Shounak Datta

Machine Learning Researcher
Austin, Texas, USA

email: shounak.jaduniv@gmail.com
Phone: +1 (919) 396 1988
URL: https://shounak-d.github.io/
GitHub: https://github.com/Shounak-D

Areas of expertise

Machine Learning * Deep Learning * Large Language Models * Large Vision Language Models * Vision Transformers * Model Alignment * Preference Optimization * Few-shot Learning * Imbalanced Classification * Multi-objective Optimization * Missing Features * Data Clustering

Positions held

2023-now	Senior ML Research Engineer, ARM Inc., Austin TX, USA.
2022-2023	Applied ML Scientist, Amazon.com Inc., Austin TX, USA.
2020-2022	ML Research Scientist, ARM Research, Austin TX, USA.
2019-2020	Postdoctoral Associate, Duke University, Durham NC, USA.
2015-2019	Senior Research Fellow, Indian Statistical Institute, Kolkata, India.
2013-2015	Junior Research Fellow, Indian Statistical Institute, Kolkata, India.

Research interests & experience

* Extensive experience of working with state-of-the-art deep learning models, such as LLMs, LVLMs, other vision and NLP transformers, generative models, etc., including pretraining, fine-tuning, preference optimization, and alignment.
* Expertise on machine learning algorithms like classification, clustering, feature learning, dimensionality reduction, etc. with focus on real-world challenges like few-shot learning, real-time inference, class imbalance, etc.
* Experienced in developing deep learning models for real-world applications like computer vision models for real-time inference, customer-facing dialogue systems, medical diagnosis.
* Authored several research publications at prestigious venues such as ICML, ICCV, AISTATS, Machine Learning (Springer), Scientific Reports (Nature), etc.
* Proficient in deep learning platforms like PyTorch, Huggingface transformers, peft, trl, etc. and Python programming.
* Supervised 20+ undergraduate and postgraduate research interns, and junior researchers (from

various notable academic institutes in India and USA) on projects leading to presentations, technical reports, dissertations, and papers since 2013.

Selected projects

2024-now **Investigating preference optimization for reasoning as well as model alignment in large transformer models on resource-constrained devices**, ARM Inc., Austin, TX, USA.

2020-now **Developing, training and optimizing large transformer models for resource-restricted devices**, ARM Inc., Austin, TX, USA.

2020-now **Integrating manifold preservation into few-shot image classification for better generalization**, Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata, India.

2022-2023 **Created a sophisticated natural language processing—based dialogue agent tailored for customer service applications**, Amazon.com Inc., Austin, TX, USA.

2019-2020 **Developed deep convolutional networks adept at diagnosing Glaucoma with OCT scans**, Dept. of Electrical and Computer Engineering, Duke University, Durham, NC, USA.

2019-2020 **Formulated several neural representations using weight rebalancing strategies for unbiased counterfactual inference**, Dept. of Electrical and Computer Engineering, Duke University, Durham, NC, USA.

2018-2019 **Automated class imbalance handling in image classification using an adversarial learning—based deep generative model**, Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata, India.

2013-2019 **Devised resilient learning algorithms capable of handling data irregularities like class imbalance and missing features**, Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata, India.

2015-2019 **Pioneered a fuzzy partitional clustering method with the unique ability to autonomously gauge the level of fuzziness in the data**, Electronics and Communication Sciences Unit, Indian Statistical Institute, Kolkata, India.

2011-2013 **Designed electrooculogram–based control mechanisms to aid rehabilitation by facilitating wheelchair control**, Department of Electronics and Telecommunication jointly with the School of Bioscience and Engineering, Jadavpur University, Kolkata, India.

2011-2013 **Devised methods for analyzing and predicting stock market–based time series data**, Department of Electronics and Telecommunication, Jadavpur University, Kolkata, India.

Education

2019 Ph.D. in Computer Science, *On the Design of Learning Systems with Resilience to Data Irregularities*, Indian Statistical Institute, Kolkata, India, under the supervision of Prof. (Dr.) Swagatam Das

2013 M.E. in Electronics and Telecommunication Engineering (Specialization: Control Engineering), Jadavpur University, Kolkata, India. CGPA: **9.78**/10

2011 B.Tech. in Electronics and Communication Engineering, Maulana Abul Kalam Azad University of Technology, Kolkata, India. CGPA: **9.02**/10

Programming Languages & Tools

PyTorch, Python, Huggingface transformers, peft, trl, NVIDIA Transformer Engine, Tensorflow, Keras, Tensorflow-Lite, MATLAB.
Experience of deploying deep learning workloads in the cloud using Amazon Web Services.
Experience of regularly coding collaboratively with a large team using Git.
Extensive experience of preparing articles and presentations using LaTeX.

