Vinod K. Kurmi

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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 **Neurocomputing**)

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 form 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 **Incremental Learning**

2020 **Domain Adaptation**

2020 **Probabilistic Generation**

2020 **Multi-Modal Generation**

PhD Research Work

Title **Understanding Transfer Learning between Domains, Tasks 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

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.

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.

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

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.

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, LaTeX, 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 **BMVC, 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`.

2018 **Multimodal Differential Network for 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`.