Navin Chandak

Curriculum Vitae

92 Bloemfontein Road, W127DB, London
+44-7565821531
navin@nchandak.com
www.nchandak.com

Interests

Primary Machine Learning, Information Retrieval

Additional Natural Language Processing, Artifical Intelligence, Databases, Algorithms

Academic and Professional Career

2015-Present **Software Engineer**, *Google London*, Rating: Exceeds Expectations.

2011–2015 **B.Tech in Computer Science and Engineering with Honours, and Minor in Applied Statistics and Informatics**, *Indian Institute of Technology Bombay*, GPA: 9.42/10.

2011 **Higher Secondary Examination**, *Delhi Public School*, Rourkela, 96.4%.

Publications

Tobias Schnabel, Adith Swaminathan, Ashudeep Singh, **Navin Chandak**, Thorsten Joachims. Recommendations as Treatments: Debiasing Learning and Evaluation. International Conference on Machine Learning (ICML) 2016. Retrieved from arxiv.org/abs/1602.05352.

Industry and Research Experience

Ongoing **AdSense Payments**, *Software Engineer*, Google London.

Tech Lead: Matt Clark, Staff Software Engineer

- Designed a system to let publishers change their country without losing access to their country-specific Billing accounts
- Wrote an end-to-end system for detecting and propagating Billing state changes to Billing team, with a periodic job to correct for inconsistencies
- Part of Monetizer rotation : Responsible for running/monitoring the monthly process which pays out AdSense publishers
- Re-wrote all PIN related functionalities to work with fundamental changes in database interaction
- Brought multiple Google specific technologies to the team codebase.
- Served as buildcop for AdSense team in London, ensuring code health and fighting breakages
- Google-internal courses on Machine Learning, Statistical Thinking, Negotiations etc

Summer 2015 **Debiasing Learning and Evaluation**, *Intern*, Cornell University, Ithaca.

Guide: Thorsten Joachims, Professor, Cornell University

- Recognize selection bias in evaluation and training recommender systems
- Providing a principled approach to handling selection biases, using casual inference
- Approach leads to unbiased performance estimators despite biased data, and substantially improved prediction performance
- Theoretically and empirically characterize the robustness of approach
- Accepted at International Conference on Machine Learning (ICML) 2016.

2014-15 **Joint entity discovery and disambiguation**, *Undergraduate Thesis*, IIT Bombay.

Guides: Prof. Soumen Chakrabarti and *Prof. Ganesh Ramakrishnan*

- Worked on the use of hierarchical non-parametric topic models for entity linking
- Proposed a novel extension of existing methods to alleviate the issue of No Attachment phrases
- Proposed optimizations to existing Gibbs sampling techniques to scale to large corpora like Wikipedia
- Evaluated the proposed algorithm on corpora constructed from Wikipedia and Yago!

Thesis: www.nchandak.com/btp/report.pdf

Summer 2014 **Topical Analysis of Twitter Data**, *IBM Research Lab*, Bangalore.
Guide: Indrajit Bhattacharya, Research Scientist, IBM Research Lab

- Implemented, analyzed and compared finite and infinite topic models for Twitter based corpora
- Developed framework for topic modeling algorithms, allowing easy code-sharing
- Scaled up Heirarchical Dirichlet Process using Map-Reduce framework
- Optimized by employing topic merging and document clustering techniques, leading to sharp drop in number of topics and improvemed perplexity measures

Summer 2014 **Implementation of Markov Models**, *Google Summer of Code*.
Guide: Ankur Ankan, Developer, PGMPY I worked on creating a Python library for Markov Models. I implemented the Markov Networks framework, triangulation heuristics, message passing algorithm for MAP & conditional probabilities, and a few heuristic inference algorithms. I also implemented Gibbs Sampling. I gained experience with good coding practices including coding conventions, testing methods and writing good documentation. I also profiled and optimized the bottleneck methods.

Winters 2012 **Diet Plan Recommendation System**, *HealthifyMe*, Bangalore.
Guide: Sachin Shenoy, Head of Engineering and co-founder, HealthifyMe
HealthifyMe is a health-based startup under Microsoft Accelerator Program. I worked on a new feature of automated diet plan recommendation. It took into account the health needs of the person and nutritional value of dishes before making a recommendation. It factors into account the likes and dislikes of the user based on his preferences and his previous logs. Another challenge was to ensure that meaningful dish combinations were being served and in adequate quantity.