Professional activities

Reviewer Duties

2025-now IEEE Transactions on Artificial Intelligence
2018-now IEEE Transactions on Neural Networks and Learning Systems
2018-now IEEE Transactions on Knowledge and Data Engineering
2017-now Transactions on Knowledge Discovery from Data (ACM)
2014-now Engineering Applications of Artificial Intelligence (Elsevier)
2014-now Neurocomputing (Elsevier)
2017-2021 Pattern Recognition (Elsevier)
2015-2021 Information Sciences (Elsevier)
2014-2015 IEEE Transactions on Systems, Man, and Cybernetics: Systems
2023 British Machine Vision Conference
2021 British Machine Vision Conference
2020 British Machine Vision Conference
2017 Ninth International Conference on Advances in Pattern Recognition
2015 Eight International Conference on Advances in Pattern Recognition

Invited talks & lectures

2025 "Reinforcement Learning for Model Alignment", *Winter School on Deep Learning*, Indian Statistical Institute, Kolkata, India.
2025 "Advanced Few-shot Learning", *Winter School on Deep Learning*, Indian Statistical Institute, India.
2024 "Diffusion Models", *Winter School on Deep Learning*, Indian Statistical Institute, Kolkata, India.
2024 "Recent advances in Few-shot Learning", *Winter School on Deep Learning*, Indian Statistical Institute, Kolkata, India.
2023 "Few-shot and Semi-supervised Learning", *Winter School on Deep Learning*, Indian Statistical Institute, Kolkata, India.
2022 "Few-shot Learning", *Winter School on Deep Learning*, Indian Statistical Institute, Kolkata, India.
2022 "Ethics in Artificial Intelligence", *Winter School on Deep Learning*, Indian Statistical Institute, India.
2018 "Data Irregularities in Pattern Classification", *SSCVGIP 2018*, Indian Statistical Institute, India.
2014 "Evolutionary Algorithms", *Lectures on Bio-Inspired Computing*, Indian Statistical Institute, India.

Publications

17 journal- and 8 peer-reviewed conference papers at top-tier venues like *ICML, ICCV, AISTATS, Scientific Reports (Nature), Machine Learning (Springer), and several IEEE Transactions.* For more details, please visit my Google Scholar page at https://scholar.google.co.in/citations?user=qtW4ugoAAAAJ

Conference articles

2025 "Evaluating Hallucination in Large Vision-Language Models based on Context-Aware Object Similarities", Shounak Datta, Dhanasekar Sundararaman, *AAAI 2025 Workshop on Preventing and Detecting LLM Misinformation.*

2023 "Interval Bound Interpolation for Few-shot Learning with Few Tasks", Shounak Datta, Sankha Subhra Mullick, Anish Chakrabarty, Swagatam Das, *ICML 2023.*

2021 "Counterfactual Representation Learning with Balancing Weights", Serge Assaad, Shuxi Zeng, Chenyang Tao, Shounak Datta, Nikhil Mehta, Ricardo Henao, Fan Li, Lawrence Carin, *AISTATS 2021, Proceedings of*, 1972-1980.

2019 "Generative Adversarial Minority Oversampling", Sankha Subhra Mullick, Shounak Datta, Swagatam Das, *ICCV 2019*, 1695-1704.

2015 "Rough-Fuzzy Collaborative Multi-level Image Thresholding: A Differential Evolution Approach", Sujoy Paul, Shounak Datta, Swagatam Das, *MENDEL 2015, Proceedings of*, 329-341.

2013 "Real time electrooculogram driven rehabilitation aid", Anwesha Banerjee, Pratyusha Das, Shounak Datta, Amit Konar, Ramadoss Janarthanan, D. N. Tibarewala", *International Conference on Advances in Computing, Proceedings of the*, 435-440.

2012 "Single channel electrooculogram (EOG) based interface for mobility aid", Anwesha Banerjee, Sumantra Chakraborty, Pratyusha Das, Shounak Datta, Amit Konar, D. N. Tibarewala", *Intelligent Human Computer Interaction (IHCI), Proceedings of the 4th International Conference on*, 1-6.

2012 "Electrooculogram based online control signal generation for wheelchair", Anwesha Banerjee, Shounak Datta, Pratyusha Das, Amit Konar, D. N. Tibarewala, Ramadoss Janarthanan, *Electronic System Design (ISED), Proceedings of the International Symposium on*, 251-255.

Journal articles

2023 "Deep Learning Assisted Detection of Glaucoma Progression in Spectral-Domain Optical Coherence Tomography", Eduardo Mariottoni, Shounak Datta, Leonardo Shigueoka, Alessandro Jammal, Ivan Tavares, Ricardo Henao, Lawrence Carrin, Felipe Medeiros, *Ophthalmology Glaucoma.*

2021 "RetiNerveNet: Using Recursive Deep Learning to Estimate Pointwise 24-2 Visual Field Data based on Retinal Structure", Shounak Datta, Eduardo B Mariottoni, David Dov, Alessandro A Jammal, Lawrence Carin, Felipe A Medeiros, *Scientific Reports (Nature).*

