Curriculum Vitae

Anand Dhoot

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Interests

Artificial Intelligence, Machine Learning

Education

Bachelor of Technology, Indian Institute of Technology Bombay *Graduating 2017*

Major: Computer Science and Engineering with Honors
Minor: Applied Statistics and Informatics
GPA: 9.48/10.00 (at the end of seven semesters)

Experience

Bachelor's Thesis *Ongoing*

Enhanced entity & type embeddings (Guide: Prof. Soumen Chakrabarti)

- The aim of the project is to create improved and interpretable embeddings across words, entities and types. This would boost performance of tasks such as question answering and knowledge base completion
- This involves using Knowledge Graphs and information from the mention context of entities in a corpus. The algorithms for learning embeddings would be developed & evaluated using Tensorflow.

Big Data Labs, American Express, Bangalore *Summer 2016*

Internship (Guide: Dr. Vidit Jain)

- Designed a framework from scratch using Python/Theano for experimenting with Deep-learning based solutions (Multi-Layer Perceptron & Autoencoder architectures) to improve performance on ranking tasks
- Experimental models showed promising results – reached within 5% of the current solution, on the test datasets, each with 10 million+ examples, 150+ attributes, with class imbalance of more than 100:1
- Received a Pre-Placement Offer in recognition of the work and results achieved

Research & Development Project *July 2015 – May 2016*

Visible Light Communication (Guide: Prof. Kameswari Chebrolu)

- Designed & developed an Android application to capture short-range video input. Several hardware intricacies (low capture resolution, rolling shutter effect, etc.) resolved to ensure robustness across devices
- Video encoding and decoding done using OpenCV, ensuring that viewer experience remains unchanged
- Achieved net throughput of 7Kbps for reliable data transfer
- 'Undergraduate Research Award' in recognition of work

Qure.ai (Previously part of Fractal Analytics), Mumbai *Winter 2015*

Research Internship

- Experimented with Deep-learning based approaches for applications in the Genetics & Medical Imaging
- Developed a solution to calculate Heart's Ejection Fraction from 150,000+ MRI images of 500 patients
- Model was based on Convolutional Neural Networks, using Theano/Lasagne libraries in Python

Research Project *Summer 2015*

Programmable Machine Translation (Guide: Prof. Ganesh Ramakrishnan)

- NLP-based interactive tool providing accurate domain specific translation with minimal human effort
- Designed chunking module for easy reordering of translated phrases and set-up a system for performing experiments to measure key metrics
- This involved understanding existing codebase of 5700+ lines, extensive coding using Java, JSP, Javascript

Academics

Electives Completed

Some exploratory courses that I have taken up -

- Advanced Machine Learning
- Foundations of Machine Learning [Ranked 4th out of 176]
- Information Retrieval and Web Mining [Ranked 2nd out of 40]
- Foundations of Intelligent and Learning Agents
- Foundations of Parallel Computation
- Performance Analysis of Networks and Systems [Ranked 3rd out of 38]

Key Course Projects

Clustering web search queries *(Information Retrieval & Web Mining)* *Autumn 2016*
The project aims to cluster list of queries to search engine into search sessions such that queries in each session have common intent. This would be helpful for search personalization, query completion, etc.

Carrom playing bot *(Foundations of Intelligent & Learning Agents)* *Autumn 2016*
Created an agent which plays the game of Carrom in Python and played in an environment created using PyGame and PyMunk using Reinforcement Learning strategies such as Q-learning, Actor-Critic methods.

Generative model for poetry *(Foundations of Machine Learning)* *Autumn 2016*
Exploratory project to understand intricacies of Recurrent Neural Networks. Modeled Shakespearean Sonnets (poems with 14 lines, 10 syllables each and a fixed rhyme scheme) using character Long Short Term Memory. Our model captured the style of writing and broad structure like size of poems & length of lines.

Planet Wars *(Artificial Intelligence)* *Autumn 2015*
Developed a bot to play Planet Wars. Implemented various heuristics for attack and defense strategies and a timeline for accurate prediction of future events. Our team stood 1st out of 32 teams in the batch.

2048 solver *(Artificial Intelligence)* *Autumn 2015*
Developed a Python based solver for the popular game 2048 and a GUI to visualize the game play. Implemented several heuristics including Minimax, Expectimax and the Monte-Carlo Tree Search algorithms.

All other course projects, their source codes and reports are at my Github account.

Honors & Awards

Scholastic

- Awarded the AP grade in the courses – 'Foundations of Machine Learning', 'Computer Programming & Utilization (CS 101)' and 'Differential Equations' for being in the top 2% students taking the course
- Stood 83rd out of 150,000 candidates in the highly competitive examination - JEE Advanced - for admission to the undergraduate program at the IIT Bombay
- Awarded the 'Lala Kailashpat Singhania Gold Medal' for being the all-round student of the year. This medal is awarded to one student of the graduating batch of Grade XII

Fellowships

- Innovation in Science Pursuit for Inspired Research (INSPIRE) Fellowship 2013 by Department of Science & Technology, Government of India for being in top 1% in the country in Indian School Certificate exam
- Kishore Vaigyanik Protsahan Yojana (KVPY) 2011 - coveted fellowship by Department of Science and Technology, Government of India awarded to 300 students across the country studying in Grade XI
- National Talent Search Examination 2009 - a program by National Council for Educational Research & Training (NCERT) to identify talented students and award them with scholarships

Extra-curricular activities

Mentorship

- **Institute Student Mentor** *July 2016 onwards*
  Single point of contact and counselor for a group of 12 freshmen, providing guidance regarding academic & holistic development and facilitating adjustment to campus life.
- **Department Academic Mentor** *July 2016 onwards*
  Volunteering to assist 8 sophomores, enabling them to cope up with the curriculum. Additionally, helping weaker students clear backlogs and get their academic careers back on track.

Other interests and activities

- Data-journalist of the institute media body, Insight. We collect data, analyze it and present insights on our blog - Datagiri with the objective of using concrete data, as against surveys or opinions, to present observations in a crisp & concise form.
- During my sophomore year, I was actively involved in the Mahindra Rise Driverless Car Challenge. This ambitious project aims to create an autonomous car for the Indian driving conditions. I helped in ideating and designing the prototype and developed mapping & visualization modules. This involved extensive amount of coding and development using C++ on ROS and using sensors such as Cameras and LIDAR.
- Playing Table Tennis – completed a one-year course in Table Tennis as a part of the National Sports Organization. Additionally, participated in two inter-hostel General Championships.