Honours and Awards

Academic

- **Represented India** at the ACM-Inter Collegiate Programming Contest (ACM-ICPC) World Finals 2015 at Marrakech, Morocco, securing joint-highest rank for India
- **Ranked $3^{\mathbf{rd}}$** out of 96 graduating students in the Dept. of CSE, IIT Bombay
- Secured $\mathbf{2^{nd}}$ **rank** at Kanpur onsite regional finals of ACM ICPC 2015
- Secured $\mathbf{11^{th}}$ **rank** at Amritapuri onsite regional finals and $\mathbf{13^{th}}$ **rank** at IIT-Kanpur onsite regional finals of ACM-International Collegiate Programming Contest 2013
- Secured $\mathbf{2^{nd}}$ **rank** at the Amritapuri online round and $\mathbf{5^{th}}$ **rank** at Gwalior online round of ACM-ICPC 2014
- All India $\mathbf{88^{th}}$ **rank** in IITJEE-2011, taken by about half-a-million students
- All India $\mathbf{41^{st}}$ **rank** and state $\mathbf{1^{st}}$ **rank** in AIEEE-2011 taken by about 1.2 million students
- Secured **State Rank 1** in CBSE Intermediate/+2 Examinations

Olympiads and Scholarships

- **Gold Medal** in Indian National Chemistry Olympiad-2011 for being among top 35 students in India and attended Orientation-cum-Selection Camp at HBCSE, Mumbai
- Among the **top 300** (top 1%) to appear for the Indian National Physics Olympiad-2011
- Awarded **Kishore Vaigyanik Protsahan Yojana (KVPY) Scholarship**, a national fellowship for students interested in science by Dept. of Science and Technology, India and attended science camps at IISER,Pune and IISc, Bangalore
- Offered **INSPIRE scholarship** by Government of India, for being among top 1% in India in Intermediate/+2 examination
- Awarded scholarships by the Steel Authority of India Ltd (SAIL), Rourkela and Delhi Public School, Rourkela for securing state rank 1 in Intermediate Examination in 2011
- Secured All India **Rank 15** in National Science Olympiad (NSO) 2010 & All India Rank **94** in National Cyber Olympiad (NCO) 2008
- Secured state **rank** $\mathbf{1^{st}}$ in Uranium Talent Search Examination-2008, conducted by Govt of Odisha

Seminars/Talks

Fall 2014 **Learning the Kernel with Hyperkernels**.

Guide: Prof. Saketha Nath, IIT Bombay

We presented a research paper which introduced and formalized the idea of learning techniques for kernels used in classification tasks - it did so by proposing a hyperkernel which imposed a reproducing kernel hilbert space on the space of kernels under consideration.

Spring 2013 **Application of POMDPs in Robot Path Planning**.

Guide: Prof. Pushpak Bhattacharyya, IIT Bombay

We presented a seminar introducing Partially observable Markov decision process and then an application to robot path planning: that of modelling spaces as well as uncertainty in measurements using POMDPs.

Summer 2013 **Error-correcting codes**.

Guide: Prof. Rahul Jain, National University of Singapore

I read papers on bounds in ϵ-noisy channels and tree codes in adverserial channels. I also worked on non-negative rank of matrices. I analyzed provably near-optimal algorithms for the same, and the proof of NP-hardness of computing the non-negative rank. I presented these papers before an audience of professors and PhD students.

Key Projects

Fall 2014 **Automatic aggregation by modeling aspects and values of reviews**.

Guide: Prof. Pushpak Bhattacharyya

We segregated the topics or aspects of a product, and provided a summary for all these aspects. For instance, battery, display and performance are aspects of a laptop. Aspect extraction was done using unsupervised topic models, LDA to be specific. We segregated sections of text which talked of different topics using these models, parsed text and applied sentiment analysis on descriptors (adjectives, adverbs) to present a summary of sentiment for each aspect of the product.

Fall 2013 **Finding the Best Merge Strategy for External Sort**.