2021 "A black-box adversarial attack strategy with adjustable sparsity and generalizability for deep image classifiers", Arka Ghosh, Sankha Subhra Mullick, Shounak Datta, Swagatam Das, Asit Kr. Das, Rammohan Mallipeddi, *Pattern Recognition (Elsevier).*

2020 "Appropriateness of Performance Indices for Imbalanced Data Classification: An Analysis", Sankha Subhra Mullick, Shounak Datta, Sourish Gunesh Dhekane, Swagatam Das, *Pattern Recognition (Elsevier).*

2020 "Artificial Intelligence Mapping of Structure to Function in Glaucoma", Eduardo Mariottoni, Shounak Datta, David Dov, Alessandro Jammal, Samuel Berchuck, Ivan Tavares, Lawrence Carin, Felipe

Medeiros, *Translational Vision Science and Technology (ARVO)*.

2019 "Boosting with Lexicographic Programming: Addressing Class Imbalance without Cost Tuning", Shounak Datta, Sayak Nag, Swagatam Das, *IEEE Transactions on Knowledge and Data Engineering*.

2019 "Fuzzy Clustering to Identify Clusters at Different Levels of Fuzziness: An Evolutionary Multi-Objective Optimization Approach", Avisek Gupta, Shounak Datta, Swagatam Das, *IEEE Transactions on Cybernetics*.

2018 "Clustering with Missing Features: A Penalized Dissimilarity Measure based approach", Shounak Datta, Supritam Bhattacharjee, Swagatam Das, *Machine Learning*.

2018 "Multi-Objective Support Vector Machines: Handling Class Imbalance with Pareto Optimality", Shounak Datta, Swagatam Das, *IEEE Transactions on Neural Networks and Learning Systems*.

2018 "Fast Automatic Estimation of the Number of Clusters from the Minimum Inter-Center Distance for Center-Based Clustering", Avisek Gupta; Shounak Datta; Swagatam Das, *Pattern Recognition Letters (Elsevier)*.

2018 "Handling data irregularities in classification: Foundations, trends, and future challenges", Swagatam Das, Shounak Datta, Bidyut B. Chaudhuri, *Pattern Recognition* 81, 674-693.

2018 "Adaptive Learning-Based k-Nearest Neighbor Classifiers With Resilience to Class Imbalance", Sankha Subhra Mullick, Shounak Datta, Swagatam Das, *IEEE Transactions on Neural Networks and Learning Systems*.

2017 "Generalized mean based back-propagation of errors for ambiguity resolution", Shounak Datta, Sankha Subhra Mullick, Swagatam Das, *Pattern Recognition Letters* 94, 22-29.

2017 "A Radial Boundary Intersection aided interior point method for multi-objective optimization", Shounak Datta, Abhiroop Ghosh, Krishnendu Sanyal, Swagatam Das, *Information Sciences* 377, 1-16.

2016 "A feature weighted penalty based dissimilarity measure for k-nearest neighbor classification with missing features", Shounak Datta, Debaleena Misra, Swagatam Das, *Pattern Recognition Letters* 80, 231-237.

2015 "Near-Bayesian Support Vector Machines for imbalanced data classification with equal or unequal misclassification costs", Shounak Datta, Swagatam Das, *Neural Networks* 70, 39-52.

2012 "Development strategy of eye movement controlled rehabilitation aid using Electrooculogram", Anwesha Banerjee, Shounak Datta, Amit Konar, D. N. Tibarewala", *International Journal of Scientific and Engineering Research* 3 (6), 1-6.

Theses & Dissertations

2018 "On the Design of Learning Systems with Resilience to Data Irregularities", Shounak Datta, under the guidance of Prof. (Dr.) Swagatam Das, *Ph.D. Thesis*, Indian Statistical Institute, Kolkata, India.

2013 "Analysis and prediction of time series indices obtained from stock market indices", Shounak Datta, under the guidance of Prof. (Dr.) Amit Konar, *M.E. Dissertation*, Jadavpur University, Kolkata, India.

Patents

2022 "Neural Processing Unit for Attention-based Inference", Shounak Datta, Dibakar Gope, Jesse Garrett Beu, Mark John O'Connor, *US Patent App. 17/870.038 (submitted)*.

Preprint, Abstracts, and Others

2020 "A Deep Learning-Based Mapping of Structure to Function in Glaucoma", Eduardo Mariottoni, Shounak Datta, David Dov, Alessandro Jammal, Samuel Berchuck, Ivan Tavares, Lawrence Carin, Felipe Medeiros, *Investigative Ophthalmology & Visual Science*.

2020 "Double robust representation learning for counterfactual prediction", Shuxi Zeng, Serge Assaad, Chenyang Tao, Shounak Datta, Lawrence Carin, Fan Li, *arXiv* 2010.07866.

2017 "Diversifying Support Vector Machines for Boosting using Kernel Perturbation: Applications to Class Imbalance and Small Disjuncts", Shounak Datta, Sayak Nag, Sankha Subhra Mullick, Swagatam Das, *arXiv* 1712.08493.