

Riddhiman Dasgupta

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Research Interests:

Deep Learning, Computer Vision, Machine Learning, Natural Language Processing

Education:

Master of Science, Computer Science and Engineering (2013-2017) International Institute of Information Technology, Hyderabad Advisor: Dr. Anoop Namboodiri, Center for Visual and Information Technology (CVIT)	9.68/10
B.Tech in Computer Science and Engineering (2009-2013) Heritage Institute of Technology, Kolkata Affiliation: West Bengal University of Technology	8.67/10
Higher Secondary Examination (2007-2009) South Point High School, Kolkata Affiliation: West Bengal Council of Higher Secondary Education	83.00 %
Secondary Examination (2006-2007) South Point High School, Kolkata Affiliation: West Bengal Board of Secondary Education	94.50 %

Publications:

- **Dialogue Act Sequence Labeling Using Hierarchical Encoder With CRF**, AAAI 2018, New Orleans, USA.
Harshit Kumar, Arvind Agarwal, Riddhiman Dasgupta, Sachindra Joshi, Arun Kumar
- **Leveraging Multiple Tasks to Regularize Fine-Grained Classification**, ICPR 2016, Cancun, Mexico.
Riddhiman Dasgupta, Anoop Namboodiri (**Oral Presentation**)
- **Learning Clustered Subspaces for Sketch-based Image Retrieval**, ACPR 2015, Kuala Lumpur, Malaysia.
Koustav Ghosal, Ameya Prabhu, Riddhiman Dasgupta, Anoop Namboodiri (**Oral Presentation**)
- **A Comparative Study Of Tag SNP Clustering**, ICAA 2014, Kolkata, India.
Riddhiman Dasgupta, Anirban Ghose, Koustav Mullick, Sujay Saha and Kashinath Dey
- **Missing Value Estimation in DNA Microarrays Using B-Splines**, ICBCB 2013, Beijing, China.
Riddhiman Dasgupta, Anirban Ghose, Koustav Mullick, Sujay Saha and Kashinath Dey

Experience:

Dec'16 - Present	Research Engineer at IBM Research, India, in the Cognitive Finance team, working on abstractive and extractive summarization, text paraphrasing and semantic text similarity.
Jan'14 - Present	Research Assistant at CVIT, IIIT Hyderabad, under the guidance of Dr. Anoop Namboodiri, working on fine-grained recognition using multi-task convnets and semantic taxonomies/hierarchies.
Aug'14 - Dec'15	Teaching Assistant Pattern Recognition , Monsoon '14, assisting Dr. Anoop Namboodiri, with 130+ students. Computer Vision , Spring '15, assisting Dr. Anoop Namboodiri, with 70+ students. Machine Learning , Monsoon '15, assisting Dr. C.V. Jawahar, with 90+ students.
Jun'12 - Jul'12	Summer Intern at CSTAR, IIIT Hyderabad under the guidance of Dr. Kannan Srinathan, developing JavaScript modules for elliptic curve cryptography algorithms.
Jun'11 - Jul'11	Summer Intern at NJIT, New Jersey under the guidance of Dr. Yun Qing Shi, designing, building and evaluating a dataset for image splicing detection using SVMs and steganographic features.

Skills:

Programming Languages	Proficient: • Lua • Python • C Acquainted: • C++ • Javascript • Matlab
Libraries & Tools	• PyTorch • Torch7 • Keras • Caffe • ScikitLearn • OpenCV • Bash • Git • L ^A T _E X • MySQL

Select Projects:

Multi-task Learning In The Context Of Deep Neural Networks (*Aug 2014 - Dec 2016*)

My MS thesis, under the guidance of *Dr. Anoop Namboodiri, CVIT*, deals with leveraging multiple tasks to act as regularizers for training deep neural networks. Our main contribution is to utilize the taxonomic/semantic hierarchies among classes, where each level in the hierarchy is posed as a classification problem, and solved jointly using multi-task learning. We employ a cascaded multi-task network architecture, where the output of one task feeds into the next, thus enabling transfer of knowledge from the easier tasks to the more difficult ones. To gauge the relative importance of tasks, and apply appropriate learning rates for each task, we propose a novel task-wise dynamic coefficient which controls its contribution to the global objective function.

Deep Learning Experience (*Aug 2014 - Present*)

Undertook independent study on sequence learning using RNNs, with focus on captioning, question answering, attention and memory networks, guided by *Dr. Anoop Namboodiri, CVIT*. Rudimentary experience with deep generative adversarial networks.

Hands-on experience learning and implementing various deep learning paradigms, architectures and problems, such as:

- Sequence to sequence models with various attention mechanisms, e.g. Luon, Bahdanau, self/intra, temporal, etc.
- Hierarchical recurrent models combined with structured prediction models such as CRF (Published in AAAI, 2017)
- Recursive neural networks such as tree based models for sentence similarity (Released on Github)
- Joint multi-modal embeddings with metric learning based loss functions (Published in ACPR, 2015)
- Semantic segmentation at superpixel level using multi-scale fully convolutional networks
- Feature inversion and visualization using gradient descent on convolutional feature maps

Accelerating Neural Network Training By Varying Network Size (*Aug 2016 - Dec 2016*)

This project, in collaboration with *Soumith Chintala, Facebook AI Research*, aims to accelerate the training of deep neural networks by expanding/reducing them in the middle of training without degrading/sacrificing performance. Our experiments show that morphing a network by deepening and/or widening its layers during training results in increased accuracies and decreased training times. Currently, we are attempting to harness reinforcement learning to identify the optimal points – when during training and where in the network – to morph/expand the network to obtain maximum benefits.

Course Projects (*Aug 2013 - May 2014*)

As part of courses on pattern recognition, computer vision, web mining and optimization methods, completed projects on diverse topics such as ensemble methods, dimensionality reduction, topic modeling, image segmentation, and sparse coding.

Text Detection using Region Based CNNs (*May 2013 - May 2014*)

Worked under the guidance of *Dr. Ujjwal Bhattacharya, CVPR, ISI, Kolkata*, to train convolutional neural networks to identify and detect text in natural scene text images. Maximally stable extremal regions were extracted from images, and pruned regions were fed to the convolutional neural networks to identify regions as text or non-text. Text regions were then grouped from the character-level to word-level and subsequently to the line-level using heuristics.

Awards and Achievements:

- **AIR 273** out of 224160 in the paper Computer Science and Information Technology in GATE 2013 (top 0.12 %).
- **Founding Member, Treasurer** of ACM Student Chapter, Heritage Institute of Technology, Kolkata
- **National Finalist Team** at Code.Fun.Do 2015 hackathon, for the app Khoj.

Volunteer Activities:

- Open source enthusiast, with contributions such as **treeLSTM.pytorch** racking up more than 150 stars
- Content creator/lab instructor for **Deep Learning Summer School** and **Deep Learning Short Course**.
- Volunteer at Asha Kiran, school for under-privileged children at IIIT Hyderabad.
- Lead at AI Hobby Group, ACM Student Chapter, Heritage Institute of Technology.

Relevant Course Work:

Graduate Level Courses

- Machine Learning • Computer Vision • Optimization Methods
- Statistical Methods in AI • Web Mining • Data Mining

Undergraduate Level Courses

- Data Structures and Algorithms • Operating Systems • Database Systems
- Artificial Intelligence • Image Processing • Networking