Guide: Prof. Bernard Menezes

We implemented external merge sort supporting generalized k way merge - as also multi pass merge with different merge ratios in each pass. We simulated external sort for extremely large fiels. Further, we applied dynamic programming to find the best merge strategy for large files - the number of passes as well as the ratio of merge in each pass.

Fall 2013 **Jaccard and Contextual Similarity Using Map-Reduce**.

Guide: Prof. Soumen Chakrabarti

We understood Map Reduce (over Hadoop). We implemented Jaccard Similarity computation of two documents using the min hash algorithm on hadoop to find similar documents in a corpus. We also implemented the code to find words which are contextually similar using cosine similarity of context vectors in O(N) time

Fall 2013 **CricQ : A Cricket Statistics Query Portal**.

Guide: Prof. Umesh Bellur

We developed a statistics query portal for the sport of cricket. We conceptualized the ER model, normalized over 70 relations and deployed the system on a PostgreSQL back-end and with a JSP-based UI after rigorous testing. We analyzed the improvement in performance on adding indices and employed the same for efficiency.

Spring 2014 **Record Oriented File System with File Cache**.

Guide: Prof. Dhananjay M. Dhamdhere

We designed an implemented a record oriented file system with efficient data structures for an experimental OS (built and maintained by IIT Bombay). We implemented B+ trees for multi level indexing, developed file access system calls and an independent file cache.

Fall 2012 **Metaheuristcs v/s Conventional Methods on Image Compression**.

Guide: Prof. Varsha Apte

We implemented JPEG compression from scratch using Discrete Cosine Transform (DCT) and entropy encoding. We also implemented the vector quantization technique using Neural Networks, with hyperthreading, to deliver another image compression tool. We then performed and documented a detailed comparative analysis of both methods.

Spring 2012 **Artificial Intelligence Player for Chess**.

Guide: Prof. Amitabha Sanyal

We built one player chess, in DrRacket (Lisp) with Xboard as GUI, using functional programming. We employed the Minimax algorithm with alpha-beta pruning and heuristcs to decide the best move for the computer player, at any state of the game. We were awarded highest credit in the batch for this project.

Summer 2012 **Physics Engine**.

This is one of my personal favorites as we worked on it in our first-year summers when we were very new to CS. Also, we didn't look at any reference material for the same. We developed code for simulating rectangular rigid blocks in 2-dimensions in real time by implementing the maths and physics equations in Javascript. Demo here.

Courses in field of interest

- Topics in Machine Learning
- Organization of Web Information
- Probabilistic Graphical Models
- Statistical Techniques in Data Mining
- Web Mining and Information Retrieval
- Advanced Machine Learning
- Probability Theory
- Organization of Web Information

Positions of Responsibility

2014-2015 **Department General Secretarty, CSE**.

- Sole student representative to the Department Undergraduate Committee, the body responsible for instituting academic policies of the department
- Led a team of 12 council members in conducting various socio-cultural activities
- Conducting sessions and competitions, managing course slotting and feedback, addressing grievances

2014-2015 **Mentor, Institute Student Mentor Program**.

- Responsible for guiding 12 freshmen focusing on their academic and holistic development, providing them counsel and helping them adjust to campus life.

2013, 2014 **Problem setter, Techfest Coding Competition**.

- Responsible for setting the questions, test cases and solutions for Techfest International Coding Challenge-2014 and three zonal coding competitions in 2013

2013 **Mentor for Institute Technical Summer Project**.

- Mentored a team of sophmores in building an answer engine like Wolfram Alpha, which answers queries related to professors, students & courses at IIT Bombay. The project was given the 'Best Project' Award

Extra-curricular Achievements

- Developed a bidding portal for IIT Bombay at Yahoo HackU! using PHP, SQL & HTML
- Engineered a wall-following robot at Techfest 2012 and ranked among the top 32 teams
- Secured 2nd rank in the institute in Logic General Championship
- Represented the hostel in coding, squash, debate and tug of war inter-hostel general championships
- Secured 1st position in IIT Bombay Freshers Debate Competition
- Awarded 2nd prize for Article-writing at Freshiezza, cultural fest for freshmen at IITB
- Completed a year-long Chinese Language course, conducted by Beijing Jiatong University, China