

# Vinod K. Kurmi

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📄 <https://vinodkkurmi.github.io>



**Research Interests:** Computer Vision, Machine Learning, Domain Adaptation.

## Education

- 2014–Present **Doctor of Philosophy in Electrical Engineering**, *Indian Institute of Technology, Kanpur*, India, Specialized in Signal processing, Communications & Networks .
- 2012–2014 **Masters of Technology in Electrical Engineering**, *Indian Institute of Technology, Kanpur*, India, Specialized in Signal processing, Communications & Networks.
- 2008–2012 **Bachelor of Engineering in Electronics & Telecommunication**, *SGSITS Indore*, India.

## Patents

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

## Journal Publications

- JVCI **Vinod K. Kurmi**, K S Venkatesh, Vinay P. Namboodiri, "Exploring Dropout Discriminator for Domain Adaptation" ( Submitted to **Journal of Visual Communication and Image Representation**)
- NeuroComp Badri N. Patro, Dev Chauhan, **Vinod K. Kurmi**, Vinay P. Namboodiri, "Revisiting Paraphrase Question Generator using Shared Discriminator" (Submitted to **Neuro-computing**)

## Conference Publications

- CVPR **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
- WACV 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.
- BMVC **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

- IJCNN **Vinod K. Kurmi**, Vinay P. Namboodiri, "Informative Discriminator for Domain Adaptation", *International Joint Conference on Neural Networks (IJCNN)*, Budapest, Hungary, 2019. (**Oral Presentation**)
- EMNLP 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.
- COLING 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.
- WSCG **Vinod K Kurmi**, G. Jain, KS Venkatesh, "Robust Human Gesture Recognition from 3D Data" *WSCG 2015, 23rd International Conference in Central Europe on Computer Graphics, Visualization and Computer Vision(WSCG)*, Czech Republic, 2015.  
\* equal contributions

## Workshop Publications

- ICCVW-19 Badri N. Patro, Sandeep Kumar, **Vinod K. Kurmi**, Vinay P. Namboodiri, "Multimodal Differential Network for Visual Question Generation", **ICCV Workshop** (CLVL), Seoul, South Korea, 2019. (4 page paper) (**Spotlight**)
- ICCVW-19 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. (4 page paper)(**Spotlight**)  
\* equal contributions

## Works under Review

- 2020 **Domain Adaptation**- Submitted in ECCV 2020
- 2020 **Incremental Learning**- Submitted in ECCV 2020
- 2020 **Domain Adaptation**- Submitted in ECCV 2020
- 2020 **Probabilistic Generation**- Submitted in IJCNN 2020

## PhD Research Work

- Title **Understading Transfer Learning between Domains, Task and Modalities.**
- Supervisors Prof. Vinay P. Namboodiri (CSE) and Prof. K S Venkatesh (EE), IIT Kanpur
- Descriptions.**
- 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 obtaining localized adaptation, we are also addressing multiple modalities in adaptation.
  - Proposed a attention and uncertainty based models for task incremental learning.
  - We proposed model for domain adaptation that can work without avail the source data.
  - Analysed the multimodal learning by jointly generating audio-videos streams.
  - Proposed a multi-scale framework for audio domain adaptation

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## Masters Research Work

Title **Human Hand Gesture Recognition from 3D Data.**  
Supervisor Prof. K S Venkatesh (EE), IIT Kanpur.

### Descriptions.

- 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.

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## Work Experiences

2014 **Computer Vision Lab IIT Kanpur**, *Senior Student Research Associate*, Kanpur, India.  
Description Developed a middleware for human hand detection from the Kinect Depth sensor data. It overcome the issues of Microsoft's SDK, which requires the full human pose to detect the hand position.

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## Fellowships and Awards

2019 Qualified in **Qualcomm Innovation Fellowship** 2019 Finalists.  
2017 Achieved **Top 20 Rank** and awarded by cash prize at Summer school of Machine Learning at Centre for Visual Information Technology (CVIT) Hyderabad  
2017 Achieved **Top 20 Rank** and awarded by cash prize at Summer school of Computer Vision at Centre for Visual Information Technology (CVIT) Hyderabad  
2016 **TCS Research Fellowship** Award for 4 years (2015-2019)  
2014-2015 Recipient of **MHRD PhD Fellowship**  
2014 Qualified for **Junior Research Fellowship (JRF)** of CSIR -NET  
2012-2014 Recipient of **MHRD Post-Graduate Fellowship**

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## Travel Grants

2019 Awarded **TCS** Travel Grant for NCVPRIPG 2019.  
2019 Awarded **Microsoft** Travel Grant for IJCNN 2019.  
2019 Awarded **Google** Travel Grant for CVPR 2019.  
2019 Awarded **Microsoft** Travel Grant for CVPR 2019.  
2019 Awarded **EE, IIT Kanpur** Travel Grant for IJCNN 2019.

