Gurpreet Singh

MASTER OF SCIENCE · COMPUTER SCIENCE · COLUMBIA UNIVERSITY

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Education

MS, COMPUTER SCIENCE
Columbia University   *2019-*

B. TECH, COMPUTER SCIENCE | GPA 9.3 / 10.0
Indian Insititute of Technology Kanpur   *2015-2019*

Scholastic Achievements

- Received 2 Academic Excellence Awards at IITK for the years 2016–18
- Selected for ACM ICPC Regionals, 2017 at two sites (Overall Rank - 70)
- Secured 174 rank in JEE, 2015 among over 0.5 million candidates
- Kishore Vaigyanik Protsahan Yojana Scholar with All India Rank 464

Work Experience

GOLDMAN SACHS   *Bangalore, May'18 - Jul'18*
Summer Analyst
Objectives
- Introduce changes in existing models for asset liability gap management for deposits and clearing house initial margin, and
- Build a lite calculator for customer margin allocation for proper internalization
- Identified bugs in pre-written code, and augmented features for proper AL Gap Management
- Built a waterfall logic for customer margin allocation, taking various parameters into consideration and a greedy strategy to allocate margin per stock, improving the run time of the allocation logic

INMOBI   *Bangalore, May'17 - Jul'17*
Data Science Intern
- Extracted image features from Ad creative images using OpenCV (in python) and Google Cloud Vision API
- Analysed Pearson Correlation with the Click Through Rate (CTR) and used variable selection (Weka) to detect explainable features
- Created a python server to handle feature extraction and prediction for building suggestions for possible Ad enhancements based on CTR

EXXAMM.COM   *Delhi + Remote, Jan'16 - Jul'16*
Web Development Intern

INMOBI   *Bangalore, Dec'15*
Software Engineering Intern

Positions of Responsibility

TUTOR/TEACHING ASSISTANT   *Spring 2019*
ESC101: Fundamentals of Computing   *Prof. Swaprava Nath, IITK*
- The position entailed taking tutorials every week, setting question papers and grading exam copies and mentoring a mini-project

COURSE MENTOR   *Fall 2018*
CS771: Introduction to Machine Learning   *Prof. Piyush Rai, IITK*

ACADEMIC MENTOR   *2016-17*
ESC101: Fundamentals of Computing   *Counselling Service, IITK*
- Took multiple doubt clearing sessions, both hall level and institute level and also gave one-on-one tutoring to a few students

Projects

GENERATIVE MODELS FOR MOLECULE DESIGN   *Spring 2019*
Prof. Piyush Rai   *Undergraduate Project*
- Modified the Junction Tree VAE model to introduce binary latent variables based on a RBM prior allowing interaction between the graph and the tree latent variables and, therefore, affording a more expressive as well as more interpretable latent model

DISCRETE VAES AND STOCHASTIC BLOCK MODELS   *Fall 2018*
Prof. Piyush Rai   *Undergraduate Project*
- Surveyed continuous relaxations to discrete latent variables such as Gumbel-Softmax, Spike-and-Exp, Overlapping, Gumbolt, etc.
- Implemented GumBolt relaxation for RBM prior using tensorflow
- Augmented GVAEs with binary latent embeddings to offer interpretable latent representations, imitating mixed membership models
- Employed the resultant model for link prediction on graph datasets (Citeseer and Cora) and achieved superior results to baseline models

MIXTURE OF EXPERTS USING DISCRETE VAE   *Fall 2018*
Prof. Arnab Bhattacharya   *CS685: Data Mining*
- Extended the VaDE model to infer cluster assignments using a deep neural network and employed Virtual Adversarial training
- The proposed model worked comparable to VaDE on clustering tasks without the need for careful layer wise pretraining
- Extended the proposed model as a gating function for Mixture of Expert tasks and achieved better performance than baseline models

INCREMENTAL NEURAL NETWORKS TRAINING   *Spring 2018*
Prof. Purushottam Kar   *CS777: Learning Theory*
- Two layer NNs can be represented as an ensemble of multiple single node hidden layer networks, which can be individually trained using generic boosting methods (gradient boosting), which also afford definite theoretical convergence guarantees
- Applied gradient boosting to train two layer networks incrementally and studied the convergence analysis under various constraints
- Applied incremental training as pre-training, along with backpropagation for fine-tuning and observed remarkably better convergence

SURVEY: METHODS FOR CONVEX OPTIMIZATION   *Sprint 2018*
Prof. Purushottam Kar   *IITK*

MACHINE COMPREHENSION USING MATCH-LSTM   *Sprint 2018*
Prof. Harish Karnick   *IITK*

JAVA TO X86 ASSEMBLY COMPILER   *Spring 2018*
Prof. Subhajit Roy   *IITK*

NACHOS OPERATING SYSTEM   *Fall 2017*
Prof. Mainak Chaudhuri   *IITK*

* Code and reports for all projects available at github://fat-fighter

Technical Skills

Programming Python, C/C++, Bash, Octave/MATLAB, R, LaTeX
Web PHP, Javascript, SQL, CSS/HTML, node.js, Flask
Utilities Git, Linux Shell Utilities, PyTorch, TensorFlow, Vim

Coursework

COMPUTER SCIENCE AND ENGINEERING

Computer Vision	Data Mining *	Networks
Probabilistic Modelling and Inference *	Statistical Learning Theory	Natural Language Processing
Introduction to Machine Learning	Compiler Design	Operating System
Algorithms - I & II	Computer Organization	Fundamentals of Computing *

MISCELLANEOUS

Probability and Statistics	Linear Algebra	Numerical Methods in Engineering

* - Exceptional Performance