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EDUCATIONAL QUALIFICATIONS

Year	Degree/ Certificate	Institute/ School, City	CPI/ %
2012-present	Bachelor Of Technology, Computer Science and Engineering, minor in Signal Processing(Electrical Engg.)	Indian Institute Of Technology, Kanpur	CPI=**9.8/10.0**
2012	AISSCE(Class XII CBSE Board)	St.Columba's School ,New Delhi	**97%**
2010	AISSCE(Class X CBSE Board)	St.Columba's School ,New Delhi	CGPA=**9.4/10**

PUBLICATIONS

- **"A Deep Neural Network Based Approach For Vocal Extraction From Songs"**
  - Accepted for IEEE's International Conference on Signal and Image Processing Applications 2015. (Single Authorship Paper)
  - This paper proposes several Deep Learning Frameworks for extracting Vocals from songs.
  - Deep Learning Frameworks like MultiLayer Perceptrons, Autoencoders, Restricted Boltzmann Machines and their extension to Deep Belief Nets were trained and their performance on this task was compared.

- **" AutoTag : Automatic Image Annotation and Content Based Image Retrieval"**
  - Submitted to European Conference on Computer Vision (ECCV) 2016, Amsterdam.
  - In this paper we propose an Automatic Image Annotation system based on a Deep Learning pipeline in conjunction with the FastXML algorithm to build a state of the art Image Annotation system on the IAPR-TC12, ESP-Game, MIRFlickr and several other benchmark datasets.
  - We also build an extremely fast content based image retrieval system by extending this approach.

- **"Automatic tagging and retrieval of E-Commerce products based on visual Features"**
  - Submitted to NAACL, Association for Computational Linguistics(ACL) conference, San Diego, 2016
  - This paper essentially uses a Deep Learning and Multi Label Classification based pipeline to identify important visual features in E-Commerce products and assigns them relevant tags. We then create a query based product retrieval system on top of it.

- **"Image Summarization using Topic Modelling"**
  - Accepted for IEEE's International Conference on Signal and Image Processing Applications 2015
  - This paper proposes a method to use topic modeling and clustering based techniques to summarize a large collection of images into a smaller, representative subset.
  - This paper describes how the techniques of topic modeling like Latent Dirichlet allocation, Latent semantic analysis along with methods like K-Means Clustering etc. can be used for image summarization.

- **"Analyzing Newspaper Crime Reports For Identification Of Safe Transit Paths"**
  - Accepted for NAACL, Association for Computational Linguistics(ACL) conference, Colorado, 2015
  - This paper proposes a method to find the safest path between two locations, based on the geographical model of crime intensities
  - This paper describes how the techniques of topic modeling like Latent Dirichlet allocation, Latent semantic analysis along with mathematical modeling and NLP techniques were successfully employed to identify the safest path based on model of crime intensities.

- **"Automatic Sign Language Recognition Systems based on Deep Neural Nets"**
    - Submitted to IEEE's Visual Communications and Image Processing, 2015. (Single Authorship paper)
    - This paper proposes several Deep Neural Network architectures and uses them to perform Automatic Sign Language Recognition. MultiLayer Perceptron, Autoencoders, Convolutional Neural Nets and Restricted Boltzmann machines were trained and state of the art performance was obtained by certain configurations
- "**A Gated Recurrent Neural Network for denoising speech signals**"
    - Submitted to IEEE's "Spoken Language Technology" Conference, Nevada, 2014
    - The paper focuses on Signal reconstruction and noise removal to denoise noisy signals by using deep and recurrent neural networks.
    - The neural network design is used to combine noise estimation and denoising into a single network design, effectively doing both simultaneously. The focus is to enhance intelligibility of speech signals by successfully removing the noise without distorting the original signal

