Prannay Khosla *July 13, 1997*

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Junior, IIT Kanpur
NLP and Deep Learning Enthusiast with a side of Algebra and Quantum Computation
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Education

Indian Institute of Technology, Kanpur — Kanpur, Uttar Pradesh, India
Bachelor of Technology, Computer Science and Engineering — *July, 2015 – May, 2019 (Expected)*
Cummulative Grade Point Average 9.6/10.0

Delhi Public School, R.K. Puram — New Delhi, India
All India Senior School Certificate Examination (AISSCE) — *2015*
- Cummulative 96.6 percent (Percentile 99.74)
- National Top 1 percent in Mathematics (100 percent) and Computer Science (98 percent).

Class 10 Board Certification — *2013*
Cummulative GPA: 9.8/10.0

Publications

Microblog Retrieval for Post-Disaster Relief: Neural IR Models — NEUIR17
Accepted — *https://arxiv.org/abs/1707.06112*
With the increased use of Neural Network techniques for Information Retrieval, a logical question is if we can use DNN, NN based Language models to retrieve relevant tweets from a large dataset. Due to small amount of data and increased amount of noise, it is relevant to pose this problem as that one of retrieval and get high precision and recall accuracies, rather than training classifiers over LM to get tweets which might be relevant. Try to speed up training, be reusing pretrained tweet structures. NeuIR is a workshop at the Conference Special Interest Group in Information Retrieval aimed specifically at Neural Network techniques for Information Retrieval.

Projects

Post Disaster Microblog Retrieval — May 2017 - July 2017
Microsoft Research India — *Aritificial Social Intelligence*
- Main focus was to build Neural Network methodologies (Deep + NLP) for retrieval
- Tested using biLSTM, attention based and other neural network methods (total : 5)
- The project aimed at building a retrieval mechanism for disaster situations
- The work involved retrieving relevant tweets and extracting information
- The model also involved matching tweets that could be of mutual benefit
- System design for a prototype level model to deploy the same

Unsupervised learning for Text to Video generation — February 2017 - November 2017
Supervisor : Prof. Vinay P. Namboodiri — *CSE Deptt., IIT Kanpur*
- The aim is to use learned word embeddings to generate video
- Built upon GANs (Goodfellow et al) and the work of Scott Reed (et al)
- Training done in Wasserstein GAN setting
- Used LSTM models to learn frame representations
- Used novel TreeGAN methods for alternative Generative model and representation learning

Optimizing MaxSAT and Inferring Grammars (Compilers / Logic) — May 2016 - July 2016
Supervisor : Prof. Subhajit Roy — *CSE Deptt., IIT Kanpur*
- Worked on building efficient algorithms to find MaxSAT instances using GPUs and Parallel programming
- Implemented algorithms with CUDA and tested against standard benchmarks
- Worked on abstracting LALR languages as Logic
- Implemented abstraction with z3 Python library

Advanced Track, ESC101 (Functional Programming / Systems / AI) — January, 2016 - April, 2016
Supervisor: Prof. Sunil E. Simon — *CSE Deptt., IIT Kanpur*
- Creating an efficient Online Judge for Programs written in C/C++/Haskell
- Efficient use of concurrent programming and deployed using the Flask Framework
- Built parsers for LR(k) gramars with Haskell
- Built a system to check if grammar is LL(1) using efficient implementation of Parsing Algorithms
- AI for solved games with faster implementations taking advantage of Lambda Calculus

Talk on Error Correcting Codes (Discrete Mathematics) November 2016
Instructor: Prof. Nitin Saxena *CSE Deptt., IIT Kanpur*
Delivered a talk on Error Correcting as an extra project, part of the discrete mathematics course. The talk aimed at familiarising the audience with Symmetric Channels and Linear codes and related mathematics it's direct application as seen in DNA.

Autonomous Underwater Vehicle (Robotics) November, 2015 - July, 2016
Supervisor: Prof. K.S. Venkatesh *Electrical Engineering Deptt., IIT Kanpur*
- Aimed at moving the Bot along a line, firing torpedos at given targets and grabbing and dropping objects underwater
- Implemented using OpenCV for Image Processing and ROS for Controls
- Mechanical Design and Optimization with Ansys

Code / Libraries

NLP Libraries Present
Word2Vec (Lua/Torch) *https://github.com/prannayk/word2vec.git*
- Word2Vec Library using Hierarchial Vocabulary trees for word vector representation
- Works for most English like languages where Context can be used for representation

Information Retrieval (Tensorflow) *presently private*
- Implemented Neural network methods for information retrieval
- Trains on multiple models
- Generic codes for efficient asynchronous updates
- Generic codes for attention models
- Generic codes for LSTM models
- GPU implementations
- Cross model testing / multi module versatile implementation

Haskell Code November 2015-May 2016
Online Judge *hhtps://github.com/prannayk/conj.git*
- Haskell based online judge
- Used concurrent and parallel programming constructs
- Enabled judgement of code based on static test cases efficiently
- Front end deployde with Python

Technical Skills

Programming Languages Go, Python, Haskell, C/C++, Java/JavaScript, Scheme
Machine/Deep Learning Text/ Image Representation, RNN,DNN, Lua(Torch), Tensorflow
Parallel/Concurrent Programming CUDA C, Haskell, Go, Erlang
Development Docker, Haskell Stack development, Full stack web development
Web/App Development Node.JS (Express), Hakyll, AngularJS, Ruby on Rails

Relevant Courses

Introduction to Programming (A*)	Natural Language Processing (Audit)
Discrete Mathematics (A)	Computational Number Theory (*)
Organization (*)	Data Structures and Algorithms (*)
Real Analysis (A)	Linear Algrebra and ODE (A*)
Game Theory (A)	

* : Presently undertaken
A* : Exceptional Course Performance

Academic and Co-curricular Acheivements

All India Rank 548 in JEE Advanced 2015 among 150,000 students
All India Rank 192 in JEE Mains 2015 among 1,500,000 students (Percentile 99.97)
Awarded Gold Medal in 2014 for academic excellence for 7 consecutive years
National Standard Examination, Physics Qualified for second stage (INPhO) in year 2014 and ranked in the top 1 percent of all appearing candidates.
Kishore Vaigyanik Protsahan Yojana fellow since year 2013, Deptt. of Science and Technology, Govt. of India. Secured All India Rank 408 in qualifying examination organized by IISc Bangalore

Interests

Crpytography	Programming Languages	Natural Language Processing
Number Theory	Game Theory	Linguistics
Functional Programming	Computer Vision	Compilers
Machine Learning	Quantum Computation	Classical Piano
	Computational Pragmatics	

Positions of Responsibility

Secretary, Science And Technology, Hall Executive Committee, Hall 2 (2016-17) : Responsible for looking after interests and management of Science And Technology resources in the hall alongwith managing participation of 300 students during Takneek, inter hall Technical Fest at IIT Kanpur.

Secretary, Programming Club (2016-17)
Organized and contributed to Introductory Lectures and workshops organized by the club along with the Fresher's Programming Contest and Blackbox, an esoteric programming language competition.

Head of Web Development at ExunClan the High School Computer Science enthusiast's Club.
- Maintained the school and club's websites and blogs and managed high traffic during InterSchool online competitions.