Harvineet Singh

CONTACT INFORMATION

Ph.D. Student
Center for Data Science
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RESEARCH INTERESTS

Interactive Machine Learning, Causal Inference, Time Series Analysis, Digital Health

EDUCATION

Ph.D. in Data Science, CGPA: 4.0/4.0 (Year 2018 - 2019)
Center for Data Science, New York University, NY, US August 2018 - Present

Integrated Master of Technology in Mathematics and Computing, CGPA: 8.7/10
Indian Institute of Technology (IIT) Delhi, India July 2010 - July 2015

Central Board of Secondary Education, Class XII, Marks(%): 92.40
D.A.V. Public School, Kota, Rajasthan 2010

Central Board of Secondary Education, Class X, Marks(%): 97.40
B.C.M. Sr. Sec. School, Ludhiana, Punjab 2008

PUBLICATIONS

- Harvineet Singh, Rina Singh, Vishwali Mhasawade and Rumi Chunara. **Fair Predictors under Distribution Shift**. *Workshop on Fair ML for Health at Conference on Neural Information Processing Systems (NeurIPS)* 2019. *Accepted.* [Link].
- Gaurush Hiranandani*, Harvineet Singh*, Prakhar Gupta*, Iftikhar Ahamath Burhanuddin, Zheng Wen and Branislav Kveton. **Cascading Linear Submodular Bandits: Accounting for Position Bias and Diversity in Online Learning to Rank**. *Conference on Uncertainty in Artificial Intelligence, (UAI)* 2019. *Oral Presentation.* [Link].
- Aadhavan M. Nambhi*, Bhanu Prakash Reddy Guda*, Aarsh Prakash Agarwal*, Gaurav Verma, Harvineet Singh and Iftikhar Ahamath Burhanuddin. **Stuck? No Worries!: Task-aware Command Recommendation and Proactive Help for Analysts**. *ACM International Conference on User Modeling, Adaptation, and Personalization, (UMAP)* 2019. [Link].
- Moumita Sinha, Vishwa Vinay and Harvineet Singh. **Modeling Time to Open of Emails with a Latent State for User Engagement Level**. *ACM International Conference on Web Search and Data Mining, (WSDM)* 2018. [Link].
- Ritwick Chaudhry*, Harvineet Singh*, Pradeep Dogga, and Shiv Saini. **Modeling Hint-Taking Behavior and Knowledge State of Students with Multi-Task Learning**. *International Conference on Educational Data Mining, (EDM)* 2018. [Link].
- Sumit Shekhar, Dhruv Singal, Harvineet Singh, Manav Kedia and Akhil Shetty. **Show and Recall: Learning What Makes Videos Memorable**. *Workshop on MBCC at IEEE International Conference on Computer Vision (ICCV)* 2017. [Link].
- Siddharth Bora, Harvineet Singh, Anirban Sen, Amitabha Bagchi and Parag Singla. **On the role of conductance, geography and topology in predicting hashtag virality**. *Springer Journal on Social Network Analysis and Mining (SNAM)* 2015. [Link].

WORK EXPERIENCE

Adobe Research, India : Research Engineer
Member of Big Data Experience Lab July 2015 - August 2018
Devised and prototyped machine learning algorithms for problems in customer behavior analytics. Worked on transferring technologies to Adobe's digital marketing solutions.

*Equal Contribution

Adobe Research, India : Research Internship PI: Dr. Moumita Sinha
Predicting abandonment of online shopping carts May 2014 - July 2014
Devised an algorithm to predict return of customers after an online shopping session and tested it on large-scale web clickstream datasets. Work productized as a feature in Adobe Experience Cloud.

Adobe Research, India : Research Internship PI: Mohit Garg
Assisting social content creators by suggesting what, when and how to post May 2013 - July 2013
Worked on a system to infer user interests and demographic attributes from online social feed. Developed an approach based on text mining and graph analysis to find most receptive user segments. Implemented a web-based tool, as a proof-of-concept prototype, built using HTML, PHP and Python to fetch Twitter feeds and display results of data analysis.

Master's Thesis

Predicting Virality and Adoption of Topics in Online Social Networks January 2014 - July 2015
[Link to Presentation] [Link to Report]
Worked with Prof. Amitabha Bagchi and Prof. Parag Singla to develop a machine learning algorithm for predicting virality of topics in Twitter. Investigated role of network structure and different derived features for the prediction task, achieving state-of-the-art accuracy. For the problem of predicting future adopters of a topic, devised a graph-based approach to find embeddings of users based on their topic activity. Experiments performed on a dataset of 7.7 million Twitter users.