PROJECTS AND INTERNSHIPS

- **Summer Internship '14 at School Of Computer Science, Carnegie Mellon University**
  (Mentors: Dr. Rita Singh , Dr. Bhiksha Raj)   *(May –Jul '14)*
    - **"Application of Deep Learning for Audio and Speech Signal Processing"**
    - The project focused on construction of a **Deep Recurrent neural network** to achieve signal reconstruction by denoising noise corrupted signals by **dynamic spectral subtraction.**
    - Techniques used: **Recurrent and Time Delay Neural Networks, Spectral Subtraction, Multi Layer Perceptrons and other Deep Learning techniques**
- **Winter Internship '15 at Xerox Research Labs, Europe**
  (Mentors: Dr. Larlus Diane and Dr. Albert Gordo)   *(Sep –Dec '15)*
    - Worked on '**Large Scale Image Recognition using Deep Nets**'
    - The projects primarily focused on constructing Deep Learning frameworks for Image Recognition. Coded AlexNet, GoogleNet and several other architectures from scratch and also worked on designing some new Deep Learning frameworks for the image recognition task on the ImageNet dataset. Also made extensive use of GPU's and the popular Caffe library for training Deep Convolutional Neural Nets.
- **Summer Internship '15 at Xerox Research Labs**
  (Mentors: Dr. Vivek Tyagi)   *(May –Sep'15)*
    - Worked on 3 projects during this internship: **"Application of Deep Learning for Automatic Speech Recognition", " A comprehensive analysis of Activation Functions in Deep Nets"** and **"A new hashing technique to enhance Deep Net performance ".** Also got the Best Project award for the same.
    - The projects primarily focused on constructing Deep Learning frameworks for Speech Recognition. The Internship provided me extensive research and coding experience of how to efficiently train Deep Nets. **Several research papers** and **patents** are also in process of being written on the same.
- **'Real Time Video Surveillance using Deep Convolutional Neural Networks'**
  (Course Project Machine Learning Techniques under Prof. Harish Karnick   *(Jan –Apr'16)*
    - Implemented a real time video surveillance system performing image segmentation and entity recognition using a **Deep Region based Convolutional Neural Networks**.
    - Applied the concept **of Transfer Learning** by training the model on Pascal VOC and using it on the large amount of unlabeled video surveillance data. The model yielded **state of the art performance** and was fast enough to be able to perform the processing in **real time**.
- **'Identifying safest path in Real time based on crime records'**   *(Mentors: Dr. Bhiksha Raj , Dr. Rita Singh)*
  Carnegie Mellon University's Winter School   *(Dec '13)*
    - Awarded **Overall Best project.**
    - Selected for **Gandhian Young Technological Innovation Award**   *(Mar '14)*
    - This project was an attempt to **counter the growing crime rates** throughout the world by ensuring commuter safety by providing him with the safest transit path between 2 locations computed in real time.
    - Techniques used: **Latent Dirichlet Allocation, Latent Semantic Analysis, Named Entity Recognition, k nearest neighbors , Bag of Words model, Probabilistic modeling etc.**.

- '**Image Summarization using Topic Modelling**'   *(Mentors: Dr. Bhiksha Raj , Dr. Rita Singh)*
  Carnegie Mellon University's Winter School   *(Dec '13)*
  - o Awarded **Overall Best project.**
  - o The aim of this project was to design an **Automatic Image Summarization software** which would choose a subset of a large collection of photos choosing only the **best images representative of the entire set** hence automatically creating an image summary.
  - o Techniques Used: **Scale Invariant Feature Transforms, Latent Dirichlet Allocation, K means clustering, Bag of Words Model etc.**
- '**Online File Sharing System with Collaborative Editing**'
  (Course Project Computing Laboratory-II under Prof. Arnab Bhattacharya)   *(Sep -Nov'14)*
  - o Implemented file/folder sharing among multiple users, allowing upload/download from remote server.
  - o Modified ShareLatex to integrate with the system, allowing multiple users to collaboratively edit and render shared Tex files collaboratively. Used python client to synchronize the local and remote file systems.
- '**Extension of NachOS**'
  (Course Project Operating Systems under Prof. Mainak Choudhari)   *(Sep -Nov'14)*
  - o Designed various functionalities in NachOS - instructional software in C++ to run as secondary OS on linux.
  - o Implemented various system calls (fork, join) , various scheduling algorithms (FIFO, RR, Unix Scheduler), various techniques for synchronization (semaphores, condition variables), demand paging, shared memory and various page replacement algorithms(FIFO, LRU, LRU Clock).
- '**Education based Webapp for Primary education**'   *(Mar '14)*
  - o Secured **2nd Position** in El-Eduvate (**Techkriti, Technical Festival, IIT Kanpur**)
  - o The webapp was designed with several interactive applications and a highly attractive GUI to provide primary school students an exciting platform to learn new things away from the monotonous classroom environment.
  - o Used HTML, CSS, Javascript, PHP to design webapp.
- ' **Karaoke Generator Webapp with vocal comparison**'   *(Yahoo! 's R & D team)*
  - o **Honorable mention.**   *(Oct '13)*
  - o Given a song, the webapp muted the vocals, fetched the lyrics and allowed the user to sing along it.
  - o Techniques Used: **Audio Processing, Vocals extraction and removal, Heuristic based vocal comparison.**
- Mobile Phone app for '**Content based Image retrieval**'   (*Microsoft's R&D team*) (*Jan '14*)
  - o Techniques Used:**Viola-Jones Face detection, Scale Invariant Feature Transforms, Image processing**
  - o The app allowed the user to **fetch specific images** from a collection based on **content specific queries**

