

Biswajit Paria

5th year undergraduate (dual degree)
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Education

Indian Institute of Technology Kharagpur, India BTech MTech (dual degree) in Computer Science and Engineering GPA 9.77/10.0, ranked 1 among final year dual degree students.	Jul 2012 - Apr 2017
Kendriya Vidyalaya IIT Kharagpur All India Senior School Certificate Examination (AISSCE), CBSE board Percentage score 92.4%	Jul 2010 - Apr 2012
Kendriya Vidyalaya IIT Kharagpur All India Secondary School Examination (AISSE), CBSE board GPA 9.8/10.0	Apr 2005 - Apr 2010

Interests

My broad area of interest is machine learning. I am currently working on deep learning, particularly on generative models including GANs and Variational Autoencoders. In the future I want to work in more mathematically involved areas including statistical machine learning, optimization, algorithms, and learning theory.

Papers

- Avishek Lahiri, **Biswajit Paria**, and Prabir Kumar Biswas. "Forward Stagewise Additive Model for Collaborative Multiview Boosting." *IEEE Transactions in Neural Networks and Learning Systems*. 2016. (Accepted, in press)
- Avishek Lahiri, **Biswajit Paria**, and Prabir Kumar Biswas. "CoMA-Boost: Cooperative Multi Agent AdaBoost." *Indian Conference on Computer Vision, Graphics and Image Processing*. 2016. (Accepted, oral presentation)
- Biswajit Paria**, Anirban Santara, and Pabitra Mitra. "Visualization Regularizers for Neural Network based Image Recognition." *arXiv preprint arXiv:1604.02646*. 2016. (Pre-print)
- Biswajit Paria**, Sanjoy Pratihar, and Partha Bhowmick. "On Farey Table and its Compression for Space Optimization with Guaranteed Error Bounds." 2016. (Submitted. Please request to get a copy for personal viewing.)

Internships and Projects

Bachelor's Thesis, Indian Institute of Technology Kharagpur Visualization Regularizers for Neural Network based Image Recognition Advisor: Prof. Pabitra Mitra	2015 - 2016
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Introduced a novel regularizer for Neural Networks based on the *visualizations* of the hidden nodes. We leveraged the closed algebraic form of the visualizations of the first layer nodes, and used it as a smoothness prior. We show that the regularizer is a special case of the general Tikhonov regularization. Experimental results show that the visualization regularizers are an improvement over standard L2 regularizers.

Indian Institute of Technology Kharagpur, India Forward Stagewise Additive Model for Collaborative Multiview Boosting. with Prof. P.K. Biswas	2015 - 2016
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On AdaBoost in a multiview setting. Introduced a notion of difficulty of an example. Difficulty ranges from -1 to 1 and is a linear function of the number of views the example was misclassified in. The weights are updated as a function of the difficulty the example rather than on whether the example was misclassified or not. We show that this is an improvement over other multiview frameworks. Analogous to AdaBoost, we derived bounds on the empirical risk and maximum margin.

Indian Institute of Science, Bangalore, India Natural Language Inference (NLI) using Deep Learning for NLP with Prof. Ambedkar Dukkipati	Summer 2016
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Worked with the Stanford NLI dataset. Given two sentences, the task is to determine whether the sentences are related as an entailment, contradiction or neutral. We explored models using LSTMs, Attentions, and Dependency Parses, and finally came up with a hybrid model. This work has been submitted to a reputed conference.

University of Southern California, Los Angeles, USA

Summer 2015

Feature Learning in Clinical Time Series using Deep Learning

with Prof. Yan Liu

Worked with ICU time series data consisting and used deep learning with a laplacian prior regularizer to predict health outcomes. We performed causality analysis on the final layer nodes, analyzed the activations of the most *causal* nodes using decision trees, and extracted their maximally activating inputs. This analysis is a step towards understanding neural networks in the context of medical data.

Indian Institute of Technology Kharagpur, India

Summer 2014

On Farey Table and its Compression for Space Optimization with Guaranteed Error Bounds

with Prof. Partha Bhowmick

Studied the number theoretic properties of Farey Sequences and the Farey Table, and came up with a novel algorithm for a lossy compression of the Farey Table. The Farey Table is an useful data-structure in digital geometry. It's quadratic size ($\Theta(n^2)$) prohibits its use for large dimensions. The compressed table has a size of ($O(n \log n)$), thus allowing table creation for larger n .

Other Projects

I have worked on numerous other projects, including developmental projects. My GitHub profile (<https://github.com/biswajitsc>) lists most of the projects I have worked on.

Academic Honors and Awards

Goralal Syngal Scholarship

2015 & 2016

for academic excellence at IIT Kharagpur.

Viterbi-India Scholarship

2015

for funding a summer internship at USC. One of the 20 scholars in India.

ACM ICPC 2015 and 2016 World Finalist

2015

Our team qualified for the International Collegiate Programming Competition (ICPC) twice, in 2015 and 2016. One of the 7 teams from India.

JBNSTS third best project

2014

Awarded for our work on Counting Dyck Paths of Bounded Height.

Jagadish Bose National Science Talent Search (JBNSTS) Scholar

2013

Awarded to 30 candidates in the state of West Bengal.

Indian National Physics Olympiad (INPhO) Awardee

2012

Among top 30 candidates in India.

Selected to attend the International Physics Olympiad (IPhO) selection camp.

Kishore Vaigyanik Protsahan Yojana (KVPY) Scholar

2011

by Dept. of Science and Technology, Govt. of India for exceptional aptitude in basic sciences. Stood 7th in India.

Indian National Mathematical Olympiad (INMO) Awardee

2010

Among top 30 candidates in India.

Selected to attend the International Mathematical Olympiad Training Camp (IMOTC).

Australian Mathematics Competition (AMC) Gold Medallist

2009

Received a Gold Medal in the Intermediate Division. One of the 23 medallists in the world.

Technical Skills

Proficient: C, C++, Python, Java, Bash, Matlab, Tensorflow, Numpy

Familiar: Mathematica, HTML, Javascript, Caffe, Theano, Scikit-learn, Keras, Lasagne, Nltk, Stanford Core-NLP

Relevant Coursework

Machine Learning
Computational Statistics
Artificial Intelligence
Speech and Natural Language Processing

Advanced Machine Learning
Algorithms I and II
Matrix Algebra
Advanced Graph Theory

Probability and Statistics
Selected Topics in Algorithms
Information Retrieval