Ashudeep Singh

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Research Interests

Machine Learning · Recommender Systems · Information Retrieval · Fairness in ML · Responsible AI

Industry Experience

2021-present **Applied Research Scientist, Advanced Technologies Group**, *Pinterest, Inc.*, Palo Alto, CA.
Working on Inclusive AI efforts at Pinterest to ensure algorithmic fairness, diversity in search and recommendations, inclusive system design in production systems for personalized discovery.

January–May 2020 **Research Intern**, *Google Brain*, New York, NY.
Safe Reinforcement Learning for Sequential Recommender Systems
*Research Internship project mentored by **Alex Beutel** (Google Brain).*
Formulated and developed a sequential recommendation framework that considers the long-term well being of the users and proposed a novel Safe Reinforcement Learning (Safe RL) based policy gradient algorithm that provides risk guarantees for the worst-case users.

May–August 2019 **Research Intern**, *Microsoft Research*, Montreal, QC, Canada.
Feedback Loops and Producer-side Fairness in Recommender systems
*Research Internship project working with **Fernando Diaz** (FATE Group).*
Studied the intertwined phenomenon of *selection bias* and *exposure unfairness* for the producers in recommender system feedback loops. The goal was to specify the conditions under which these effects amplify and to propose algorithms to mitigate these effects.

May–August 2017 **Research Intern**, *Facebook*, Menlo Park, CA.
Active Learning for Multilabel Classification on Newsfeed
*Research internship project working with **Khalid El-Arini** (Feed Content Classification Team at Facebook Newsfeed).*
Developed an active learning approach to optimize for the trade-off between model accuracy and human labeling effort for a large-scale multilabel classification problem on the Facebook Newsfeed.

May–August 2016 **Research Intern**, *Microsoft Research Lab*, New York City, NY.
Contextual Bandits for Personalization of Notifications in Microsoft Health App
*Research internship project working with **John Langford** (MSR NYC) and **Ryen White** (Microsoft Health and MSR Redmond).*
Developed a *Contextual Bandits* based approach to personalize reminder and notification messages on the Microsoft Health App to optimize for user's long term health and fitness.

Education

2015-2021 **Ph.D. Computer Science**, *Cornell University*, Ithaca, NY.
Advisor: Thorsten Joachims
Thesis Committee: Solon Barocas, Karthik Sridharan, David Mimno.
Topic: Fairness in Ranking and Recommendation Systems.
GPA– 4.0

2010–2015 **B.Tech.-M.Tech. Dual Degree**, *Indian Institute of Technology (IIT) Kanpur*, India.
Major: Computer Science and Engineering.
M.Tech. GPA– 10.0/10.0, BTech. GPA– 9.6/10.0 (Academic Excellence Award for all years)

Selected Publications

Ashudeep Singh, David Kempe, Thorsten Joachims. **"Fairness in Ranking under Uncertainty"**. In Proceedings of Advances in Neural Information Processing Systems (NeurIPS) 2021.

Marco Morik*, Ashudeep Singh*, Jessica Hong, Thorsten Joachims. **"Controlling Fairness and Bias in**

Dynamic Learning-to-Rank". In Proceedings of 43rd International ACM SIGIR Conference on Research and Development in Information Retrieval 2020. (*equal contribution) [**Best Paper Award**]

Ashudeep Singh, Yoni Halpern, Nithum Thain, Konstantina Christakopoulou, Ed H. Chi, Jilin Chen, Alex Beutel. **"Building Healthy Recommendation Sequences for Everyone: A Safe Reinforcement Learning Approach"**. In FAccTRec Workshop at ACM RecSyS, 2020.

Ashudeep Singh, Thorsten Joachims. **"Policy Learning for Fairness in Ranking"**. In Proceedings of Advances in Neural Information Processing Systems (NeurIPS) 2019, Vancouver, BC, Canada.

Ashudeep Singh, Thorsten Joachims. **"Fairness of Exposure in Rankings"**. In KDD '18: The 24th ACM SIGKDD International Conference on Knowledge Discovery & Data Mining (KDD), 2018, London, UK.

Ashudeep Singh, Thorsten Joachims. **"Equality of Opportunity in Rankings"**. At Workshop on Prioritising Online Content at NeurIPS 2017, Long Beach, CA.

Ashudeep Singh, Thorsten Joachims. **"Learning Item Embeddings using Biased Feedback"**. At Causal Inference and Machine Learning for Intelligent Decision Making Workshop at NeurIPS 2017, Long Beach, CA.

Tobias Schnabel, Adith Swaminathan, Ashudeep Singh, Navin Chandak, Thorsten Joachims. **"Recommendations as Treatments: Debiasing Learning and Evaluation"** In Proceedings of The International Conference on Machine Learning (ICML), 2016, New York, NY.

Complete list on the homepage and Google Scholar .

Awards and Achievements

2020 Awarded the **Best Paper Award** at ACM SIGIR 2020.

2019 Outstanding TA Award by the Department of Computer Science for CS6780: Advanced Machine Learning class.

2019 Awarded the NeurIPS Travel Award to attend NeurIPS 2019, Vancouver, BC, Canada.

2018 Awarded the ACM Student Travel Award to attend SIGKDD 2018, London, UK.

2015 **Ranked first** in the M.Tech. class of 108 students graduating in 2015 at IIT Kanpur.

2011–2015 Awarded **Academic Excellence Award** for outstanding academic achievements at IIT Kanpur for all years.

2010–2014 Awarded **CBSE Merit Scholarship** for Professional Studies by Central Board of Secondary Education, India.

2012 Recipient of **Summer Undergraduate Research Grant for Excellence (SURGE)**, granted by Dean Resource Planning and Generation, IIT Kanpur.

Professional Service

- **Area Chair/Meta-Reviewer** for ICML 2022.
- **Reviewer** for ICLR 2021-2022, RecSys 2021, ICML 2019-2021, NeurIPS 2019-2022, AAAI 2020.
- **Senior Program Committee** member for ACM EAAMO 2022.
- **Ethics Reviewer** for NeurIPS 2022.
- **Program Committee** (PC member) for TheWebConf 2022, ACM FAccT Conference 2021-2022, ACM RecSys 2021, UpML Workshop at ICML 2022, FAccTRec workshop at ACM RecSys 2020, FACTS-IR Workshop at SIGIR 2019, Repl4NLP Workshop at ACL 2018.

Positions of Responsibility and Extra Curricular Activities

- Co-developed **ViCoRecS: Virtual Conference Recommender System** to provide attendees at KDD 2020 with relevant Networking and Paper recommendations, which was used by ∼1000 users. (2020)

- Organized the **Machine Learning Discussion Group** at Cornell University. (2016-18)
- Coordinated the PhD Visit Day 2016 for Cornell Computer Science as a **Visit Day Czar**. (2016)
- Student Guide, Academic Mentor, and Link Student for Counselling Service, IIT Kanpur. (2011–13)

Teaching

- **Teaching Assistant** for CS6780: Advanced Machine Learning, CS4786: Machine Learning for Data Science, CS4780/5780 : Machine Learning for Intelligent Systems at Cornell University. (2015-16, 2019)
  - Awarded **Outstanding TA Award** for CS 6780: Advanced Machine Learning. (2019)
- **Teaching Assistant** for CS679: Machine Learning for Vision, and ESC101: Fundamentals of Computing at IIT Kanpur. (2014–15)