SCHOLASTIC ACHIEVEMENTS

- Awarded the prestigious **World Quantitative and Science Scholarship** from **Worldquant** (Among the 30 students from all over the world and 2 from India, chosen across all years and departments)
- Gave an **invited talk** on 'A Deep Autoencoder based approach for Music Retrieval' at Sound and Music Technology Group at **National University of Singapore**.
- Among the 25 students shortlisted for the prestigious **Aditya Birla Scholarship** 2012 from all over India.
- Selected for **S.N. Bose Scholars program, Google Mountain View Internship program, Qualcomm San Diego Internship program** and **University of California, Irvine's** Internship program
- Shortlisted for the **Institute Of Engineering Technology National Scholarship**.(Among the 168 selected from over 3,700 applicants from the top engineering colleges of India)
- Among the 20 students selected from South East Asian region to attend Advances in Computer Science Technology Workshop at **National University of Singapore**.
- **IIT-JEE** examination : All India Rank of **165** out of 5,00,000 students(99.9967 percentile holder)
- **AIEEE** examination : All India Rank of **93** out of 1.5 million students (99.999938 percentile holder)
- **ISAT**(Indian Institute of Space Technology) :All India Rank of **65** out of 1 million students(99.999935 percentile)
- **UPSEE**(State Entrance Exam) : All India Rank of **12** out of 1.2 million students(99.99999 percentile holder)

- Received the **Academic excellence** award for the outstanding academic performance in the year 2012-13,2013-2014
- **National Scholarships** Received:
  1. National Talent Search Exam **(NTSE)** (Among 500 selected by NCERT, Government Of India from 1.5 million applicants)
  2. Junior Science Talent Search Exam (**JSTSE**) (Among the 100 students selected by Department of Science and Technology, Government of India from across the world)
  3. Kishore Vaigyanik Protsahan Yojana **(KVPY)** (Among the 1000 selected by Department of Science and Technology, Government of India from 100,000 applicants)
- **International/National Olympiads** Cleared**:**
  1. **International Informatics Olympiad** (Silver Medal)
  2. **National Standard Olympiad in Physics** (Top 1% of the country)
  3. **National Standard Olympiad in Chemistry**(Among the 200 students clearing 1st stage)
  4. **International Assessment for Indian Schools**(conducted by University of New South Wales) (1st position **Internationally** in Science and 1st Position in Delhi in Maths)
  5. **National Cyber Olympiad** (Silver Merit)
  6. **National Science Olympiad** (Delhi Topper)
  7. **National Mathematics Olympiad** (School Topper)
- Obtained an All India Rank of **45** in **National Science Talent Search Exam**(NSTSE)
- Received Certificates for Outstanding Performance in ASSET test conducted by University of New South Wales, Australia
- Adjudged the **Best Computer Aided presentation** in **Science Symposium** at St. Columba's School
- Secured **3rd position** in **National Maths Talent Test** conducted by Manavsthali.

