Ashudeep Singh

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Education

2015-present   **Ph.D. Computer Science**, *Cornell University*, Ithaca, NY.
Advisor: Thorsten Joachims
Relevant Courses: Machine Learning Theory, Advanced topics in Machine Learning, Design and Analysis of Algorithms
Grade Point Average: 4.00

2010–2015   **B.Tech.-M.Tech. Dual Degree**, *Indian Institute of Technology Kanpur*, India.
M.Tech. Cumulative Performance Index (CPI)– 10/10
B.Tech. Cumulative Performance Index (CPI)– 9.6/10

Awards and Achievements

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

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

2010   Awarded the **Certificate of Merit** in English for being in the top 0.1% students in the country for All India Senior School Certificate Examination.

Publications

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. [pdf]

David Adamson, Akash Bharadwaj, Ashudeep Singh, Colin Ashe, David Yaron, Carolyn P. Rosé. **"Predicting Student Learning from Conversational Cues"**. In Proceedings of 12th International Conference of Intelligent Tutoring Systems (ITS), Honolulu, HI, USA, June, 2014. [pdf]

David Adamson, Divyanshu Bhartiya, Biman Gujral, Radhika Kedia, Ashudeep Singh, Carolyn P. Rosé. **"Automatically Generating Discussion Questions"**. In Proceedings of 16th International Conference of Artificial Intelligence in Education (AIED), Memphis, TN, USA, July, 2013. [pdf]

Research Internships

May–August 2016   **Microsoft Research Lab**, *New York City, NY*.
"Contextual Bandits for Personalization in fitness tracking applications"
Research internship project mentored by **John Langford***(MSR NYC) and* **Ryen White***(Microsoft Health Intelligence and MSR Redmond)*
The work was aimed to frame the task of providing reminders and notifications to users of Microsoft Health band and app as a Contextual Bandits problem, so as to personalize these messages to optimize user's health and fitness.

- We used user's demographics and current health and fitness statistics as the context and calculated rewards based on the change in health and fitness measurements of the user per day.
- Worked with a state of the art decision service called Multi-world testing (MWT) to serve as the interface between the Microsoft Health and the app. The service is based on Vowpal Wabbit and we used it to rank a set of messages to be shown to a particular user that maximizes the rewards.

May–July 2014   **Cornell University**, *Ithaca, NY*.
"Using Preference Data to Embed documents in Metric spaces"
Research Project mentored by **Prof. Thorsten Joachims***(Cornell University)*
The work is aimed at using human interaction signals to embed documents onto a low dimensional space. The data used is click-logs for user sessions on `arxiv.org`. We also try to embed the user sessions into the same space to facilitate its application in document recommendations and personalized search.

- Used **Logistic Markov Embedding** (LME) approach after decomposing user-sessions into first order markov chains. Utilised the feasible set information due to presentation and introduced a de-biasing feature vector to the model to **overcome the *bias*** because of presentation and browsing behavior.
- The embeddings perform **much better than traditional n-gram models** on predicting user clicks and also learn an intuitive low-dimensional space representation without using any text features.
- Currently working on **embedding user-sessions** onto the same metric space to represent user's intent and hence provide better recommendations and search results.

May–July 2013   **Carnegie Mellon University**, *Pittsburgh, PA*.
"A Computational Model for Quantitative Discourse Analysis in a Collaborative Learning Setting"   [report][paper]
Research Project mentored by **Prof. Carolyn P. Rosé** *(Language Technologies Institute, CMU)*
We aimed to identify quantitative metrics that can be used to discriminate between successful and unsuccessful groups involved in a collaborative learning task, using text based chat transcripts.

Dec. 2012   **Internship Programme in Technology Supported Education**, *Winter School, Bangalore*.
"Question Generation for Discussion Facilitation"   [report][paper]
Research Project mentored by **Prof. Carolyn P. Rosé** *(Language Technologies Institute, CMU)*
The motivation of the work was to encourage discussion and reasoning amongst students in a class through an intelligent tutoring system which generates questions that initiate discussion over a certain text.

May–July 2012   **Summer Undergraduate Research Grant for Excellence (SURGE)**, *IIT Kanpur*.
"Logic Studio: Automatic Problem Generation in Propositional Logic"   [report]
Research Project mentored by **Dr. Sumit Gulwani** *(Microsoft Research, Redmond)*.
The project comprised of generating deduction problems, hints and solutions to problems in Propositional Logic, which was part of a larger project which aims at building an Intelligent Tutor for Logic Course.

Selected Projects

Ongoing   **Debiasing learning from human interactions**.
Project with Thorsten Joachims
Using importance weighting methods to derive unbiased and consistent estimators to learn embeddings from user interaction data like clicks. Working with observational data such as clicks on `arXiv.org` to learn embeddings of research articles.

Ongoing   **Conversational Modeling with an adversarial reward generator**.
Joint project with Dipendra Misra (Cornell) and Yoav Artzi (Cornell)   [github]
Using ideas similar to a Generative Adversarial Networks (GANs) to train a chatbot neural network from chatlog dataset using Imitation Learning. We use the predictions of the discriminators as the rewards to do policy gradient updates for the chatbot network

Teaching

○ **Teaching Assistant** for **CS4786: Machine Learning for Data Science**   **(Spring 2016)**
Faculty Instructor: Prof. Karthik Sridharan (Cornell University)
○ **Teaching Assistant** for **CS4780/5780 : Machine Learning for Intelligent Systems**   **(Fall 2015)**
Faculty Instructor: Prof. Kilian Weinberger (Cornell University)
○ **Teaching Assistant** for **CS679–Machine Learning for Vision**   **(Spring 2015)**
Faculty Instructor: Prof. Vinay P. Namboodiri (IIT Kanpur)
○ **Tutor (Graduate Student Instructor)** for **ESC101–Fundamentals of Computing**   **(Fall 2014)**
Faculty Instructor: Prof. Amey Karkare (IIT Kanpur)

Skill Set

○ **Programming Languages** – C++, Python, C#, Lua
○ **Web Development** – HTML, CSS, PHP, JavaScript
○ **Other Tools** – Tensorflow, Torch, Shell Scripting, Matlab, SQL, Octave, LaTeX

Positions of Responsibility and Extra Curricular Activities

○ Coordinated the PhD Visit Day 2016 for Cornell Computer Science Department as the **Visit Day Czar** with other czars, department staff and volunteers.   **(2016)**
○ **Student Guide, Counselling Service, IIT Kanpur**   **(2011–12)**
Guided freshmen for a year to adjust to the campus environment.
○ **Academic Mentor, Counselling Service, IIT Kanpur**   **(2011–12)**
Conducted remedial classes for subjects like Fundamentals of Computing & Mathematics-I,II
○ **Link Student, Counselling Service, IIT Kanpur**   **(2012–13)**
Responsible for helping two academically deficient students.
○ **Member of Hall Executive Committee**, Hall 9, IIT Kanpur   **(2011–12)**
○ **Secretary, Hospitality Cell**, Techkriti 2011   **(2011)**.