Patents

- Sumit Shekhar, Dhruv Singal, Harvineet Singh and Atanu Sinha. 'Summarizing Video Content based on Memorability of the Video Content'. U.S. Patent Application 10/311,913.
- Moumita Sinha, Kandarp S. Khandwala, Harvineet Singh and D. P. Tejas. 'Predicting Unsubscription of Subscribing Users'. U.S. Patent Application 16/192,517.

Awards and Achievements

- Awarded **HRD Scholarship** by Ministry of Human Resource Development for academic excellence at IIT, 2014.
- **IITD Semester Merit Award** for meritorious academic performance (top 7% of batch).
- **All India Rank 813** in IIT-JEE (entrance examination) 2010 among 0.46 million students.
- Awarded **Travel Grant** to attend UAI 2019, FairML4H@NeurIPS 2019.

Selected Research Projects

Online Recommendation of Diversified Lists
Dr. Branislav Kveton, Adobe Research January 2017 - Present
- Modeled the problem of personalizing recommendation lists to user interests with an objective of maximizing probability of a click on the list. [**UAI 2019**]
- Developed an online learning algorithm with provable guarantees that learns from click feedback.

Mixture Models for Survival Analysis of Email Data
Dr. Moumita Sinha and Dr. Vishwa Vinay, Adobe Research January 2017 - August 2018
- Devised a predictive model for time taken by a customer to open an email using Survival analysis.
- Used a mixture model to account for population heterogeneity in survival times. [**WSDM 2018**]

Machine Learning for Online Education
Dr. Shiv Kumar Saini, Adobe Research May 2017 - November 2017
- Developed a model for estimating knowledge state of students taking online assessments.
- Proposed a memory-augmented neural network trained jointly on two tasks, namely, students' knowledge state prediction and hint-usage prediction. [**EDM 2018**]
- Demonstrated state-of-the-art performance on both tasks with AUC improvement of 2%.

Video Summarization with Memorability Objective
Dr. Sumit Shekhar, Adobe Research December 2016 - August 2017

- Designed and implemented a system to create memorable summaries of user-generated videos.
- Introduced a method for video memorability estimation using video semantics, saliency and color.
- Solved a submodular optimization problem to create video summaries, achieving accuracies at par with state-of-the-art methods. **[ICCV Workshop 2017]**

Professional Service

Teaching Assistant: Taught tutorial classes and guided students for 2 courses at IIT Delhi.

- MAL 180: Discrete Mathematical Structures — July 2014 - November 2014
- MAL 111: Intro to Analysis and Differential Eqns. — July 2013 - November 2013

Paper Reviewer: ML4H@NeurIPS 2019, RecSys 2017 (sub-reviewer), UAI 2017 (sub-reviewer).

Press Coverage of Work

Churn Prediction in Email Marketing

- 'Adobe wants to bring its AI smarts to email marketing campaigns'. **TechCrunch**. August 29, 2017. [Link]
- 'Adobe Previews In-Development Features at Summit 2016'. **Techvibes**. March 25, 2016. [Link]

Positions of Responsibility

Internship Mentor, ARISE Program, NYU Tandon

- Mentored two high school students in a STEM research exposure program.

Internship Project Supervisor, Adobe Research

- Ritwick Chaudhry and Pradeep Dogga, *Personal assistants for online education*
- Neha Banerjee and Sahil Garg, *Optimal send time strategy for email campaigns*
- Stefanie Baby, Akash Gupta and Varun Rawal, *Multi-view learning for user behavior prediction*

Teaching Volunteer, Aarohan NGO

- Taught students from a government school supplementing their higher secondary education.

Hostel Captain, BSA (Board for Sports Activities) IIT Delhi

- Led hostel Basketball team in inter-hostel tournaments finishing with Bronze medal in 2014.

Technical Skills

Programming Languages: (Proficient) Python, R; (Familiar) MATLAB, Java, JavaScript
ML Frameworks: PyTorch, Tensorflow, Apache Spark
Applications and Tools: Basic Bash Scripting, Git, LaTeX

Relevant Courses

Computer Science
Fundamentals of Machine Learning
Analysis and Design of Algorithms
Programming Languages
Database Management Systems

Statistics, Mathematics
Probability and Stochastic Processes
Multivariate Statistical Methods
Optimization Methods and Applications
Probabilistic Time Series Analysis