Shubham Agrawal

Machine learning enthusiast · Backend web developer

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Education

Indian Institute of Technology, Kanpur — *Kanpur, U.P.*

B.Tech. in Computer Science and Engineering — *July 2013 - PRESENT*

CGPA till 7^{th} semester : **8.8**

St. Joseph's Sr. Sec. School — *Kota, Rajasthan*

CBSE, Higher Secondary (Class 12^{th}) — *2013*

Performance : **94 %**

St. Joseph's Sr. Sec. School — *Kota, Rajasthan*

CBSE, Secondary (Class 10^{th}) — *2010*

CGPA : **10**

Scholastic Achievements

2016	**Patent,** Smart Geo-fencing using Location Sensitive Product Affinity (internally accepted at Adobe)	*India*
2013	**All India Rank 191 ,** IIT-JEE Advanced (among 150,000 candidates)	*India*
2014	**Academic Excellence Award,** for exceptional academic performance	*IIT Kanpur, India*
2015	**Best Rookie Team,** BAJA Student India, an inter-collegiate all terrain vehicle design competition	*India*
2013	**All India Rank 1234,** JEE Mains (among 1,400,000 candidates)	*India*
2013	**Shortlisted for Interview Round,** Kishore Vigyan Protsahan Yojna (KVPY)	*India*

Experience

Adobe — *Bangalore, India*

Research Intern, Big Data Experience Lab — *May - July 2016*

- The project focused on analyzing customer's historical app usage behavior to automatically learn geo-fences for selective geo-targeting
- To unsheathe interest from sparse location tagged browsing data, algorithm captures intrinsic interest of user, trends at semantically similar locations and similarity between products and users
- Achieved precision was 5 times higher than existing geo-fence
- Patent is internally accepted at Adobe. Paper under submission

Pariksha.co — *Pune, India*

Research and Developement Intern — *May - July 2015*

- Engineered an algorithm that adaptively recommend questions depending upon student's performance and question ratings
- Modeled and programmed scalable adaptive question recommender system using GO language and MongoDB database as a micro service
- Implemented Pariksha Practice Section for adaptive content and a Gamification engine with impact on 20K students

Projects

Multiple Kernel Learning — *IIT Kanpur, India*

Undergraduate project under Dr. Harish Karnick — *Jan. - Apr. 2015*

- Explored relative kernel hilbert space, multiple kernel learning algorithm and hierarchical kernel learning.
- Extracted surf and convolutional deep-net (pre-trained BVLC GoogleNet model) features for Caltech multiclass object classification dataset
- Implemented Simple MKL algorithm and studied effects of linear combination of distinct kernels on svm classifier

Densecap with NMS Convenet — *IIT Kanpur, India*

Course Project under Dr. Gaurav Sharma — *Aug. - Nov. 2016*

- Chose the paper *"DenseCap: Fully Convolutional Localization Networks for Dense Captioning"* and reproduced the results on smaller 2 GB GPUs
- Used the Tryolean network - *"A convolutional network for NMS"*, to discard test-time NMS in favor of a trainable spatial suppression layer
- Enhanced the mAP of densecap from 5.698 to 5.76. The code was implemented using Torch, LuaJIT, Keras and python.

Low rank model for neural networks

IIT Kanpur, India

Research Project under Dr. Purushottam Kar — *Aug. - Nov. 2016*

- Based on the paper - *"Robust PCA problem via outlier pursuit"* which finds the low-dimensional subspace approximation to high dimesional points after eliminating corruptions.
- Implemented a module for decomposing the input weight matrix into a low rank and a sparse matrix. Code was written in matlab and python.
- The resultant neural network performed with comparable accuracy and takes less time.

Automatic Abstract Generation for Research Papers

IIT Kanpur, India

Course Project under Dr. Harish Karnick — *Aug. - Nov. 2016*

- The important sentences are first extracted from the paper text and fed to an abstractive model which outputs the final summary for the paper
- Word frequency based scores, text rank and latent semantic analysis were experimented for extraction.
- Implemented RNN encoder-decoder network to generate the final abstract. Model was evaluated using ROGUE metric.

Object(Pedestrian/Two-Wheeler/Three-Wheeler) Detection in Survillience Videos

IIT Kanpur, India

Course Project under Dr. Harish Karnick — *Jan. - Aug. 2016*

- Identified and classified objects into pedestrians, two-wheelers, three-wheelers and four-wheeler in surveillance video
- Performed background-foreground separation to identify moving objects. Used surf and convolutional deep-net features (BVLC GoogleNet)
- Used decision tree, random forest and svm (ovr and ovo) classifiers to predict labels

Go-Python-x86 Compiler Design

IIT Kanpur, India

Course Project under Dr. Subhajit Roy — *Jan. - Apr. 2016*

- Implemented an end-to-end compiler for a subset of Go language and x86 architecture in python using PLY (python Lex-Yacc)
- Provided support for multi-dimensional arrays, nested and recursive procedures etc. Used back tracking algorithm and done short circuiting

NachOS

IIT Kanpur, India

Course Project under Dr. Mainak Choudhari — *Jan. - Apr. 2016*

- Extended the standard system call library of NachOS and implemented system calls pertaining to Fork, Exec, Join, Yield, Sleep and Exit
- Implemented process scheduling algorithms: UNIX Scheduling, FIFO, Round Robin, Shortest Job First and Non-pre-emptive job scheduling
- Programmed page replacement algorithms: Random Page Allocation, FIFO, LRU and LRU Clock to evaluate relative performances

Zoobar Secure

IIT Kanpur, India

Course Project under Dr. Sandeep Shukla — *Jan. - Apr. 2016*

- Extended zoobar web application to learn about various security concepts including buffer overrun attacks, xss, csrf and sql injection
- Done privilege separation and server side sandboxing on OKWS web server. Created program analysis tools based on symbolic execution

Skills

Machine Learning Scikit Learn, Keras, Theano, Lua, Matlab

Web Go, Javascript, Material Design, CSS, HTML, PHP, MYSQL, MongoDB, CakePHP

Programming Python, C/C++

Tools Ubuntu, Windows, Vim, LaTeX, SolidWorks

Courses

Machine Learning Machine Learning Tools, Natural Language Processing, Recent Advances in Computer Vision, Optimization Techniques

Systems Operating Systems, Compiler Design, Computer Networks, Computer Security, Computer Organization

Theory Advanced Algorithms, Data Structures and Algorithms, Theory of Computation

Mathematics Linear Algebra, Probability and Statistics

Extracurricular Activity

IITK Motorsports, BAJA Student India

IIT Kanpur, India

Chassis Head — *Oct. 2013 - Jan. 2015*

- Built the 3rd lightest All-Terrain vehicle of the country in a team of 20 members to compete against 44 national teams
- Designed the chassis on Solidworks and did FE Analysis and weight optimization on ANSYS WorkBench.
- Contacted dealers for tubes, welding and supervised the whole manufacturing process
- Bagged 4th position in the acceleration event, Best Rookie Team trophy and awarded as Design Finalists in BAJA Student India'15

Counselling Service

IIT Kanpur, India

Academic Mentor, Introduction to Electrodynamics (PHY103) — *July 2014 - Apr. 2015*

- Conducted regular tutorials at the institute and hall level attended by 10 students
- Guided 2 students out of the Academic Probation Program (AP) by constant academic and emotional support