA Manual

## Achievements

- Awarded Cisco Grant of 100,000 USD **2023**
- Received Preeminent Postdoctoral Program (P3) award with amount of 5,000 USD [award letter] **2023**
- Shortlisted to participate in Research Week with Google [Certificate] **2022**
- Selected for Doctoral Consortium at WACV 2022 **2021**
- Qualcomm Innovation Fellowship (QIF) India 2020 Finalist [Certificate] **2020**
- Received GARP Funding for attending ICIP 2019 Conference in Taipei, Taiwan **2019**
- Selected for ICML 2019 travel grant for attending the conference at Long Beach, CA, USA **2019**
- Senior Research Fellowship for Ph.D. research at Indian Institute of Science. **2019-2022**
- Junior Research Fellowship for Ph.D. research at Indian Institute of Science. **2017-2018**
- Qualified UGC NET-JRF [Net Certificate] [JRF Certificate] **2016**
- Qualified GATE and among top 2 percent. **2015**
- Qualified NTSE Stage 1 **2007**

## Technical Skills

- **Programming Languages:** • C • C++ • Python • R • Java
- **Deep Learning Frameworks:** • Tensorflow • Pytorch • Keras • Caffe
- **Scripting Languages:** • PHP (Zend Framework)
- **Database:** • MYSQL and Oracle

## Relevant Courses

- Deep Learning for Computer Vision • Machine Learning for Signal Processing • Pattern Recognition • Practical Data Science • Linear and Non Linear Optimization •Stochastic models and Applications

## Teaching Responsibility

- Course Instructor, Generative AI (DAL-586) at IIT Roorkee — Jan-May 2025
- Course Instructor, Image and Video Analytics (DA-302) at IIT Roorkee — Jan-May 2025
- Course Instructor, Statistical Learning Theory (DA-305) at IIT Roorkee — July-Nov 2024
- Course Instructor, Technical Communication (DA-391) at IIT Roorkee — July-Nov 2024
- Course Instructor with Prof. Mubarak Shah, Advanced Computer Vision (Topics: Visual-Language Models) at UCF (USA) — Jan 2024-Mar 2024
- Course Observer, Advanced Computer Vision (Topics: Diffusion Models), UCF (USA) — Jan 2023-Apr 2023
- Teaching Assistant, Data Analytics and Visualization — Jan 2019-Apr 2019
- Teaching Assistant, Video Analytics course — Aug 2019-Dec 2019

  *Duties:* Assisting the instructor in preparing course materials including course content, assignments, projects and grading.

## Administrative Responsibility

- Nodal officer for IndiaAI Fellowship — 07 Apr 2025 - Present
- Professor-in-Charge (PIC) for Labs and Store — 01 Mar 2025 - Present
- Member of ScAPC Committee — 01 Jan 2025 - Present IIT Roorkee
- Member of School Administrative Committee (ScAC) — 26 Feb 2025 - Present
- Memeber of ScRC and ScAPC Committee — 25 Apr 2024 - 31 Dec 2024
- Chair IEEE-IISc joint student chapter (Computational Intelligence and Computer Society) 20 Mar 2019 - 10 Mar 2021
- Student Coordinator, IISc Open Day — 14 Feb 2018 - 15 Feb 2019
- Student Coordinator, International Conference (VLDB) — 05 Sep 2016

## Mentoring Experience

*Guided several students from different colleges which lead to several publications*

- Vicente Vivanco Cepeda (B.Tech) — University of Central Florida, USA
- Ruchit Rawal (B.Tech) — Netaji Subhas University of Technology, Delhi
- Inder Khatri (B.Tech) — Delhi Technological University, Delhi
- Shubham Randive (M.Tech) — IIT Madras
- Monish Keswani (M.Tech) — Indian Institute of Science, Bangalore
- Het Shah (B.Tech) — Birla Institute of Technology and Science, Goa

- Saksham Jain (B.Tech) — Netaji Subhas University of Technology, Delhi
- Sharan Seshadri (B.Tech) — Manipal Institute of Technology, Manipal
- Rohit Lal (B.Tech) — Visvesvaraya National Institute of Technology, Nagpur
- Himanshu Patil (B.Tech) — Visvesvaraya National Institute of Technology, Nagpur

