

Nishant Rai

Email: nishantr@iitk.ac.in

EDUCATION

April 2017	B.Tech (COMPUTER SCIENCE AND ENGINEERING)	IIT KANPUR	9.9/10.0
April 2013	Class XII (CENTRAL BOARD FOR SENIOR EDUCATION)	K.V. DELHI	96.20 %
April 2011	Class X (CENTRAL BOARD FOR SENIOR EDUCATION)	K.V. SHILLONG	10.0/10.0

ACADEMIC ACHIEVEMENTS

- Received **Charpak Research Scholarship** for the year **2015**.
- Received the **Academic Excellence Award** for exceptional academic performance in the **13-14** academic session.
- Secured AIR - **257** in **JEE (Advanced) 2013** and AIR - **79** in **JEE (Mains) 2013**.
- One amongst the **6 INMO Awardees** selected for **IMO training camp**, after clearing **INMO '13**.
- Awarded Gold medal for being selected for **IPhO training camp**, after clearing **INPhO '13**.
- Awarded **Ashray Hasta Award and Scholarship, 2013** for exceptional performance in **AISSCE, 2013**.
- Selected for the prestigious **KVPY** scholarship, in stream **SX**.
- Secured **Rank 1** in **Regional Mathematics Olympiad '12** (Delhi Region).

ACHIEVEMENTS IN PROGRAMMING

- Secured **1st** place in **Microsoft CodeHunt** amongst individuals from over the country. Selected for **finals** in **China**.
- Secured **13th** place in **IOPC** (International Online Programming Contest) amongst **900+** teams from over the world held during **Techkriti '15**.
- Secured **1st** place in the event **Chaos** (Esoteric Programming Contest) held during **Techkriti '15**.
- Secured **17th** place in **Morgan Stanley Codeathon 2014** amongst **1000+** individuals from over the country.
- Secured **26th** place in **ACM ICPC Onsite Contest 2014** amongst **250+** teams from over the country.
- Secured **1st** place in the **Web-dev** event during **Takneek '14** (Inter-Hostel Technical Competition).
- Secured **1st** place in the programming event **Blackbox** during **Takneek '13** (Inter-Hostel Technical Competition).

INTERNSHIPS

X.R.C.I

Xerox Research Center India
Bangalore, India

RESEARCH INTERNSHIP

Dec '15

MULTI VIEW CLUSTERING VIA NON NEGATIVE MATRIX FACTORIZATION:

Mentored by Om Deshmukh, Senior Researcher (Area Manager, Multimedia Analytics), XRCI and Sumit Negi, Principal Researcher, XRCI, for developing and evaluating algorithms for Multi View Clustering using Non Negative Matrix factorization.

- Literature Survey on **existing work** and **Variants** of Multi View Clustering: **Partial/Constrained Multi View Clustering**.
- Studied various algorithms for optimization including **Greedy Coordinate Descent**, **Alternating Least Squares**, Method of **alternate Optimizations**, **Augmented Lagrangian** methods. **Formulated update rules** for our methods based on them.
- Proposed, implemented and evaluated several models to tackle the Partial Multi View problem. **Outperform** existing models.
- Artificially created Partial View data and ran experiments on them. Used both **Image** and **Textual** data to analyze the performance of our algorithms with previous work according to different clustering metrics.
- Studied the effect of **Graph Regularization** on the results and the effect of **varying Kernels** on it.

I.N.R.I.A.

The French Institute for Research in Computer Science and Automation
Rocquencourt, France

RESEARCH INTERNSHIP

May '15 - Jul '15

ALTERNATE PATHS IN ROAD NETWORKS:

Mentored by Laurent Viennot, Senior Researcher, INRIA and Adrian Kosowski, Researcher, INRIA, for finding routes substantially different from the shortest path based on different criteria.

- Implemented various **shortest path** algorithms and compared their efficiency on **real world road networks**.
- Proposed algorithms to compute paths according to another feasible definition.
- Created **measures** to **compare** different algorithms developed efficient algorithms for the involved computations.

FEATURE BASED REPRESENTATION OF SOCIAL NETWORKS:

Mentored by Adrian Kosowski, Researcher, INRIA, finding good local features which are suitable predictors for global features

- Studied **information spread models** and about maximizing spread, **Local Ranking** problem, **Pagerank** algorithm.
- Implemented and studied randomized **rumor spreading**, the relation between size and steps for spread of the rumor
- Studied and explored different **local features** in graphs based on **walks**, **subgraph densities**, **centrality measures** and their relation with other **global properties** along with arguments to explain the obtained results.

PROJECTS

WORD EMBEDDINGS WITH MULTIPLE WORD PROTOTYPES:

AUG '15 - NOV '15

- **Course Project** for course **CS671A**: Introduction to Natural Language Processing, under **Prof. Amitabha Mukherjee**.
- Project aimed at constructing of **Multiple Sense Embeddings** for different words using purely **unsupervised approaches**.
- Proposed algorithms involved **Online clustering**, analysis of Word-Word **co-occurrence matrix** and **Non-parametric clustering** using penalties based on **Negative Sampling**.
- **Outperform existing methods** in **Local Similarity Metric** and **comparable** in terms of other metrics, result in more semantically coherent senses than the state of the art methods.

