

Sourav Sahoo

Indian Institute of Technology Madras

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Education

Dual Degree (B.Tech & M.Tech) in Electrical Engineering
Indian Institute of Technology, Madras

July 2017 - Present
CGPA: 9.52/10.00

Publications and Preprints

- (C3) Distributed Online Optimization with Byzantine Adversarial Agents.
S. Sahoo, A. Gokhale, and RK Kalaimani.
American Control Conference (ACC), 2022.[[Preprint](#)]
- (C2) *k*-experts - Online Policies and Fundamental Limits
S. Mukhopadhyay, **S. Sahoo**, and A. Sinha.
International Conference on Artificial Intelligence and Statistics (AISTATS), 2022.[[Paper](#)]
- (C1) A Segment Level Approach to Speech Emotion Recognition Using Transfer Learning
S. Sahoo, P. Kumar, B. Raman, and PP Roy.
Asian Conference on Pattern Recognition (ACPR), 2019.[[Paper](#)][[Supplementary](#)][[Poster](#)][[Code](#)]
- (W1) Multi-Modal Detection of Alzheimer's Disease from Speech and Text.
A. Mittal*, **S. Sahoo***, A. Datar*, J. Kadiwala*, H. Shalu, and J. Mathew (* equal contribution)
International Workshop on Data Mining in Bioinformatics (BIOKDD), 2021.[[Preprint](#)].

Experience

Undergraduate Researcher

Indian Institute of Technology, Madras

May 2021 - Present

Guide: [Prof. Abhishek Sinha](#)

- Studying the novel *k*-experts problem - a generalization of the classic *Prediction with Expert's Advice* problem. We propose SAGE (Sampled Hedge) - a framework for designing efficient online learning policies by leveraging statistical sampling techniques and carry out experiments to verify the theoretical results.

Undergraduate Researcher

Indian Institute of Technology, Madras

May 2021 - Sept 2021

Guide: [Prof. Rachel Kalpana Kalaimani](#)

- Studied the problem of non-constrained, online distributed optimization in a multi-agent system in the presence of adversarial agents. We defined the notion of regret in the considered setting and proved it to be sublinear.

Undergraduate Researcher

Indian Institute of Technology, Madras

Sept 2020 - July 2021

Guide: [Prof. Kaushik Mitra](#)

- Developed a novel deep network, *LeRoSNet (Learning from Rolling Shutter Net)*, for high-speed video reconstruction from a single rolling shutter capture from a lensless camera. The network achieves superior performance to traditional techniques and untrained networks on simulated and real data.

Data Science Intern

Gramophone - Transforming Agriculture

Dec 2019 - Jan 2020

Bengaluru, India

- Developed an algorithm for a chatbot system to diagnose crop diseases based on the user's queries that detects the disease with at least 80% confidence within an average of four queries from the user from an internal crop disease database consisting of 6k+ symptoms for 500+ diseases.

Research Intern

Indian Institute of Technology, Roorkee

May 2019 - July 2019

Guide: [Prof. Balasubramanian Raman](#)

- Proposed a novel deep learning model that predicts emotion for multiple segments of a single audio clip and utilizes transfer learning to improve performance. It achieved 68.7% accuracy on the [IEMOCAP](#) audio-only database and outperformed the previous state-of-the-art model by 6.3% relative accuracy.

Selected Projects

SVRG-SO: SVRG for Stochastic Optimization

Mar 2022 - May 2022

Stochastic Optimization Final Project

- Adapted the famous stochastic variance reduction algorithm (SVRG) optimization algorithm for stochastic optimization. Conducted theoretical analysis to recover optimal convergence rate for the problem setting. [\[Technical Report\]](#)

An Empirical Study on Online Agnostic Boosting

Oct 2020 - Dec 2020

Theoretical Machine Learning Final Project

- Conducted a study on an [novel online agnostic boosting algorithm](#), which efficiently converts an online convex optimizer to an online booster, by performing experiments on different datasets to measure the proposed algorithm's empirical performance. [\[Technical Report\]](#) [\[Video\]](#) [\[Code\]](#)

Stochastic Mirror Descent in Overparameterized Models

June 2020 - July 2020

Convex Optimization Term Paper

- Designed novel experiments to prove the theoretical results on convergence and implicit regularization for overparameterized linear regression models and reproduced the experimental results for deep neural networks. [\[Technical Report\]](#) [\[Code\]](#)

Awards and Honors

Awarded **Caltech Summer Undergraduate Research Fellowship (SURF)** in 2020* and 2021.

Selected to attend **Google Research India AI Summer School**, 2020.

All India Rank 584 among 200,000 candidates in JEE Advanced 2017.

All India Rank 49 among 1.5 million applicants in JEE Mains 2017.

Gold Medal in Indian National Physics Olympiad, 2017 and was offered provisional admission in Chennai Mathematical Institute (CMI).

All India Rank 18 in Kishore Vaigyanik Protsahan Yojana, 2015 and was offered provisional admission with a fellowship in Indian Institute of Sciences (IISc), Bangalore.

Certificate of Merit for promising performance in Indian National Mathematical Olympiad, 2015.

Coursework and Technical Skills

Courses: Applied Linear Algebra, Convex Optimization, Estimation Theory, Advanced Probability Theory, Distributed Optimization, Information Theory, Theoretical Machine Learning, Linear Optimization[†], Stochastic Optimization[†]

Programming Languages: Python (8/10), C++ (6/10)

Software & Libraries: Tensorflow, PyTorch, Numpy, CVX, L^AT_EX

Technology: GitHub, Windows, Linux

Teaching

Teaching Assistant for introductory programming class for freshmen year students.

Spring 2022

Teaching Assistant for introductory probability class for graduate students.

Fall 2021

Teaching volunteer at KV-IIT for science and mathematics.

2017 – 2018

Online tutor for physics and mathematics for JEE aspirants at [Melvano](#).

2017 – 2018

Professional Services

Assisted reviewing for COMSNETS 2022.

* rescinded † Spring 2022 semester