

SHANU KUMAR

SENIOR UNDERGRADUATE, IIT KANPUR

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EDUCATION

2019 **Indian Institute of Technology Kanpur**
B.Tech in Electrical Engineering, Minor in Machine Learning

GPA: 8.63/10

RESEARCH INTERESTS

COMPUTER VISION, DOMAIN ADAPTATION, NATURAL LANGUAGE PROCESSING, MACHINE LEARNING

ACHIEVEMENTS

- 2019 Received **Conference Travel Grant** from Microsoft Research India for attending CVPR
- 2019 Received **Conference Travel Grant** from Indian National Academy of Engineering for attending CVPR
- 2019 Received **Conference Travel Grant** from Microsoft Research India for attending WWW
- 2018 Received **A*** (top 1%) grade for exceptional performance in the course "Neural Network"
- 2017 Received **Academic Excellence Award**, awarded to Top 5% students in IIT Kanpur
- 2015 Secured **All India Rank - 2499** in **JEE Advanced** among 1.25 lakh Candidates

PUBLICATIONS


- 2019 **ATTENDING TO DISCRIMINATIVE CERTAINTY FOR DOMAIN ADAPTATION**
Vinod Kumar Kurmi, Shanu Kumar*, Vinay P. Namboodiri*
In Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019
- 2019 **ADVERSARIAL ADAPTATION OF SCENE GRAPH MODELS FOR UNDERSTANDING CIVIC ISSUES**
Shanu Kumar, Shubham Atreja, Anjali Singh and Mohit Jain
In Proceedings of the International World Wide Web Conference (WWW), 2019 [Paper]
- 2019 **ALIGNING THE CERTAINTY OF CLASSIFIER FOR DOMAIN ADAPTATION**
Shanu Kumar, Vinod Kumar Kurmi*, Vinay P. Namboodiri*
IEEE International Conference on Computer Vision (ICCV), 2019 [Under Review]

INTERNSHIP







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| MAY-JUL
2018 | ADVERSARIAL ADAPTATION OF SCENE GRAPH MODELS FOR UNDERSTANDING CIVIC ISSUES
<i>Research Intern at IBM India Research Laboratory, Bangalore</i>
<i>Supervisor: SHUBHAM ATREJA</i> <ul style="list-style-type: none">Proposed a novel application of existing Scene Graph models by adapting them to generate a Civic issue graph for understanding civic issues present in an image.Created two multi-modal datasets with bounding boxes and descriptions about civic issues. |
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RESEARCH PROJECTS

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| JAN-APR
2019 | ALIGNING THE CERTAINTY OF CLASSIFIER FOR DOMAIN ADAPTATION
<i>Undergraduate Project at IIT Kanpur</i>
<i>Supervisor: PROF. VINAY P. NAMBOODIRI</i> <ul style="list-style-type: none">Proposed a method for generating certainty activation maps of the classifier, and improved classifier's certainty by aligning certainty activation maps across source and target domain.Achieved state of the art results on <i>Office Home</i>, <i>Office-31</i> and <i>ImageCLEF-2014</i> datasets. |
| SEP-NOV
2018 | ATTENDING TO DISCRIMINATIVE CERTAINTY FOR DOMAIN ADAPTATION
<i>Undergraduate Project at IIT Kanpur</i>
<i>Supervisor: PROF. VINAY P. NAMBOODIRI</i> <ul style="list-style-type: none">Proposed a method to identify adaptable regions using the certainty estimates of discriminator for improving classifier's performance on target dataset.Achieved state of the art results on <i>Office Home</i>, <i>Office-31</i> and <i>ImageCLEF-2014</i> datasets. |

AUG-OCT 2018	KNOWING WHEN TO ADAPT: A BAYESIAN APPROACH FOR DOMAIN ADAPTATION <i>Undergraduate Project at IIT Kanpur</i> <i>Supervisor: PROF. VINAY P. NAMBOODIRI</i> <ul style="list-style-type: none"> Proposed a Bayesian framework for domain adaptation by transforming both the Classifier and Discriminator into Bayesian Neural Networks using Monte Carlo-Dropout approach. Achieved improvement over the Non-Bayesian Model on <i>Office Home</i> and <i>Office-31</i> datasets.
JAN-APR 2018  report	HIERARCHICAL WORD SENSE DISAMBIGUATION USING WORDNET SENSES <i>Undergraduate Project at IIT Kanpur</i> <i>Supervisor: PROF. HARISH KARNICK</i> <ul style="list-style-type: none"> Developed an end to end Hierarchical model based on synset and lexicographer number of Word-Net senses for predicting senses sequentially for each word in the sentence. Applied convolutional neural networks on word vectors for capturing the context of the word and the local features around a neighborhood of the word.

SELECTED PROJECTS

JAN-APR 2018  report	UNSUPERVISED MACHINE TRANSLATION USING STRUCTURED LATENT SPACE <i>Course Project for Natural Language Processing under Prof. Harish Karnick</i> <ul style="list-style-type: none"> Implemented the research paper: "<i>Unsupervised Machine Translation using monolingual corpora only</i>" Proposed graph convolutional networks (GCN) based autoencoder that imposes structure into the latent space representation for languages with complex grammar rules.
AUG-NOV 2017  report	BIDIRECTIONAL ATTENTION FLOW FOR MACHINE COMPREHENSION <i>Course Project for Machine Learning under Prof. Purushottam Kar</i> <ul style="list-style-type: none"> Studied and implemented research paper: "<i>Bidirectional attention flow for machine comprehension</i>" Included grammatical structure in the word embeddings by using part-of-speech embedding.
MAY-JUN 2017  github	RELATION CLASSIFICATION USING BIDIRECTIONAL LSTM TREE <i>Project Supervisor Prof. Harish Karnick</i> <ul style="list-style-type: none"> Developed a model to classify the relation between two given entities in a sentence. Applied Bidirectional tree structured LSTMs on the shortest dependency path between a pair of entities in dependency tree for jointly representing both entities and relations.
NOV-DEC 2016  github	AUTOMATIC QUALITY ASSESSMENT OF WHEAT GRAIN <i>Project Supervisor Gaurav Agrawal, Assistant Secretary, Department of Agriculture, India</i> <ul style="list-style-type: none"> Facilitated the process of automatic quality assessment of grains with impurity from images. Created a dataset of different qualities of wheat grain images, captured from Anaj Mandi.
NOV-DEC 2016  github	KERNELIZED CORRELATION FILTER BASED OBJECT TRACKING <i>Project Supervisor Prof. Vinay P. Nambodiri</i> <ul style="list-style-type: none"> Studied research paper: "<i>High-Speed Tracking with Kernelized Correlation Filters</i>" by Joao et. al. Tried to improve KCF tracker by using the feature maps from pretrained VGG16 network.
JAN-APR 2018  github	VISUAL MOTOR CONTROL OF ROBOTIC ARM <i>Course Project for Neural Network under Prof. Laxmidhar Behera</i> <ul style="list-style-type: none"> Implemented neural network based Single Network Adaptive Critic (SNAC) and Self-Organizing Maps (K-SOM) for visual motor control of a robotic arm in TensorFlow.

RELEVANT COURSEWORK

Probabilistic Modeling & Inference	Probability & Statistics	Visual Recognition	Machine Learning
Natural Language Processing	Data Structure & Algorithm	Linear Algebra and ODE	Neural Network

TECHNICAL SKILLS

Programming Languages	Python, C, C++, Lua
Deep Learning Libraries	Torch, PyTorch, TensorFlow
Tools	NumPy, Scikit-learn, MATLAB, Django, \LaTeX , Git