RushabMunot

COMPUTER SCIENCE AND ENGINEERING,
Indian Institute of Technology, Kanpur

Homepage: home.iitk.ac.in/~rushab
Email: rushab@iitk.ac.in
Phone: +91 7755048125

EDUCATION

Bachelor of Technology in Computer Science and Engineering,
Indian Institute of Technology, Kanpur
CGPA: 9.2/10.0 (2014-18)

INTERNSHIPS

Risk Analyst – Risk Division, Goldman Sachs *Summer 2017*

- Worked with the **Market Risk Management and Analysis - Credit Risk Modelling** team
- Modelled **constrained non-linear dependencies** between time-dependent **Credit Risk Factors**
- Handled three **critical fixes in models in production** pertaining to constraints on risk factors
- Developed several generalized methods to handle inconsistencies in stationarity, co-integration, etc.
- Calibrated financial indexes for markets outside the United States, where such data is unavailable
- **Offered** a full-time position at Goldman Sachs

Research Intern - Prof. Vibhav Gogate, University of Texas at Dallas *Summer 2016*

- Theoretically analyzed a paper on tying parameters by quantization and applied it to logistic regression
- The method works as a regularizer by constraining weights having a certain relationship amongst themselves
- Obtained an accuracy about **2-3%** higher than L2 regularization on specific email classification and Iris dataset

ACADEMIC PROJECTS

Probabilistic Models for Word Representation (Reports 1 & 2) *Sep 2017-Present*
Prof. Piyush Rai and **Prof. Purushottam Kar**

- Improvising on the paper *Multimodal word embeddings, ACL 2017* by Athiwaratkun and Wilson
- Our model **reduces the number of parameters (by 10^2)** and makes the model **nonparametric**
- Each sense of every word is modelled using an **abstract concept pool** (basically a mixture over concepts)
- A word is a mixture over its senses (Dirichlet Process, non-parametric model)
- Complete Inference is performed by large Gibbs Sampling Sweeps, using conjugacy wherever possible
- For point estimates stochastic EM or SGD can also be used
- In another approach we model the problem as a Matrix Factorization problem

The Lemke-Howson Algorithm – Prof. Rajat Mittal (Linear Prog and Spectral Graph Theory) *Jan-April 2018*

- Studied the Lemke Howson Algorithm for finding Nash Equilibria in Bimatrix games
- Studied Minimax Theorem and its extension to Polymatrix Games
- Studied Shapley's formulation of the Lemke Howson algorithm,
- The algorithm includes reduction to a mixed Linear Complementarity Problem and using a modified version of Simplex Algorithm to reach a Nash Equilibrium

Word Sense Disambiguation using Localized RNNs – Undergraduate Project I, II, Dr. Harish Karnick *Jan 2017-Present*

- The model is a deep LSTM layer with **word dependent, context-independent attention** mechanism
- Working on using WordNet Sense Keys **hierarchically to disambiguate senses**
- Hierarchical disambiguation provides much more tagged data as we go higher in the hierarchy
- Obtaining accuracies in the range of **80-95%** on the hard, line, serve, interests datasets (Senseval 2)
- Obtained an improvement of about **5-7%** for some words (One million sense tagged instances dataset)

Abstractive Summarization using seq2seq models – Dr. Harish Karnick, Course Project, NLP *Aug-Dec 2016*

- Developed an abstractive summarization model for the Amazon Fine Food Reviews Dataset
- Based on the neural translation model proposed by Mikolov et al. 2014
- An end-to-end deep encoder-decoder model, using LSTM layers for each of them

Image Tagging using Fast-Tag and Fast-Zero-Tag – Dr. Piyush Rai, Machine Learning Techniques *Aug – Dec 2016*

- Automatic annotation of images with unseen tags, based on other information about the tags
- The paper classifies relevant tags using similarity of the tags' word vectors with the image's principal direction
- Proposed a **Deep Neural Net with Multi-Task Loss** for FastTag and **kernelized SVMs** instead of Linear Mappings

OTHER PROJECTS

Comparing Subgraph Isomorphism Algorithms
Implementing OS Functionalities in NachOS

Compiler for C Programming Language
Share@IITK – A platform to share belongings in IIT Kanpur

TEACHING EXPERIENCE

Teaching Assistant, Data Structures and Algorithms (ESO207, IIT Kanpur) *Spring 2018*

- Help design and grade assignments, quizzes and exams
- Mandatory Course for all Computer Science undergraduates

Tutor, Introduction to Computing (ESC101, IIT Kanpur) *Fall 2017*

An introductory course in C and programming techniques, with more than 400 enrolled students

- Conducted Tutorial Lectures for a batch of 40 students, once every week
- Designed and Graded Lab Sessions, Quizzes, Theory and Lab Exams
- Supervised the work of Teaching Assistants
- Mentored two advance track projects by first-year students (a web-based chat app with support for file sharing and encryption; fraud detection using SVMs, GMMs, Gaussian Anomaly Detection)

Mentor, Machine Learning Techniques (CS771, IIT Kanpur) *Fall 2017*

- Mentored course projects of five groups (five students each)
- The topics include sequence to sequence modeling for summarization, sense vector generation, word sense disambiguation and deep learning for keyword extraction

RESEARCH INTERESTS

Machine Learning, Natural Language Processing, Probabilistic Machine Learning, Kernels and SVMs, Cognitive Science

COURSE WORK

Artificial Intelligence :	Machine Learning Techniques, Natural Language Processing, Probabilistic Machine Learning, Topics in Learning Theory, Algorithmic Game Theory, Computational Cognitive Science
Computer Science :	Data Structures, Algorithms, Database Management, Operating Systems, Compiler Design, Computer Organization
Mathematics :	Probability and Statistics, Linear Algebra, Real Analysis, Complex Analysis, Linear Programming and Spectral Graph Theory, Discrete Mathematics, Abstract Algebra, Logic, Theory of Computation, Numerical Methods
Philosophy :	Introduction to Philosophy, Logic and Philosophy, Moral Thinking, Philosophy of Science

ACADEMIC AWARDS

- **Academic Excellence Award for 2015-16, IIT Kanpur,** awarded for outstanding academic performance
- **Academic Excellence Award for 2014-15, IIT Kanpur,** awarded for outstanding academic performance

ACADEMIC ACHIEVEMENTS

- Secured a **rank of 20** in the **Regional Mathematics Olympiad**, 2012
- Qualified for the **Indian National Informatics Olympiad** 2013
- Secured **rank 1** in the **Centralized Admission Process**, Maharashtra State Board, 2014

POSITIONS OF RESPONSIBILITY

- Vice President Helpline, Kanpur City – BloodConnect Foundation (2015-16)
- Secretary, Fine Arts Club, IIT Kanpur (2015-16)
- Volunteer, National Social Service, IIT Kanpur(2014-15)