

Saurabh Garg

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Google Scholar

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Education

Ph.D. in Machine Learning.

2019 – Present

School of Computer Science, Carnegie Mellon University (CMU)

GPA: 4.22/4.00

Advisors: Zachary Lipton, Sivaraman Balakrishnan

Bachelors (with honors) in Computer Science and Engineering.

2014 – 2018

Minor in Applied Statistics and Informatics,
Indian Institute of Technology (IIT) Bombay

GPA: 9.51/10.0

Awards: Excellent in Research Award (1 among 100 students), Institute Academic Award

Selected Research & Publications

Overview: Published seven peer-reviewed conference papers (two competitive oral presentations) and 2 journal papers in machine learning and its applications in venues such as NeurIPS, ICML, EMNLP and MICCAI with additional machine learning papers in submission. Work in my main line of research includes:

RATT: Leveraging Unlabeled Data to obtain Generalization Guarantees. Saurabh Garg, Zico Kolter, Sivaraman Balakrishnan, Zachary Lipton. *ICML 2021 (Oral)*.

Mixture Proportion Estimation and PU Learning: A Modern Approach. Saurabh Garg, Yifan Wu, Alex Smola, Sivaraman Balakrishnan, Zachary Lipton. *ICML UDL, 2021. Under Submission*.

A Unified View of Label Shift Estimation. Saurabh Garg, Yifan Wu, Sivaraman Balakrishnan, Zachary Lipton. *ICML UDL, 2020 (Oral). NeurIPS 2020*.

On Proximal Policy Optimization's Heavy-Tailed Gradients. Saurabh Garg, Emilio Parisotto, Adarsh Prasad, Zico Kolter, Zachary Lipton, Sivaraman Balakrishnan, Ruslan Salakhutdinov, Pradeep Ravikumar. *ICML 2021*

Selected Awards & Honors

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|---|------|
| • Invited to attend Deep Learning Theory Summer School at Princeton (remote) | 2021 |
| • Excellence in Research Award (1 among 110 students) from CSE dept, IIT Bombay | 2018 |
| • Undergraduate Research Award, IIT Bombay | 2018 |
| • EMNLP non-student travel grant | 2018 |
| • ISCA student travel grant | 2018 |
| • Institute Academic Award, IIT Bombay | 2015 |
| • All India Rank 93 in JEE Main (out of 1.4 million) | 2014 |
| • All India Rank 154 in JEE Advanced (out of 126k) | 2014 |

Work Experience

Google Brain

Research Intern under Hanie Sedghi and Behnam Neyshabur

June '21 – Present
Mountain View, CA (remote)

Samsung Research HQ

Research Engineer

Sept. '18 – July '19
Suwon, South Korea

Microsoft Research

Research Intern with Sunayana Sitaram

Dec '17
Bangalore, India

Samsung Research HQ

Research Intern at Virtualization Platform Lab

May '17 – July '17
Suwon, South Korea

Purdue University

Research Internship under Prof. Alex Pothen

May '16 - July '16
West Lafayette, USA

Publications

Journal.....

- J2. **Estimating Uncertainty in MRF-based Image Segmentation: An Exact-MCMC Approach**
Suyash Awate*, **Saurabh Garg***, Rohit Jena* [\[Paper\]](#) (*alphabetic ordering)
Medical Image Analysis (MedIA) Journal, 2019
- J1. **Neural Architecture for Question Answering Using a Knowledge Graph and Web Corpus**
Uma Sawant, **Saurabh Garg**, Soumen Chakrabarti, Ganesh Ramakrishnan [\[Paper\]](#)
Information Retrieval Journal, 2019
Invited Oral Talk at European Conference on Information Retrieval (ECIR), 2020

Conference.....

