Spandan **Senapati**

Incoming CS Ph.D. student, University of Southern California
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Education

Indian Institute of Technology Kanpur — *Kanpur, Uttar Pradesh*

Bachelor of Technology in Computer Science and Engineering — *July 2018 - May 2022*

- Cumulative Performance Index (CPI): **9.1/10.0** (graduated with **Distinction**)
- Awarded **Proficiency Medal** at the 55th Convocation for the best undergraduate project done by a graduating student in the CSE department
- **Academic Excellence Award** (2018-19, 2019-20): Awarded for excellent academic performance in an academic year

Research Interests

- Learning Theory
- Online Convex Optimization
- Optimization
- Theoretical Machine Learning

Experience

Graduate Research Assistant — *SPiN Lab, IIT Kanpur*

Advisor: Prof. Ketan Rajawat — *Aug 2022 - May 2023*

- Project on Sharpened Lazy Incremental Quasi-Newton (SLIQN) method, the first algorithm with an $\mathcal{O}(d^2)$ per-iteration complexity and an explicit non-asymptotic superlinear convergence rate

Data Scientist intern in Related Search Team - Microsoft Bing — *Microsoft IDC, Hyderabad*

RS STCI Team - Microsoft Bing — *May 2021 - July 2021*

- Project on Topics in Organised Map of Suggestions (TOMS). Developed an efficient clustering algorithm and built an interface which automated the clustering process and allowed doing several large-scale experiments seamlessly
- Offered a Pre-Placement offer (PPO) for a full-time data scientist position

Publications

Online Convex Optimization with Switching Cost and Delayed Gradients

Spandan Senapati, Rahul Vaze — *August 2023*

Accepted at IFIP Performance 2023. Full paper to appear in a special issue of Performance Evaluation (PEVA)

Proximal Algorithms for Smoothed Online Convex Optimization with Predictions — *[Preprint]*

Spandan Senapati, Ashwin Shenai, Ketan Rajawat — *August 2023*

To appear in the IEEE Transactions on Signal Processing

Preprints

Sharpened Lazy Incremental Quasi-Newton Method — *[Preprint]*

Aakash Lahoti*, **Spandan Senapati***, Ketan Rajawat, Alec Koppel — *May 2023*

Under review

Selected Projects

Non-asymptotic convergence of Quasi-Newton Methods — *SPiN Lab, IITK*

ADVISOR: Prof. Ketan Rajawat — *August 2022 - Present*

- Derived theoretical results which improve the time of onset of superlinear convergence of Greedy Quasi-Newton Methods from the existing bound of $\mathcal{O}(n\kappa \log(n\kappa))$ to $\mathcal{O}(n\kappa \log(n \log \kappa))$ on general smooth, strongly convex, and strongly self-concordant functions while attaining the same superlinear convergence rates

Non-asymptotic convergence of APGM algorithms on a class of Lojaseiwicz functions — *Dept. of Electrical Engineering, IIT K*

Advisor: Prof. Ketan Rajawat — *Aug 2021 - Dec 2021*

- Extended the asymptotic convergence of the Alternating Structure Adapted Proximal Descent (ASAP) algorithm to local non-asymptotic convergence to critical points and global minimizers for a class of non-convex objective functions satisfying the Kurdkya Lojaseiwicz (KL) inequality.

Online Bayesian Tensor Completion for Traffic Estimation — *Dept. of Electrical Engineering, IIT K*

Advisor: Prof. Ketan Rajwat — *Aug 2019. - Nov 2019*

- Proposed a model for the online prediction of the estimated time of arrival for cab services via Online Variational Bayesian Subspace Filtering.

Building Gem OS

Dept. of Computer Science, IIT K

Advisor: Prof. Debadatta Mishra — *Aug 2020 - Nov 2020*

- Implemented the kernel code, i.e., system calls, memory management APIs, and a debugger for GemOS (a toy operating system)

Honors & Awards

2022	**Proficiency Medal,** Best undergraduate project done by a graduating student from the CSE department	*IIT Kanpur, India*
2018	**All India Rank 161,** Joint Entrance Examination Main, among 1.5 Million Candidates	*India*
2018	**All India Rank 191,** Joint Entrance Examination Advanced, among 200000 Candidates	*India*
2017	**All India Rank 24,** KVPY Scholarship, Indian Institute of Science and Government of India	*Bangalore, India*
2016	**NTSE Scholar,** Awarded to the top 1000 students in the nation by the Government of India	*India*
2016	**IJSO OCSC,** Selected for the team selection camp of the International Junior Science Olympiad(top 35 India)	*Mumbai, India*
2018	**National Top 1% ,** National Standard Examination in Physics(NSEP) among 200000 Candidates	*India*
2017	**National Top 1% ,** National Standard Examination in Physics(NSEP) among 200000 Candidates	*India*
2018	**National Top 1% ,** National Standard Examination in Chemistry(NSEC) among 200000 Candidates	*India*
2017	**State Top 1% ,** National Standard Examination in Astronomy(NSEA)	*India*
2018	**State Top 1% ,** National Standard Examination in Astronomy(NSEA)	*India*
2017	**3rd in State,** Represented Odisha State in the Indian National Maths Olympiad(INMO)	*India*
2016	**State Top 35,** Represented Odisha State in the Indian National Maths Olympiad (INMO)	*India*

Service

Coordinator

IIT Kanpur

Special Interest Group in Machine Learning(SIGML) IIT Kanpur — *May 2021 - Nov 2021*

- Responsible for the smooth conduction of talks in different active areas of research in Machine Learning

Student Guide

IIT Kanpur

Counselling Service, IIT Kanpur — *July. 2019 - July 2020*

- Responsible for the guidance and mentorship at a personal level of 5 freshman undergraduates and the smooth conduction of various events in the Orientation Session for the incoming Batch of Y19

Project Mentor

IIT Kanpur

Association of Computing Activities, IITK — *Jan 2020 - Jun 2020*

- Introduced Inference algorithms in Bayesian ML to a group of freshman undergraduates, and prepared assignments to track progress