

# Vinod K Kurmi, Ph.D.

- ✉ [vinodkk@iiserb.ac.in](mailto:vinodkk@iiserb.ac.in), [vinodkumarkurmi@gmail.com](mailto:vinodkumarkurmi@gmail.com)
- ☎ +91-9651180055
- 🌐 <https://vinodkkurmi.github.io/>
- 📄 <https://scholar.google.co.in/citations?user=Exo2VNAAAAAJ&hl=en>
- 🌐 <https://www.linkedin.com/in/vinod-k-kurmi-b5b70651/>
- 🐦 @vinodkkurmi



Experience in Computer Vision, Deep Learning, Machine Learning, Domain Adaptation, Multimodal Learning, Fair Learning, Medical Image Processing, and Speech/Audio Processing.

## Employment History

- March 2022- Present 📌 **Assistant Professor**, Data Science and Engineering IISER Bhopal, India
- May 2021- March 2022 📌 **Post-Doc Research Fellow**, KU Leuven, Belgium  
Supervisor: Prof. Tinne Tuytelaars
- Aug 2020-April 2021 📌 **Post-Doc Research Fellow**, CVIT, IIIT Hyderabad, India  
Supervisor: Prof. C V Jawahar
- July 2019-Nov 2019 📌 **Tutor**, Introduction to Electronics (Lab), IIT Kanpur
- July 2018-Nov 2018 📌 **Tutor**, Introduction to Electronics (Lab), IIT Kanpur
- May 2014- June 2014 📌 **Senior Student Research Associate**, Computer Vision Lab IIT Kanpur

## Education

- 2014 – 2020 📌 **Ph.D., EE, Indian Institute of Technology Kanpur**, India.  
Thesis title: *Understanding Transfer Learning between Domains and Tasks*,  
"**Outstanding Ph.D.Thesis Award**" by IIT Kanpur, 2021  
Supervisors: Prof. Vinay P. Namboodiri and Prof. K S Venkatesh.
- 2012 – 2014 📌 **M.Tech, EE, Indian Institute of Technology Kanpur**, India.  
Thesis title: *Human Hand Gesture Recognition from 3D Data*,  
Supervisor: Prof. K S Venkatesh.
- 2008 – 2012 📌 **B.E., Electronics & Telecommunication, SGSITS Indore**, India.

## Students Supervision

- PhD 📌 **Rajeev Ranjan Dwivedi**, IISER Bhopal (2022- present).  
📌 **Parinita Nema**, IISER Bhopal (2022- present).  
📌 **Akanksha Singh**, IISER Bhopal (2023- present).  
📌 **Shivangi Rai**, IISER Bhopal (2023- present).
- MS-Thesis 📌 **Anuradha Mahato**, IISER Bhopal (2023- present)  
(Thesis doing with IIT Jodhpur).  
📌 **Praharsh Amit Nanavati**, IISER Bhopal (2023- present)  
(Thesis doing with IIIT Delhi).  
📌 **Kiran Devraj**, MS, IIIT Hyderabad (*Completed*).  
Thesis title: *Open-Vocabulary Audio Keyword Spotting with Low Resource Language Adaptation*,  
(Jointly with Prof CV Jawahar and Prof. Vinay P. Namboodiri)
- BS-Thesis 📌 **Aayusman**, IISER Bhopal (2024- present).

## Students Supervision (continued)

- Amish Anand, IISER Bhopal (2024- present).
- Anushka Shreyam, IISER Bhopal (2024- present).
- Zarikunte Kunal Dayanand, IISER Bhopal (2024- present).
- Rohit Kumar, IISER Bhopal (2024- present).
- Shubham Latpate, IISER Bhopal (2023).
- Yashika Patil, IISER Bhopal (2023).
- Anuradha Mahato, IISER Bhopal(2023).
- Chethan S Reddy, IISER Bhopal (2023).
- Sushil Vemuri, IISER Bhopal (2023).
- Shraddha Agarwal, IISER Bhopal (2023).