- C6. **RATT: Leveraging Unlabeled Data to obtain Generalization Guarantees**
Saurabh Garg, Zico Kolter, Sivaraman Balakrishnan, Zachary Lipton [\[Paper\]](#)
Long Talk at International Conference of Machine Learning (ICML), 2021
ICLR Workshop on Robust Machine Learning (RobustML), 2021
- C5. **On Proximal Policy Optimization's Heavy-Tailed Gradients**
Saurabh Garg, Joshua Zhanson, Emilio Parisotto, Adarsh Prasad, Zico Kolter, Zachary Lipton, Sivaraman Balakrishnan, Ruslan Salakhutdinov, Pradeep Ravikumar [\[Paper\]](#)
International Conference of Machine Learning (ICML), 2021
ICLR Workshop on Science and Engineering of Deep Learning (SEDL), 2021
- C4. **A Unified View of Label Shift Estimation**
Saurabh Garg, Yifan Wu, Sivaraman Balakrishnan, Zachary Lipton [\[Paper\]](#)
Advances in Neural Information Processing Systems (NeurIPS) 2020
Contributed Talk at ICML Workshop on Uncertainty & Robustness in Deep Learning (UDL), 2020
- C3. **Code-Switched Language models using Dual RNNs and Same-Source Pretraining**
Saurabh Garg*, Tanmay Parekh*, Preethi Jyothi [\[Paper\]](#) (* joint first authors)
Empirical Methods in Natural Language Processing (EMNLP), 2018
- C2. **Uncertainty Estimation in Segmentation with Perfect MCMC Sampling in Bayesian MRFs**
Saurabh Garg, Suyash Awate [\[Paper\]](#)
Medical Image Computing & Computer Assisted Intervention (MICCAI), 2018
- C1. **Dual Language Models for Code Mixed Speech Recognition**
Saurabh Garg, Tanmay Parekh, Preethi Jyothi [\[Paper\]](#)
Interspeech 2018 (19th Annual Conference of ISCA)

Pre-print.....

- P1. **Mixture Proportion Estimation and PU Learning: A Modern Approach**
Saurabh Garg, Yifan Wu, Alex Smola, Sivaraman Balakrishnan, Zachary Lipton
ICML Workshop on Uncertainty & Robustness in Deep Learning (UDL), 2021
Under Submission, 2021

Invited Talks

- **RATT: Leveraging Unlabeled Data to obtain Generalization Guarantees**
 - International Conference on Machine Learning 2021 July '21
 - Google Brain Deep Phenomena Group June '21
 - Carnegie Mellon University (Andrej's Reading Group) June '21
- **On Proximal Policy Optimization's Heavy-Tailed Gradients**
 - ICLR Workshop on Science and Engineering of Deep Learning (SEDL) April '21
 - Carnegie Mellon University (Zico's Reading Group) June '21
- **Unified View of Label Shift Estimation**
 - ICML Workshop on Uncertainty and Deep Learning Workshop (UDL) 2020 July '20
- **Neural Architecture for Question Answering using KG and Corpus**
 - European Conference on Information Retrieval (ECIR) 2020 April '20

- **Uncertainty Estimation with Perfect MCMC Sampling**
 - IIT Bombay Seminar April '18
- **Code-Switched Language models**
 - IIT Bombay Seminar April '18
 - Microsoft Research Labs, India Dec '17
- **Approximation algorithms for weighted b-Matching**
 - Purdue University July '16

Academic Responsibilities

- **Program Committee/Reviewer:** NeurIPS '21, ICML '21, '20 (external), ACL '21, '20, NAACL '21
- **Ph.D. Admission's Committee, MLD, CMU** Fall 2021
- **Undergraduate Teaching Assistant, IIT Bombay**
 - Introduction to Machine Learning, Prof. Preethi Jyothi Spring 2018
 - Data Analysis and Interpretation, Prof. Suyash Awate Autumn 2017
 - Computer Programming and Utilisation, Prof. Sunita Sarawagi Spring 2017
 - Computer Programming and Utilisation, Prof. Benard Menezes Autumn 2016

Outreach & Inclusion

- Launched an **Online Learning Initiative (OLI)** Channel aimed to help student studying in *under-represented* regional languages under National Service Scheme (NSS) (**crossed 10M views** on YouTube by 2020)
- My lecture on Compound Interest in the Hindi Language **crossed 650K views** on Youtube

Selected Coursework

- **Carnegie Mellon University:** Advanced Introduction to Machine Learning (A+), Intermediate Statistics (A+), Advanced Statistical Theory 1 (A+), Convex Opt. (A+), Advanced Machine Learning Theory (A)
- **IIT Bombay:** Web Search and Mining (AA), Organization of Web Information (AA), Optimization (AA), Artificial Intelligence (AA), Automatic Speech Recognition (AA), Linear Algebra (AA), Numerical Analysis (AA), Operating Systems (AA), Compilers (AP), Automata theory and logic (AA)