NACHOS OPERATING SYSTEM:

JULY '15 - NOV '15

- **Course Project** for course **CS330A**: Operating Systems, under **Prof. Mainak Chaudhuri**.
- **Extended** the **NachOS** operating system to perform basic operating system functions including **Fork, Join, Sleep and Exec**.
- Implemented and evaluated performance of various algorithms for scheduling processes.
- Developed and added support for **Demand Paging, Shared Memory, Condition Variables and Semaphores**.

MULTI MODAL EMOTION RECOGNITION:

MAY '14 - JUN '14

- Project aimed at performing **Emotion Detection** using three features i.e. **textual, speech and visual**. Developed emotion detectors which use **text, video and audio** as features.
- Merged the results of the three classifiers to identify emotions accurately.
- Learnt about **Facial Action Coding System, Active Shape/Appearance Models** and other prevalent methods for emotion classification.

GEOMETRIC DATA STRUCTURES:

SEP '14 - NOV '14

- Project for **Advanced Track** in course **CS210**: Data Structures and Algorithms, under **Prof. Surendar Baswana**.
- Project involved **re-invention** of several **geometric** data structures to efficiently answer specified queries.
- **Queries handled**: Point in Polygon, Polygon-Line intersection, Simplex problem, Orthogonal Range Search, Half Plane problem.

NEWS REPORT CLASSIFICATION:

JAN '14 - APR '14

- Project aimed at **classifying news articles** into various categories.
- Trained **Naive Bayes Classifier** after processing the article text (**Tokenisation, Stemming, removing Stopwords**, etc)
- Implemented **K Nearest Neighbors** and **automated scraping** of online news articles for collection of Training data.

SENTIMENT ANALYSIS OF SOCIAL MEDIA:

AUG '14

- Application developed during **Web-Dev, Takneek '14** and secured **First** position.
- Interface to analyze the past and present **social sentiment of brands and their products**.
- Identifies the **"good" and "bad" features** of the product to act upon them.

OTHER MINOR PROJECTS:

- Implemented a **Captcha Decoder**, able to work with some level of noise.
- Created models for **Predicting Search trends, Assigning Topic** based on keywords and **Categorizing questions** into multiple classes.
- Completed project to discover patterns and trends about the **New York Subway**, under the **Udacity** course: **Intro to Data Science**.

POSITIONS OF RESPONSIBILITY

Jan '15 - Current

Member, Core Team Academics, Counseling Service

Responsible for managing remedial lectures, mentor allotment and other academics related issues.
Managing a team of 100+ Academic Mentors to help and guide academically troubled students.
Assisting peer students in departmental courses by conducting classes as well as personal tutoring.

Aug '14 - Mar '15

Senior Executive, Public Relations, Techkriti '15, IIT Kanpur

Responsible for inviting eminent personalities for talks, shows and looking after their publicity and hospitality
Responsible for smooth conduction of 5 talks and 2 shows in the festival along with other teammates.
Managed a team of 15 members to organise TechPlanet which witnessed footfall of over 3000 people

Apr '14 - Apr '15

Secretary, Programming Club

Jun '14 - Apr '15

Academic Mentor (MTH101/102), Counselling Service

Jun '14 - Apr '15

Student Guide, Counselling Service

Previous

Secretary, Hospitality Cell, Udghosh '14

Volunteer, Hospitality Cell, Udghosh '13

TECHNICAL SKILLS

Programming Languages (PROFICIENT):

C, C++, PYTHON, MATLAB, GNU OCTAVE, ASSEMBLY (VERILOG)

Programming Languages (FAMILIAR):

JAVA, CSS, JAVASCRIPT, PHP, MYSQL

Software and Utilities:

GIT, GNU PLOT, L^AT_EX, AUTOCAD, INVENTOR

INTERESTS

Algorithms and Data Structures
Competitive Programming
Machine Learning

Artificial Intelligence
Computer Vision
Natural Language Processing

RELEVANT COURSES

ESC101 : Fundamentals of Computing
CS201 : Discrete Mathematics
Udacity: Intro to Data Science
CS203 : Abstract Algebra
CS345 : Algorithms - II
CS252 : Computing Laboratory - II
CS676 : Computer Vision and Image Processing *

MTH101 : Analytical Calculus
CS210 : Data Structures and Algorithms
CS251 : Computing Laboratory
CS220 : Computer Organization
CS330 : Operating Systems
CS671 : Natural Language Processing
CS335 : Compiler Design *

MTH102 : Linear Algebra and DE
Coursera: Algorithms
CS202 : Mathematical Logic
MSO201 : Probability and Statistics
CS340 : Theory of Computation
CS771 : Machine Learning: Tools and Techniques *
* - ONGOING

EXTRA-CURRICULAR ACTIVITIES

Secured **1st** place in **Reviews** - Lifestyle event in **Spectrum '14** (Inter-Hostel Competition).
Secured **1st** place in **Tennis (Singles)** in **Freshers' Inferno '13** (Inter-Hostel Sports Competition).
Selected for **CBSE Tennis Regionals** (Guwahati Region), 2009.
Selected for participation in **U-17 Inter School Table-Tennis Tournament**, Shillong in 2010.
Secured **1st** place in **U-17 Tennis Open** held at Basava International School, New Delhi in 2011.