## Teaching

- Winter 2022 Transfer Learning for Computer Vision, IISER Bhopal
- Fall 2022 Deep Learning, IISER Bhopal
- Winter 2023 Deep Learning, IISER Bhopal
- Fall 2023 Transfer Learning for Computer Vision, IISER Bhopal
- Applied Accelerated Artificial Intelligence, IISER Bhopal
- Winter 2024 Deep Learning, IISER Bhopal

## Awards and Achievements




- 2024 Selected for ACM-Pingla Event by ACM India.
- 2021 Outstanding Ph.D.Thesis Award 2021 by IIT Kanpur
- ICCV 2021 Doctoral Consortium
- 2020 DAAD AI Post-Doc Net Fellow
- NeurIPS 2020 Financial Assistance Award
- 2019 Qualcomm Innovation Fellowship 2019 Finalists
- 2017 Among top performers, and awarded by cash prize at “Summer school of Machine Learning” at Centre for Visual Information Technology (CVIT) Hyderabad.
- Among top performers, and awarded by cash prize at “Summer school of Deep Learning” at Centre for Visual Information Technology (CVIT) Hyderabad.
- 2015 TCS Research Fellowship Award for 4 years (2015-2019).
- 2014 Recipient of MHRD PhD Fellowship.
- Qualified for Junior Research Fellowship (JRF) of CSIR -NET.
- 2012 Recipient of MHRD Post-Graduate Fellowship.

## Travel Grants

- Dec 2022 Awarded DAAD-AI Net Post Doc Travel Grant to travel research and academic institute of Germany.
- Dec 2019 Awarded TCS Travel Grant for NCVPRIPG 2019.
- July 2019 Awarded Microsoft Travel Grant for IJCNN 2019.




## Travel Grants (continued)

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- June 2019  Awarded **EE, IIT Kanpur** Travel Grant for IJCNN 2019.
- June 2019  Awarded **Google** Travel Grant for CVPR 2019.
- June 2019  Awarded **Microsoft** Travel Grant for CVPR 2019.





## Position of Responsibility

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- Jan 2024- Present  **Convener, Dept. Post Graduate Committee (DPGC)**, Data Science and Engineering IISER Bhopal, India.
- Feb 2023- Present  **Member of Departmental Faculty Affairs Committee (DFAC)**, Data Science and Engineering IISER Bhopal, India.
- May 2022-Present  **Dept. representative for Center for Science and Society (CS2) activities**, Data Science and Engineering IISER Bhopal, India.



## Research Funding

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- April 2024-March 2025  **Title:** Enhancing Head and Neck Cancer Treatment: Deep Learning for Efficient Tumor Contour Detection from Limited CT Scan Data. (PI)  
**iHub data IIIT Hydersbad Grant**  
Amount: 9,97,700 INR
- April 2022-March 2024  **Title:** Fair Deep Learning Model for Unbiased Prediction from Biased Data (PI)  
**IISERB -Seed Grant**  
Amount: 48,00,000 INR
- July 2023-June 2025  **Title:** Towards Building a Deep Learning Framework to Accurately Identify Tumor Contours from CT Images to Improve the Quality of Radiotherapy for Head and Neck Cancer (PI)  
**MEDSER Grant**  
Amount: 28,78,000 INR
-  **Title:** Early Prediction of Signs of Obstructive Sleep Apnea Based on Mallampati Classification and Basic Health Profile using Machine Learning (Co-PI)  
**MEDSER Grant**  
Amount: 9,78,000 INR

## Skills


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- Programming Languages  Python, Matlab, Lua, C++, C and  $\LaTeX$
- Deep Learning Frameworks  PyTorch, OpenCV, Torch, Theano, Keras, TensorFlow


## Publications

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### Patents

- Patent-2015  **Vinod K Kurmi**, Garima Jain, KS Venkatesh, "A Human-Hand Detection System, Apparatus and a Method Thereof", India PO No.1678/DEL/2015, 526161 [Certificate].




