Sayantan Choudhury

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Google Scholar: Google Scholar Profile

About Me

I am a 4th year PhD student in the Applied Mathematics and Statistics Department of Johns Hopkins University. I work at JHU - Optimization and Machine Learning Lab under the supervision of Dr Nicolas Loizou. I am primarily interested in areas of Large-Scale Optimization and Machine Learning.

Education

Johns Hopkins University
Department of Applied Mathematics and Statistics
PhD, 2020-2025 (expected)
Advisor: Nicolas Loizou

Johns Hopkins University
Department of Applied Mathematics and Statistics
MSE in Applied Mathematics and Statistics (Optimization), 2023
GPA: 4.08/4

Indian Statistical Institute, Kolkata
M.Stat in Statistics with Distinction 86.1%, 2018-2020
Specialization in Probability

Indian Statistical Institute, Kolkata
B.Stat in Statistics, 2015-2018

Research Interests

- Machine Learning.
- Stochastic Optimization.
- Nonconvex Optimization.
- Adaptive Methods.
- Federated Learning.
- Minimax Optimization.
- Randomized Algorithms for Linear Systems.

Research Projects

MBZUAI, UAE
Research Assistant

1. Adaptive Methods for Solving Minimization Problems.
   - Ongoing work with Eduard Gorbunov and Martin Takac.

Johns Hopkins University, Baltimore
Graduate Research Assistant

1. Single-Call Stochastic Extragradient Methods for Structured Non-monotone Variational Inequalities: Improved Analysis under Weaker Conditions
   - Joint work with Eduard Gorbunov and Nicolas Loizou.
   - Accepted at **NeurIPS, 2023**.
   - arViv preprint: arXiv:2302.14043
2. Communication-Efficient Gradient Descent-Accent Methods for Distributed Variational Inequalities: Unified Analysis and Local Updates
   - Joint work with Siqi Zhang, Sebastian Stich and Nicolas Loizou.
   - Accepted at **ICLR, 2024**.
   - arViv preprint: arXiv:2306.05100

3. Iterative Methods for Solving Large Scale Linear Systems
   • Ongoing work with Nicolas Loizou.

Indian Statistical Institute, Kolkata
M.Stat Student
1. Overparameterization for Sparse Regression
   • Joint work with Soumendu Sundar Mukherjee.

CSSL, Delhi
Summer Intern
1. Analysis of Background Data for Andhra Pradesh Student Learning Achievement Survey
   • Guided by Prateek Mantri.
   • Determined main factors responsible for students' performance using Grouped LASSO regression on high dimensional low sampled data.
2. Development of a Cheating Detection Algorithm
   • Guided by Prateek Mantri.
   • Built an R package for CSSL to detect copy pairs statistically with the help of Multidimensional Item Response Theory and Hypothesis Testing.
3. Confirmatory Analysis of Academic Skills Map Using Factor Analysis Approach
   • Guided by Prateek Mantri.
   • We analyzed the mapping of questions to various skills of NITI AAYOG and CSSL data using confirmatory factor analysis. Determined the reason behind the poor TLI values and designed new skill mapping models using Explanatory Factor Analysis.

Honors and Awards

- **Acheson J. Duncan Fund** for the Advancement of Research in Statistics Travel Award — 2023
- **NeurIPS 2023 Scholar Award** — 2023
- **MINDS (Mathematical Institute of Data Science) Fellowship** — 2022
- **Award for Excellent Academic Performance** in Masters First Year Indian Statistical Institute, Kolkata. — 2019
- **KVPY Fellowship** Department of Science & Technology (DST), Government of India. — 2015
- **Selected for INSPIRE Fellowship** Department of Science & Technology (DST), Government of India. — 2015

Invited Talks & Poster

- Conference on Neural Information Processing Systems (NeurIPS 2023), New Orleans, USA (Poster) — 2023
- SIAM Conference on Optimization (OP23), Seattle, USA (Talk) — 2023
- Annual Conference on Information Sciences and Systems (CISS 2023), Baltimore, USA (Talk) — 2023

Teaching Assistant

- Iterative Algorithms in Machine Learning: Theory and Applications — 2023
- Optimization in Data Science — 2023
- Large Scale Optimization for Data Science — 2022
- Machine Learning II — 2022
- Introduction to Convexity — 2021
- Network Analysis and Operations Research — 2021

Relevant Skills Python, LaTeX, R, MATLAB, C, GitHub