Harvineet Singh

PERSONAL INFORMATION

Member of Technical Staff
Big Data Experience Lab, Adobe Research
Bangalore, India

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RESEARCH INTERESTS

Machine Learning for Structured Data, Network Analysis, Statistical Modeling, Interactive Learning, Computational Social Science

EDUCATION

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(%): 95.67
B.C.M. Sr. Sec. School, Ludhiana, Punjab 2008

PUBLICATIONS

- 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**.
- Sumit Shekhar, Dhruv Singal, **Harvineet Singh**, Manav Kedia and Akhil Shetty. 'Show and Recall: Learning What Makes Videos Memorable'. IEEE International Conference on Computer Vision, **ICCV Workshop on MBCC 2017**.
- Siddharth Bora, **Harvineet Singh**, Anirban Sen, Amitabha Bagchi and Parag Singla. 'On the role of conductance, geography and topology in predicting hashtag virality'. **Social Network Analysis and Mining 2015**. Springer Journal.

UNDER REVIEW

- **Harvineet Singh**, Amitabha Bagchi and Parag Singla. 'Learning User Representations in Online Social Networks using Temporal Dynamics of Information Diffusion'. arXiv preprint arXiv:1710.07622 [Link]. (Under Review). Submitted November 2017.
- Prakhar Gupta*, Gaurush Hiranandani*, **Harvineet Singh***, Iftikhar Ahamath Burhanuddin, Zheng Wen and Branislav Kveton. 'Online Diverse Recommendations from Partial Click Feedback'. Submitted November 2017.
- **Harvineet Singh**, Shiv Saini, Ritwick Chaudhry and Pradeep Dogga. 'Deep Multi-Task Learning Model for Knowledge Tracing and Hint-Taking Prediction in Online Assessments'. Submitted October 2017.

WORK EXPERIENCE

Adobe Research : Member of Technical Staff
Member of Big Data Experience Lab July 2015 - Present
Current work focuses on applications of machine learning algorithms to problems in customer data analytics. Worked on transferring technologies to Adobe's Digital Marketing solutions.

*Equal Contribution

Adobe Research, Bangalore, 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, Bangalore, India : Research Internship *PI:* Mr. 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 graph analysis and text mining 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 on them.

Budapest University of Technology and Economics, Hungary *PI:* Dr. Krisztian Buza
Missing value imputation for classification problems May 2012 - July 2012
Analysed effect of imputation techniques in *missing completely at random* case. Experimented with decision tree and neural network based classifiers on both real-world and synthetic datasets.

Master's Thesis

Predicting Virality and Adoption of Topics in Online Social Networks January 2014 - July 2015

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. In an extension of the work, looked at the problem of learning user representations to predict future spread of topics. [Link to Report]

Awards and Achievements

- **IITD Semester Merit Award** for meritorious academic performance (top 7% of batch)
- Awarded **HRD Scholarship** by Ministry of Human Resource Development for academic excellence at IIT
- **All India Rank 813** in IIT-JEE (entrance examination) 2010 among 0.46 million students.
- Awarded CBSE Merit Certificates for being in **top 0.1%** nationwide in Mathematics & English secondary school examination.
- Achieved **All India Rank 76** in National Level Science Talent Search Examination, 2008
- 3rd in Campus Centurion, a Pan-IIT Data Analytics Competition by American Express, 2014

Patents (Pending)

- Moumita Sinha, Kandarp S. Khandwala, Harvineet Singh and D. P. Tejas. 'Online Shopping Cart Analysis'. U.S. Patent Application 14/623,248. Filed February 2015.
- Moumita Sinha, Kandarp S. Khandwala, Harvineet Singh and D. P. Tejas. 'Predicting Unsubscription of Potential Customers'. U.S. Patent Application 14/614,252. Filed February 2015.
- Kokil Jaidka, Prakhar Gupta, Iftikhar Ahamath Burhanuddin and Harvineet Singh. 'Generation of Natural Language Notifications'. U.S. Patent Application 15/163,531. Filed May 2016.
- Moumita Sinha, Harvineet Singh, Philippe Ferdinand and Veronique Gaudrat. 'Fatigue Control in Dissemination of Digital Marketing Content'. U.S. Patent Application 15/216,360. Filed July 2016.
- Prakhar Gupta, Shiv Kumar Saini, Gaurush Hiranandani and Harvineet Singh. 'End of Period Metric Projection with Intra Period Alerts'. U.S. Patent Application 15/609,254. Filed May 2017.
- Moumita Sinha, Vishwa Vinay, Harvineet Singh and Frederic Mary. 'Modeling Time to Open of Electronic Communications'. U.S. Patent Application 15/808,171. Filed November 2017.