### Book Chapters

- Elsevier 2021  Indu Joshi, Ayush Utkarsh, Riya Kothari, **Vinod K. Kurmi**, Antitza Dantcheva, Sumantra Dutta Roy, Prem Kalra, , "On Estimating Uncertainty of Fingerprint Enhancement Models", DIGITAL IMAGE ENHANCEMENT AND RECONSTRUCTION, Elsevier 2021 [PDF] .

### Journals

- IMAVIS- 2023  H. Tiwari, **Vinod K. Kurmi**, Venkatesh K Subramanian, Yong-Sheng Chen, "Distilling Knowledge for Occlusion Robust Monocular 3D Face Reconstruction", *Image and Vision Computing*, 2023 [PDF] [IF: 3.103]
- Neurocomp- 2021  **Vinod K. Kurmi**, Venkatesh K Subramanian, Vinay P. Namboodiri, "Exploring Dropout Discriminator for Domain Adaptation", *Neurocomputing*, 2021 [PDF][IF: 4.438]
- IMAVIS- 2021  Badri N. Patro, **Vinod K. Kurmi**, Sandeep Kumar, Vinay P. Namboodiri, "MUMC: Minimizing Uncertainty of Mixture of Cues", *Image and Vision Computing*, 2021 [IF: 3.103]
- IMAVIS-2021  **Vinod K. Kurmi**, Venkatesh K Subramanian, Vinay P. Namboodiri, "Informative Discriminator for Domain Adaptation", *Image and Vision Computing*, 2021 [PDF] [IF: 3.103]
- Neurocomp- 2020  Badri N. Patro, Dev Chauhan, **Vinod K. Kurmi**, Vinay P. Namboodiri, "Revisiting Paraphrase Question Generator using Pairwise Discriminator", *Neurocomputing*, 2020. [PDF] [Code] [IF: 4.438].

### Conferences


- Interspeech-2022  Kirandevraj R., **Vinod K. Kurmi**, Vinay P Namboodiri, C V Jawahar "Generalized Keyword Spotting using ASR embeddings", *Conference of the International Speech Communication Association (Interspeech)*, Incheon Korea, 2022 [PDF]. [H5-Index: 89][Core Rank A].
- AAAI-2022  **Vinod K. Kurmi\***, Rishabh Sharma\*, Yash Vardhan Sharma\*, Vinay P Namboodiri "Gradient Based Activations for Accurate Bias-Free Learning", *Proceedings of the AAAI Conference on Artificial Intelligence, (AAAI)*, Vancouver BC, Canada, 2022 (\* Equal contributions)[PDF]. [H5-Index: 157][Core Rank A\*].
- WACV-2022  H. Tiwari, **Vinod K. Kurmi**, Venkatesh K Subramanian, Yong-Sheng Chen, "Occlusion Resistant Network for 3D Face Reconstruction", *IEEE Winter Conference of Applications on Computer Vision (WACV)*, Waikoloa, 2022[PDF]. [H5-Index: 62][Core Rank A].

