Sourav Sahoo

Indian Institute of Technology Madras
Email ◇ Website ◇ Google Scholar ◇ Github

Education

Dual Degree (B.Tech + M.Tech) in Electrical Engineering July 2017 - Present
Indian Institute of Technology, Madras CGPA: 9.53/10.00

Publications and Preprints

(P2) k-`experts` - Online Policies and Fundamental Limits
S. Mukhopadhyay, **S. Sahoo**, and A. Sinha.
Under Review.[Preprint]

(P1) Distributed Online Optimization with Byzantine Adversarial Agents.
S. Sahoo, A. Gokhale, and RK Kalaimani.
Submitted at American Control Conference (ACC), 2022.[Preprint]

(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

SURF Intern July 2021 - Present
California Institute of Technology (Caltech), Pasadena *Guide: Prof. Babak Hassibi*

- Working on generalization of the linear quadratic regulator problem.

Undergraduate Researcher May 2021 - Present
Indian Institute of Technology, Madras *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 June 2021 - Sept 2021
Indian Institute of Technology, Madras *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 May 2020 - July 2021
Indian Institute of Technology, Madras *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 Dec 2019 - Jan 2020
Gramophone - Transforming Agriculture *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 May 2019 - July 2019
Indian Institute of Technology, Roorkee *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

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 and carried out novel experiments to prove the theoretical results on convergence and implicit regularization for overparameterized linear regression models and reproduce 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 exceptional 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
Programming Languages: Python, C++, C, MATLAB
Software & Libraries: Tensorflow, PyTorch, Numpy, CVX, LaTeX

Teaching

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 Activities

Assisted reviewing for COMSNETS 2022.

* rescinded