- Prakhar Gupta, Iftikhar Ahamath Burhanuddin, Harvineet Singh and Atanu Sinha. 'Intelligent Analytics Interface'. U.S. Patent Application 15/808,498. Filed November 2017.

Selected Research Projects

Representation learning on Graphs
Prof. Amitabha Bagchi and Prof. Parag Singla, IIT Delhi — January 2015 - July 2015
- Developed a method to learn representations of users in social networks from their activity traces.
- Extracted representations used as features for demography prediction and adoption prediction.

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

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.
- Developed an efficient learner that interactively learns user interests from partial click feedback.

ML for Online Education
Dr. Shiv Kumar Saini, Adobe Research — May 2017 - November 2017
- Developed a system to trace the knowledge state of students during online assessments.
- Proposed a memory-augmented neural network trained jointly on two tasks, namely, students' knowledge state prediction and hint-usage prediction.
- Demonstrated state-of-the-art performance on each of the tasks with improvement of up to 2%.

Video Summarization with Memorability Constraint
Dr. Sumit Shekhar, Adobe Research — December 2016 - August 2017
- Designed and implemented a system to create memorable summaries of user-generated videos.
- Leveraged submodular optimization combined with video memorability predictor to achieve accuracies at par with state-of-the-art methods using a mix of objectives [**ICCV Workshop 2017**]

Conversational Agents for Data Analysts
Dr. Iftikhar Ahamath Burhanuddin, Adobe Research — November 2016 - Present
- Implemented a chatbot to assist analysts with customer segmentation using interactive clustering.

Multi-View Learning for Customer Behavior Prediction
Dr. Atanu Sinha, Adobe Research; Prof. Niloy Ganguly, IIT Kharagpur — May 2015 - August 2015
- Proposed a method to integrate web and mobile data of customers to predict behavior using a deep learning variant of Canonical Correlation Analysis.

Time Series Forecasting of Web Traffic Metrics at Multiple Time Scales
Dr. Shiv Kumar Saini, Adobe Research — July 2016 - December 2016
- Investigated a recurrent neural network architecture to forecast end of period values of time series, say daily or yearly, from intra-period data, say hourly or monthly, respectively.

Invited Talks

1. Algorithms for Fatigue Management in Email Marketing
   - **Adobe Symposium, Mumbai, India** — May 2017
   - **Adobe Tech Summit, San Jose, CA, USA** — February 2017
2. Embedding Nodes in Online Social Networks
   - **Indian Institute of Technology (IIT) Delhi** — July 2015
   - **Graph Workshop, IBM India Research Laboratory** — March 2015

Professional Service

- **Teaching Assistant:** Intro to Analysis and Differential Eqns at IIT Delhi.
- **Sub-reviewer:** RecSys 2017, UAI 2017.

Positions of Responsibility

Supervision of Intern Projects, 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 in 2014

Technical Skills

Programming Languages: (Proficient) Python, Java, R; (Familiar) C++, Matlab, Javascript
ML Frameworks: Tensorflow, Keras, Apache MXNet, Apache Spark, Numpy
Applications and Tools: LaTeX, Basic Bash Scripting, Git, MS Office

Relevant Courses

Computer Science	**Mathematics**
Machine Learning	Probability and Stochastic Processes
Design and Analysis of Algorithms	Statistical Methods and Algorithms
Data Structures	Optimization Methods
Programming Languages	Linear Algebra
Database Management Systems	Discrete Mathematics
Operating Systems	Data Mining

References

Available upon request.