SABYASACHI SAHOO

sabyasachi.sahoo.1@ulaval.ca ◇ sabyasachis.github.io ◇ gScholar ◇ ◇ ◇ ◇ ◇ ◇ en/fr

EDUCATION

PhD in Machine Learning — 2021 - Present
Mila, Université Laval, Canada — GPA: 4.33/4.33

Master's in Computational Science — 2014 - 2016
Indian Institute of Science - Bangalore, India

Bachelor's in Mechanical — 2010 - 2014
Sardar Vallabhbhai National Institute of Technology, India

RESEARCH EXPERIENCE

Research Assistant, **Mila & IID, Université Laval** — 2021 - Present
Advisor : Christian Gagné and Frédéric Precioso.

- Broadly work on improving model robustness in real-world deployments. Specifically, domain generalization, out-of-distribution detection, continual learning, online learning, test time adaptation and adversarial attacks.

Research Associate, **Machine Learning Lab, IISc** — 2019 - 2021
Advisor : Chiranjib Bhattacharyya

- Worked on unsupervised domain adaptation, model explainability, and 3d computer vision for medical imaging and robotics applications.

Research Student, **Middleware and Runtime Systems Lab, IISc** — 2015 - 2016
Advisor : Sathish S. Vadhiyar

- Worked on scaling molecular dynamics on supercomputers.

ENGINEERING EXPERIENCE

Deep Learning Engineer, **Donut Research Labs** — 2018 - 2019

- Led extreme text classification, text normalization, and object detection projects.

Software Engineer II, **NVIDIA** — 2016 - 2018

- Led embedded-system display and device tree projects.

PUBLICATIONS

"Challenges of AI driven diagnosis of chest X-rays transmitted through smart phones: a case study in COVID-19". [pdf]
Mariamma Antony, Siva T Kakileti, Rachit Shah, Sabyasachi Sahoo, Chiranjib Bhattacharyya, Geetha Manjunath.
(Scientific Reports, Nature '23)

"Differentiable SLAM Helps Deep Learning-based LiDAR Perception Tasks".
Prashant Kumar, Dheeraj Vattikonda, Vedang Bhupesh Shenvi Nadkarni, Erqun Dong, Sabyasachi Sahoo. [pdf]
(BMVC '23)

"Domain Generalization by Minimizing Out-of-Distribution Detection".
Sabyasachi Sahoo, Fan Zhou, Yann Pequignot, Jonas Ngnawe, Frédéric Precioso, Christian Gagné. [pdf]
(MAIS '22)

"Fully Differentiable Global SLAM for LiDAR with Pose-Graph Optimization".
Aryan, Dheeraj Vattikonda, Erqun Dong, Sabyasachi Sahoo. [pdf]
(IROS Workshop '22)

"DSLR: Dynamic to Static LiDAR scan Reconstruction using Adversarially Trained Autoencoder".
Sabyasachi Sahoo*, Prashant Kumar*, Vanshil Shah, Vineetha Kondameedi, Abhinav Jain, Akshaj Verma, Chiranjib Bhattacharyya, Vinay V. [pdf]
(AAAI '21)

* equal contribution

ONGOING RESEARCH WORKS

"A Layer Selection Approach to Improving Test Time Adaptation".
Sabyasachi Sahoo, Mostafa Elarabi, Jonas Ngnawe, Yann Pequignot, Frédéric Precioso, Christian Gagné.

"Local Robustness Evaluation of Deep Neural Networks using Adversarial Perturbations".
Jonas Ngnawe, Sabyasachi Sahoo, Yann Pequignot, Frédéric Precioso, Christian Gagné.

"Test Time Adaptation for Object Detection under Domain Shift".
Apoorva Verma, Sabyasachi Sahoo, Christian Gagné.