EXTRA CURRICULAR ACHIEVEMENTS

- Awarded the "**Outstanding Freshman of The Year**" by Student's Gymkhana, IIT Kanpur
- Won the **Gold** medal in **Water Polo** at Inter IIT Meet, Mumbai, 2014.
- Part of the Aquatics team which won the **Overall Aquatics championship** at Inter IIT 2014, Mumbai
- Won a **Silver medal** in 200m Freestyle at **Inter IIT Meet**, IIT Roorkee, October 2012.
- Felicitated by **Director, IIT Kanpur** for **Outstanding Performance** at the Inter IIT meet 2013 where IIT Kanpur won the **General Championship**.
- Won a 1 **Gold**, 1 **Silver and 3 Bronze medals in Aquatics** at **Inter IIT Meets** 2012,2013,2014
- The **best ever individual** performance by a first year student in the Inter IIT meet from IIT Kanpur
- Received the prestigious **Sports Scholarship** from IIT Kanpur for **leadership & excellence** in sports
- Awarded **Best Incoming Sportsperson '12** by the Games and Sports Council, IIT Kanpur
- National Cadet Corps**(NCC)**
  1. Received the **Sahara India** Cadet's Welfare **Scholarship,** 2009
  2. Received the **'A' Certificate** on clearing the 'A' Certificate Examination
  3. Highest Rank of **Sergeant** awarded
- 5th position in The **Oracle Think quest '09** (International **Website Designing** Competition)
- **Delhi State Swimming Championship -** Won **1 Silver and 2 Bronze** Medals
- **West Delhi Aquatics Championship-** Won **1 Silver and 1 Bronze** Medal
- Received Raman Subramanyam Award for **All Round Excellence** and Vijay Srinivasan Award for **Brotherhood And Service** from St.Columba's School
- Won the programming competitions 'Fossdev','Blackbox' and 'Crypto' in Takneek 2012.,IIT Kanpur

- 2nd Position in **Delhi State Chess** Championship
- 2nd position in Botwinik Chess Championship
- 1st Position In Quiz held at **National Science Center** (Delhi)
- 2nd Position in **Delhi State Chess** Championship as well as in in Botwinik Chess Championship
- Participated in the **successful world record** attempt to solve maximum number of **Rubik's Cube**   *(Jan '13)*
- 2nd Position In **Poetry Writing** in the 'Columban Fest'   *(Oct '10)*
- Successfully completed the **Leadership Training Programme** by the NGO Pravah   *(May '09-Aug '10)*
- Successfully completed Sunday Club Theatre Training Part 1 and 2 and Summer Workshop from the **NATIONAL SCHOOL OF DRAMA**. Also acted in 4 **plays** and 1 **Telefilm**.

POSITIONS OF RESPONSIBILITY

- Selected as **Secretary**, **Programming Club**, IIT Kanpur   *(May '13-May '14)*
  - Helped inculcate a culture of programming on campus
  - Organized various workshops, competitions and lectures for students on campus
- Selected as **Student Guide**, Counseling Service IIT Kanpur   *(Jun '13-Jun '14)*
  - Helped in organizing the Orientation Program for the incoming batch of 830 students.
  - Helped several first year students personally in overcoming their initial anxieties and guided them so that they can settle down comfortably in the campus.
- Selected as **Academic Mentor**, Counseling Service IIT Kanpur   *(Sept '12-Jun '14)*
  - Conducted classes and mentored academically weaker students to cope up with their academics
- Member of the **Alumni Contact Program**   *(Jan '13-Aug '13)*
  - Ensured strengthening of the Alumni Network of the institute
  - Convinced Alumni to provide funds for various scholarships and infrastructural developments on campus
- Member of the **'Editorial Board'**, St. Columba's School   *(Apr '10-Jul '11)*
- **Student Representative** ,St. Columba's School   *(Apr '10-Jan '12)*
  - Voiced the opinions and demands of the students and acted as a link between students and faculty
- **Prefect** for 6 consecutive years, St. Columba's School   *(Mar '05-Jan '10)*

TECHNICAL SKILL SET

- **Programming Languages**: C, C++, Python + Theano, Caffe, Torch, Pylearn2, Matlab, R, SQL, HTML, Javascipt, PHP, Bash, Perl, OpenCV

RELEVANT COURSES DONE

Code	Course Name	Grade	Code	Corse Name	Grade
CS210	Data Structures And Algorithms	A	CS335	Compiler Design	Ongoing
MTH102	Linear Algebra and Ordinary Diff. Eqn's	A*	CS345	Advanced Algorithms	A
MSO201	Probability and Statistics	A*	EE200	Digital Signal Processing	A
CS771	Machine Learning Techniques	Ongoing	MTH552	Data Mining and AI	Ongoing
CS202	Intro. To Logic	A	CS330	Operating Systems	A*
Coursera	Digital Image and Video Processing	Distinction	Coursera	Data Science Specialization (7courses)	Completed