## Professional Services

- Served as Distinguished Jury Member for "the AGBA Gen AI Innovation Series, Jury Round" for evaluating the innovations for 16th Edition of annual Aegis Graham Bell Awards, supported by Ministry of Electronics and Information Technology Government of India, New Delhi and Country Partner Swissnex [LinkedIn Post] June 2025
- Served as a Judging panelist at the Microsoft Ideathon, held as part of the IIT Roorkee Hackathon at Cognizance 2025 Mar 2025
- Served as a Judge for the Agent-X event at Cognizance 2025 Mar 2025
- Delivered an online two-day lecture on Generative AI concepts (Intro, GANs, VAE, and Diffusion Models) as a part of a DSML course jointly conducted by TimesPro and IIT Roorkee Feb 2025
- Delivered an expert lecture on "Intro and Application of Generative AI" in FDP program as a part of MeitY initiative organized by E& ICT, IIT Roorkee along with KKR & KSR Institute of Technology and Sciences, Guntur, [Slides] Jan 2025
- Delivered an expert lecture on "Data-efficient AI in Worldwide Geo-localization and Knowledge Distillation" in the five-day short-term course on Artificial Intelligence and Machine Learning for Engineering Applications (AIMLEA-2024) organized by NIT Kurukshetra [Certificate] Aug 2024
- Delivered an online lecture on "Logistic Regression" at Intellipaat Aug 2024
- Delivered a Guest Lecture in Deep Learning for Computer Vision course (at IISc, Bangalore) on "Data-efficient Deep Learning in Computer Vision" in March 2024
- Reviewed four papers in CVPR 2024 Dec 2023
- Presented Start-up Proposal in UCF Technology Ventures Symposium 2023 [Weblink] Oct 2023
- Reviewer three papers in AAAI and five papers in WACV 2024 Sept 2023
- Presented recent work of NeurIPS 2023 to National Geospatial-Intelligence Agency (NGA) [Slides] Aug 2023
- Reviewed six papers in NeurIPS 2023 Jun-Jul 2023
- Reviewed two papers in WACV 2023 Jul-Aug 2022
- CVPR Workshop 2022 - Presented *"Holistic Approach to Measure Sample-level Adversarial Vulnerability and its Utility in Building Trustworthy Systems"* paper [Slides] June 2022
- Delivered a Guest Lecture in Data Analysis and Visualization course (at IISc, Bangalore) on "*Principle Component Analysis*" [Slides] March 2022
- Delivered a Guest Lecture in Deep Learning for Computer Vision course (at IISc, Bangalore) on "*Deep Learning in the absence of Training Data*" [Slides] March 2022
- Reviewed six papers in BMVC 2021 and two papers in WACV 2022 Jul-Sept 2021
- Delivered a keynote talk on "Data-Free Knowledge Distillation in Deep Networks" in Manav Rachna University [Momento] [Certificate] July 2021
- Reviewed a paper for Pattern Recognition Journal Feb 2021

- WACV 2021 - Presented *"Effectiveness of Arbitrary Transfer Sets for Data-free Knowledge Distillation"* paper [Slides] Jan 2021
- Reviewed two papers for WACV 2021 Oct 2020
- IEEE BigMM 2020 - Presented *"Fusion of Deep and Non-Deep Methods for Fast Super-Resolution of Satellite Images"* paper [Slides] Sept 2020
- Reviewer for Elsevier Pattern Recognition Journal [Certificate] May 2020
- Reviewed Research Papers for BMVC 2020 May 2020
- NCVPRIPG 2019 (Conference on Computer Vision) - Presented *"Zero-Shot Knowledge Distillation"* paper in session on "VISION INDIA" [Slides] Dec 2019
- ICIP 2019 - Presented *"Efficient Person Re-Identification in Videos Using Sequence Lazy Greedy Determinantal Point Process (SLGDPP)"* paper [Poster] Sep 2019