PREPRINTS

"GROOD: GRadient-aware Out-Of-Distribution detection in interpolated manifolds".
Mostafa Elarabi, Sabyasachi Sahoo, Yann Pequignot, Paul Novello, Liam Paull. (2023) [pdf]

"Hessian Aware Low-Rank Weight Perturbation for Continual Learning".
Jiaqi Li, Rui Wang, Yuanhao Lai, Changjian Shui, Sabyasachi Sahoo, Charles X. Ling, Shichun Yang, Boyu Wang, Christian Gagné, Fan Zhou. (2023) [pdf]

"Test Time Adaptation as an Adversarial Defense Strategy".
Kunal Samanta, Sabyasachi Sahoo, Christian Gagne. (2023) [pdf]

"Diffusion based Pseudolabeling under Distribution Shifts".
Apoorva Verma, Sabyasachi Sahoo, Christian Gagne. (2023) [pdf]

"Test-time Out-of-Distribution Generalization".
Sabyasachi Sahoo, Yann Pequignot, Frédéric Precioso, Christian Gagné. (2022) [pdf]

"Enhancing Explainability in Medical Images using Global Methods".
Darshika Tiwari, Rachit Shah, Sabyasachi Sahoo, Chiranjib Bhattacharyya. (2022) [pdf]

"Adversarial Robustness for Local Interpretable Methods".
Gaurav Parashar, Sabyasachi Sahoo, Chiranjib Bhattacharyya. (2021) [pdf]

"Automated Microservice Extraction using Reinforcement Learning".
Sabyasachi Sahoo*, Khaled Sellami*. (2021) [pdf]

"An Approach For Accurate Sceneflow Prediction for LiDAR-based Sensors".
Dhiraj Shanbag, Sabyasachi Sahoo, Chiranjib Bhattacharyya, Vinay V. (2020) [pdf]

"Hierarchical Task Mapping on Dragonfly topology for Scaling Molecular Dynamics".
Sabyasachi Sahoo, Sathish S. Vadhiyar. (2016) [pdf]

"Establishing Semantic relationships among Object Classes using Deep Networks for Image Classification".
Sabyasachi Sahoo*, Vineetha Kondameedi*. (2015) [pdf]

PROJECTS

"Deep Ensemble Methods for Vehicle Classification".
Sabyasachi Sahoo*, Sara Karami*, Arman Safarnejadian*, Adam Tupper*. (2021) [ppt]

"DCT-VAE: Capturing Low-level and High-level Features for Image Generation".
Tezuesh Varshney, Sabyasachi Sahoo, Chiranjib Bhattacharyya. (2021) [ppt]

"Improving Automatic Concept Extraction for Global Model Explainability".
Sabyasachi Sahoo, Abhinav Jain, Rachit Shah, Chiranjib Bhattacharyya. (2021) [ppt]

"FAIR : Frugal ADAS for Indian Roads".
Vineetha Kondameedi, Santosh Shet, Akshaj Verma, Sabyasachi Sahoo, Prashant Kumar, Chiranjib Bhattacharyya, Soma Biswas. (2020) [pdf]

"Proximal Pose Search for Adapting SLAM in Dynamic Environments on Slow Moving UGVs".
Sabyasachi Sahoo, Prashant Kumar, Vinay V, Chiranjib Bhattacharyya. (2019) [pdf]

TEACHING AND LEADERSHIP ROLES

Teaching Assistant, Introduction to Machine Learning (‘22, ‘23), Université Laval.

Organizer, Machine Learning Reading Group, Université Laval.

Research Mentor, SHARE Research Labs.

Organizer, ML/Autonomous Navigation Paper Reading Group, IISc.

Organizer, Deep Learning Brainstorming Sessions, Donut Research Labs.

Placement Coordinator, IISc.

Head Coordinator, Technical Events, SVNIT.

HONORS AND AWARDS

- IID Scholarship 2022 [www]
- Top 5 in class (CDS 2014-16, IISc)
- Distinction for master’s thesis
- NIPS 2017 Challenge (1st) [www]
- SO1 Customer Basket Prediction (3rd) [www]
- Deep Traffic for the self-driving car (finalist) [www]