## Publications (continued)




- ICASSP-2021  **Vinod K. Kurmi**, Vipul Bajaj, Badri N. Patro, Venkatesh K Subramanian, Vinay P. Namboodiri, Preethi Jyothi, “Collaborative Learning to Generate Audio-Video Jointly,” *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP), Virtual, 2021*.  
[PDF] [Code][H5-Index: 96].
- WACV-2021  **Vinod K. Kurmi**, Venkatesh K Subramanian, Vinay P. Namboodiri, “Domain Impression: A Source Data Free Domain Adaptation Method,” *IEEE Winter Conference of Applications on Computer Vision (WACV), Virtual, 2021*.  
[PDF] [Code][H5-Index: 62][Core Rank A].
- WACV- 2021  **Vinod K. Kurmi**, Badri N. Patro, Venkatesh K Subramanian, Vinay P. Namboodiri, “Do not Forget to Attend to Uncertainty while Mitigating Catastrophic Forgetting,” *IEEE Winter Conference of Applications on Computer Vision (WACV), Virtual, 2021*.  
[PDF] [Code][H5-Index: 62][Core Rank A].
- IJCNN-2021  Indu Joshi, Ayush Utkarsh, Riya Kothari, **Vinod K. Kurmi**, Antitza Dantcheva, Sumantra Dutta Roy, Prem Kalra, “Learning Noise-aware Preprocessing Of Fingerprints,” *International Joint Conference on Neural Networks (IJCNN), Virtual, 2021* [H5-Index: 57][Core Rank B].
- IJCNN- 2021  Indu Joshi, Ayush Utkarsh, Riya Kothari, **Vinod K. Kurmi**, Antitza Dantcheva, Sumantra Dutta Roy, Prem Kalra, “On Learning Sensor-invariant Features For Fingerprint ROI Segmentation,” *International Joint Conference on Neural Networks (IJCNN), Virtual, 2021* [H5-Index: 57][Core Rank B].
- WACV-2020  Badri N. Patro, **Vinod K. Kurmi**, Sandeep K., Vinay P. Namboodiri, “Deep Bayesian Network for Visual Question Generation,” *IEEE Winter Conference of Applications on Computer Vision (WACV), Snowmass Village, USA, 2020*.  
[PDF] [Code][H5-Index: 62][Core Rank A].
- BMVC-2019  **Vinod K. Kurmi**, Vipul Bajaj, Venkatesh K Subramanian, Vinay P. Namboodiri, “Curriculum based Dropout Discriminator for Domain Adaptation,” *British Machine Vision Conference (BMVC), Cardiff, UK, 2019*.  
[PDF] [Code] [H5-Index: 66].
- CVPR-2019  **Vinod K. Kurmi\***, Shanu Kumar\*, Vinay P. Namboodiri, “Attending to Discriminative Certainty for Domain Adaptation,” *IEEE Conference on Computer Vision and Pattern Recognition (CVPR), Long Beach, California, USA, 2019 (\* Equal contributions)*.  
[PDF] [Code][H5-Index: 356][Core Rank A\*].
- IJCNN-2019  **Vinod K. Kurmi**, Vinay P. Namboodiri, “Looking back at Labels: A Class based Domain Adaptation Technique,” *International Joint Conference on Neural Networks (IJCNN), Budapest, Hungary, 2019 (Oral Presentation)*.  
[PDF] [Code][H5-Index: 57][Core Rank A].
- EMNLP-2018  Badri N. Patro, Sandeep K., **Vinod K. Kurmi**, Vinay P. Namboodiri, “Multimodal Differential Network for Visual Question Generation,” *Conference on Empirical Methods in Natural Language Processing (EMNLP), Brussels, Belgium, 2018*.  
[PDF] [Code][H5-Index: 132][Core Rank A].
- COLING-2018  Badri N. Patro\*, **Vinod K. Kurmi\***, Sandeep Kumar\*, Vinay P. Namboodiri, “Learning Semantic Sentence Embeddings using Pair-wise Discriminator,” *Proceedings of 27th International Conference on Computational Linguistics (COLING), Santa Fe, New Mexico, USA, 2018 (\* Equal contributions)*.  
[PDF] [Code][H5-Index: 64][Core Rank A].

## Publications (continued)



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- WSCG-2015     **Vinod K Kurmi**, G. Jain, KS Venkatesh, “Robust Human Gesture Recognition form 3D Data” *WSCG 2015, 23rd International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision (WSCG), Czech Republic, 2015*. [PDF].

### Workshops


- WACV-XAI-2021     Indu Joshi, Riya Kothari, Ayush Utkarsh, **Vinod K. Kurmi**, Antitza Dantcheva, Sumantra Dutta Roy, Prem Kalra, “Explainable Fingerprint ROI Segmentation Using Monte Carlo Dropout”, *Workshop on Explainable and Interpretable Artificial Intelligence for Biometrics at WACV 2021*.  
[H5-Index: 54]
- ICCV-CLVL-2019     Badri N. Patro\*, **Vinod K. Kurmi\***, Sandeep Kumar\*, Vinay P. Namboodiri, “Learning Semantic Sentence Embeddings using Pair-wise Discriminator”, **ICCV Workshop (CLVL)**, Seoul, South Korea, 2019.(**Spotlight**) (\* Equal contributions)  
[H5-Index: 51].
- ICCV- CLVL-2019     Badri N. Patro, Sandeep Kumar, **Vinod K. Kurmi**, Vinay P. Namboodiri, “Multi-modal Differential Network for Visual Question Generation”, **ICCV Workshop (CLVL)**, Seoul, South Korea, 2019.(**Spotlight**)  
[H5-Index: 51].

