

# Sourav Sahoo

Indian Institute of Technology Madras  
[Email](#) ♦ [Website](#) ♦ [Google Scholar](#) ♦ [Github](#)

## Education

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

July 2017 - Present  
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

Caltech, Pasadena

July 2021 - Present

Guide: [Prof. Babak Hassibi](#) and [Prof. Anima Anandkumar](#)

- Working on the generalization of the linear quadratic regulator problem.

### 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

June 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

May 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

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### 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

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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

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**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,  $\text{\LaTeX}$

## Teaching

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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

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Assisted reviewing for COMSNETS 2022.

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