Dhruv Singal

Contact Information

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Education

Columbia Business School 2018 - present
Doctor of Philosophy, Finance and Economics

Indian Institute of Technology Kanpur 2012-16
Bachelor of Technology, Computer Science and Engineering
Cumulative Performance Index: **9.5** (on a scale of 10)

Awards and Achievements

- Awarded the OP Jindal Engineering and Management Scholarship 2013 for excellence in academics and leadership
- Awarded the Certificate of Merit for Academic Excellence by IIT Kanpur

Refereed Publications

- Show and Recall: Learning What Makes Videos Memorable; S Shekhar, D Singal, H Singh, M Kedia, A Shetty; *ICCV Workshops (ICCVW) 2017* [Paper]
- Forecasting Granular Audience Size for Online Advertising; R Sinha, D Singal, P Maneriker, K Chawla, Y Shrivastava, D Pai, AR Sinha; *AdKDD 2018* [Paper]
- Parse Condition: Symbolic Encoding for LL(1) Parsing; D Singal, P Agarwal, S Jhujhunwala, S Roy; *LPAR 2018*

Working Papers

- RAPID: Rapid and Precise Interpretable Decision Sets; S Dhamnani, D Singal, Tharun M, M Dash, R Sinha *(under review at WSDM 2018)*

Industry Research Experience

Research Fellow Jun 16 - Aug 18
BigData Experience Lab, Adobe Research Bangalore
- Worked on projects in data mining, computer vision, information retrieval, natural language processing, deep learning and marketing science
- Associated with product and engineering teams to understand the industrial scenario and use cases to develop prototypes
- Generated intellectual property – **six patent applications** pending at USPTO

Research Intern May 15 - Jul 15
BigData Experience Lab, Adobe Research Bangalore
- Defined and analyzed the notion of memorability for videos, using machine learning and computer vision, with applications in video summarization
- Collected the ground truth by a crowdsourced survey on Amazon MTurk, using a MEAN stack server
- Research paper accepted at ICCVW 2017 and **one patent issued** by USPTO

Selected Industry Projects

Forecasting Audience Size for Web Advertising
Applied statistical techniques and time series analysis with frequent itemset mining to predict size of audience segments in the display advertising ecosystem

Fast and Precise Audience Segmentation
Used association rule mining and submodular optimization techniques to generate interpretable and efficient segments from high-dimensional audience attribute space

Voice Assisted Intelligent Searching in Documents
Developed a prototype for voice based non-factoid answer retrieval in textual documents, using natural language processing methods, LSTMs and CNNs

Document Content Analysis
Analyzed documents using computer vision methods and CNNs to identify non-content structural elements

Academic Research Experience

Symbolic Parsing of Grammars Dec 15 - Apr 16
Undergraduate Project with Prof. Subhajit Roy, CSE IITK
- Studied the theory of LL(1) parsers and related topics in predictive parsing
- Proposed and implemented a novel system to build predictive parsers using constraint solving, with applications in parser synthesis and bug repairing

Coalition Formation Games Aug 15 - Apr 16
Undergraduate Project with Prof. Sunil Simon, CSE IITK
- Studied hedonic games with emphasis on stability concepts using techniques of algorithmic game theory
- Proposed a new subclass of hedonic games, shared preference hedonic games and investigated some algorithmic properties of this class in detail

Relevant Courses

- *Theory:* Algorithmic Game Theory, Theory of Computation, Data Structures and Algorithms, Algorithms - II
- *Machine Learning:* Machine Learning: Tools, Techniques and Applications, Learning with Kernels, Probabilistic Machine Learning
- *Mathematics:* Abstract Algebra, Discrete Mathematics, Probability and Statistics, Logic in Computer Science, Linear Algebra, Analytical Calculus, Partial Differential Equations, Complex Algebra
- *Humanities and Social Sciences:* Applied Game Theory, Academic Writing

Technical Skills

Languages: Python, R, STATA, C, C++, MATLAB, Java, Oz, Ruby
Web Development: JS, PHP, MEAN, MySQL
Other Tools: Android, TensorFlow, Keras, Apache Hive, Spark, Shell scripting, LaTeX, Git

Teaching

Tutor *for ESC101A, IITK* 2015-16
Faculty Instructors: *Prof. Nitin Saxena (Fall) and Prof. Sunil Simon (Spring)*
- Student Instructor for the core institute course *Fundamentals of Computing* for two semesters
- Supervised weekly tutorials and problem solving sessions
- Assisted the instructors in designing course material, quizzes, labs and exams

Service

Academic Mentor, *Counselling Service, IITK* 2013-14
Student Guide, *Counselling Service, IITK* 2013-14
Editor, *Vox Populi, IITK* 2014-15
Student Member, *Department Undergraduate Committee, CSE IITK* 2014-15