### Preprints

- arXiv preprint 2021     Shanu Kumar, **Vinod K Kurmi**, Praphul Singh, Vinay P Namboodiri, “Mitigating Uncertainty of Classifier for Unsupervised Domain Adaptation”, *arXiv:2107.00727* [PDF].
- arXiv Preprint 2021     Blessen George, **Vinod K Kurmi**, Vinay P Namboodiri, “Prb-GAN: A Probabilistic Framework for GAN Modelling”, *arXiv:2107.3834501* [PDF].


## PhD Research Work

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- Jan 2014-June-2020     **Understanding Transfer Learning between Domains and Tasks**,  
*Prof. K S Venkatesh and Prof. Vinay P. Namboodiri*  
Analyzed and tackled the different problems of faced in domain adaptation. We proposed variety of techniques such as improved discriminator and considering distribution based adaptation. By obtaining uncertainty and through these localized adaptation has been proposed. In next work, we proposed a attention and uncertainty based models for task incremental learning. We tackled the domain adaptation problems without avail the source data.

## Masters Research Work


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- July 2013-June-2014     **Human Hand Gesture Recognition from 3D Data**,  
*Prof. K S Venkatesh*  
The objective was to develop efficient algorithms to detect hand gestures in varying light conditions, irrespective of background clutter. The hardware used was Kinect sensor from Microsoft. Human hand constellation identified from the 3D data to identify the hand. The proposed algorithm and system works in varying light conditions, background clutter and any human pose.






## Research Projects

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### Industrial Projects








- July 2013-June 2014     Gesture Recognition System of Smart TV (**Samsung-IITK collaboration Project**)

### Academic Projects

- 2015     Gaussian Process based Hallucination of Features for Object Classification (Machine Learning in Computer Vision)
-  Study of Clustering and Classification Technique for Analytical Datasets (Convex Optimization)
-  Indoor Positioning Using UWB-IR Signals in the Presence of Dense Multipath with Path Overlapping (Statistical Signal Processing)
- 2014     Cooperative MIMO Multicell Networks (Wireless Communications)
- 2012     GPS based Vehicle Tracking System (B.E. Project)

## Teaching Assistantship





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- July 2017-Nov 2017     **Teaching Assistant**, Signal, Systems and Networks
- Jan 2017- May 2017     **Teaching Assistant**, Introduction to Electronics
- July 2016- Nov 2016     **Teaching Assistant**, Introduction to Electronics
- Jan 2016- May 2016     **Teaching Assistant**, Department Post-Graduation Committee
- July 2015- Nov 2016     **Teaching Assistant**, Computer Vision Lab
- Jan 2015- May 2015     **Teaching Assistant**, Department Post-Graduation Committee
- July 2012- May 2014     **Teaching Assistant**, Department Post-Graduation Committee






## Miscellaneous Experience

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### Professional Services

- 2019-2021     Served as a reviewer for IEEE Transactions on Neural Networks and Learning Systems (TNNS), Pattern Recognition (PR), and IEEE Transactions on Image Processing (TIP) .
- 2018-2022     Served as a reviewer for conferences **AAAI, ECCV, ICCV, ICLR, CVPR, NeurIPS, BMVC, ICASSP, ECML-PKDD, WACV, ICVGIP, NCVPRIPG, ICME.**
- 2019     Member of International Neural Network Society (INNS)
- 2019-2021     Member of Computer Vision Foundation (CVF)