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## Teaching Experiences

2020 **Tutor**, *Introduction to Electronics*, ESC201, Winter, IIT Kanpur.  
2019 **Tutor**, *Introduction to Electronics*, ESC201, Autumn, IIT Kanpur.  
2017 **Teaching Assistant**, *Signal, Systems and Networks*, EE200, Winter, IIT Kanpur .  
2016 **Teaching Assistant**, *Introduction to Electronics*, ESC201, Autumn, IIT Kanpur.

- 2016 **Teaching Assistant**, *Introduction to Electronics*, ESC201, Winter, IIT Kanpur.
- 2015 **Teaching Assistant**, *Computer Vision Lab*, Autumn, IIT Kanpur.
- 2015 **Teaching Assistant**, *Department Post-Graduation Committee*, Winter, IIT Kanpur.
- 2014 **Teaching Assistant**, *Department Post-Graduation Committee*, Winter, IIT Kanpur.
- 2013 **Teaching Assistant**, *Introduction to Electronics*, ESC201, Autumn, IIT Kanpur.
- 2012-13 **Teaching Assistant**, *Department Post-Graduation Committee*, IIT Kanpur.

## Technical Skills

Deep learning Torch, Pytorch, Caffe, OpenCV  
 Language : Lua, Python, C, C++, MATLAB  
 Tools : Source Insight, L<sup>A</sup>T<sub>E</sub>X, Rhapsody, Perforce.  
 IDE : Code Composer Studio, Keil, Sublime.

## Industrial Collaboration Projects

- 2014 Gesture Recognition System of Smart TV (Samsung-IITK collaboration Project)

## Industrial Workshops

- 2019 Participated in **Amazon Research Day** 2019 at Bangalore sponsored by Amazon
- 2018 Participated in **Amazon Research Day** 2018 at Bangalore sponsored by Amazon
- 2017 Attended Summer School on **Advance Computer Vision using Deep learning** at IIIT Hyderabad
- 2017 Attended summer School on Machine Learning using Deep Learning at IIIT Hyderabad
- 2016 Attended Mysore Park Workshop on **Vision, Language and AI** at VLAI 2016, Mysore
- 2016 Attended Summer School on Deep Learning at IIIT Hyderabad

## Talks/Seminars

- 2019 Delivered oral presentation on 'Attending to Discriminative Certainty for Domain Adaptation' in **NCVPRIPG** at Hubli(India)
- 2019 Delivered oral presentation on 'Looking back at Labels: A Class based Domain Adaptation Technique' in **IJCNN** at Budapest(Hungary)
- 2019 Presented poster on 'Attending to Discriminative Certainty for Domain Adaptation' in **CVPR** at Long Beach, CA(USA)
- 2019 Delivered talks on '**Bayesian Models for Domain Adaptation**' in 'QINF' at Qualcomm, Bangalore (India)
- 2019 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)

- 2018 Delivered talks on 'Computer Vision and Image Processing' in "TEQIP training session" at IIT Kanpur (India)
- 2017 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**
- 2016 Delivered State-of-the-Art seminar on 'Domain Adaptation and Modality Hallucination' at Electrical Engineering **IIT Kanpur**

## Technical Course Projects

- 2015 Gaussian Process based Hallucination of features for object classification (Machine Learning in Computer Vision)
- 2015 Study of Clustering and Classification Technique for Analytical Data Sets (Convex Optimization)
- 2015 Indoor Positioning Using UWB-IR Signals in the Presence of Dense Multipath with Path Overlapping (Statistical Signal Processing)
- 2013 Cooperative MIMO Multicell Networks (Wireless Communications)
- 2012 GPS based Vehicle Tracking System (B.E Project)

## Professional Services

- 2019 Served as a reviewer in IEEE Transactions on Neural Networks and Learning Systems(**TNNS**)
- 2018-19 Served as a reviewer in conference **ECML-PKDD, WACV, ICVGIP, NCVPRIG, ICME** and Workshop on ML4H at **NeurIPS**
- 2019 Member of International Neural Network Society(**INNS**)
- 2019 Member of Computer Vision Foundation(**CVF**)

## Github Codes

- 2018 **Learning Semantic Sentence Embeddings using Pair-wise Discriminator**, : .  
 ○ [https://github.com/vinodkkurmi/Visual\\_Question\\_Generation](https://github.com/vinodkkurmi/Visual_Question_Generation).
- 2018 **Multimodal Differential Network for Visual Question Generation**, : .  
 ○ [https://github.com/vinodkkurmi/Visual\\_Question\\_Generation](https://github.com/vinodkkurmi/Visual_Question_Generation).
- 2019 **Looking back at Labels: A Class based Domain Adaptation Technique**, : .  
 ○ <https://github.com/vinodkkurmi/DiscriminatorDomainAdaptation>.
- 2019 **Curriculum based Dropout Discriminator for Domain Adaptation**, : .  
 ○ <https://github.com/vinodkkurmi/CD3A>.
- 2019 **Attending to Discriminative Certainty for Domain Adaptation**, : .  
 ○ <https://github.com/vinodkkurmi/cada>.