### Talks/Seminars

- 2024     Invited as Resource Person at "Hydro-ML Workshop" held in IISER Bhopal.
-  Keynote Speaker at Sixed International Conference on "Recent Trends in Engineering, Management , Pharmacy and Science 2024" SIRT, Bhopal.
-  Invited talk at National Science day celebration SIRT, Bhopal on "Deep learning for AI".
- 2023     Invited talk at Professional Development Programme held at School of Planning and Architecture, Bhopal on "Geospatial and Big Data Analysis".
-  Invited talk at International Conference on Recent Trends in Mathematics, Statistics, and Engineering (ICRTMSE) organized by the School of Technology Management and Engineering, SVKM's NMIMS (Deemed-to-be University), Indore, Madhya Pradesh, India.



## Miscellaneous Experience (continued)

- 2022
  - Invited for an expert talk on "Basics of AI" at Science Day in Govt Polytechnic College, Sironj, Vidisha (India).
  - Delivered a lecture on 'Unlocking the Power of Transfer Learning: Revolutionizing AI with Limited Data Constraints' at the Faculty Development Program (FDP) held at RNTU Bhopal.(India).
  - Invited talk on "AI: Past, Present and Future" at Science Fiesta 2023 in Regional Science Centre, Bhopal (India).
- 2021
  - Invited talk on 'Disaster Management using Computer Vision' in Knowledge Workshop at Digital University Kerala (India).
  - Invited talk on 'Domain Adaptation in Industry' in Viman Technology India.
  - Keynote speaker in International Conference ICRASE 2020 at New Delhi, India.
- 2019
  - Delivered oral presentation on 'Attending to Discriminative Certainty for Domain Adaptation' in **NCVPRIPG** at Hubli (India).
  - Delivered oral presentation on 'Looking back at Labels: A Class based Domain Adaptation Technique' in **IJCNN** at Budapest (Hungary).
  - Presented poster on 'Attending to Discriminative Certainty for Domain Adaptation' in **CVPR** at Long Beach, CA (USA).
  - Delivered talks on '**Bayesian Models for Domain Adaptation**' in 'QINF' at Qualcomm, Bangalore (India).
  - Delivered talks on '**Basics of Python and PyTorch**' in "ITEC course on AI" at IIT Kanpur (India).
- 2018
  - Presented poster on 'Learning Semantic Sentence Embeddings using Pair-wise Discriminator' in **Amazon Research Day** at Bangalore (India).
  - Delivered talks on 'Computer Vision and Image Processing' in "TEQIP training session" at IIT Kanpur (India).
  - Delivered talks on '2D and 3D Vision for Robotics' in "TEQIP short term course on Introduction to Robotics" at IIT Kanpur (India).
- 2017
  - Presented poster on 'Domain Adaptation on Computer Vision' at Electrical Engineering **IIT Kanpur Research Day**.
  - Delivered State-of-the-Art seminar on 'Domain Adaptation and Modality Hallucination' at Electrical Engineering **IIT Kanpur**.

## Workshops and Conferences Attended

- 2020
  - Participated in **DAAD AI Post-Doc Net Tour**, Virtual.
  - Attended **NeurIPS 2020**, Virtual.
- 2019
  - Participated in **NCVPRIPG 2019** at Hubli, India.
  - Participated in **IJCNN 2019** at Budapest, Hungary.
  - Participated in **CVPR 2019** at Long Beach, USA.
  - Participated in **Amazon Research Day 2019** at Bangalore sponsored by Amazon, India.
- 2018
  - Participated in **Amazon Research Day 2018** at Bangalore sponsored by Amazon, India.
- 2017
  - Attended Summer School on **Advance Computer Vision using Deep learning** at IIIT Hyderabad, India.
  - Attended summer School on Machine Learning at IIIT Hyderabad
- 2016
  - Attended Mysore Park Workshop on **Vision, Language and AI** at VLAI 2016, Mysore, India.



## Miscellaneous Experience (continued)

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- Attended Summer School on Deep Learning at IIIT Hyderabad, India.

## References

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Available on Request