Shubham Agrawal

Member of Technical Staff, Adobe · Computer Science Graduate IIT Kanpur

(+91) 77-5491-6150 | agshubh191@gmail.com | submagr | submagr

Education

Indian Institute of Technology, Kanpur *July 2013 - May 2017*

B.Tech. Computer Science & Engineering

CGPA : 8.7

Reserach Interests

Recommendation Systems, Machine Learning

Publication

Smart Geo-fencing with Location Sensitive Product Affinity

With: Ankur Garg, Sunav Choudhary, Payal Bajaj, Sweta Agrawal, and Abhishek Kedia

ACM SIGSPATIAL 2017, California, USA

Patent

Smart Geo-fencing using Location Sensitive Product Affinity

With: Ankur Garg, Payal Bajaj, Sweta Agrawal, and Abhishek Kedia

Patent Application Number - 15/434,886. (Filed)

Experience

Adobe Systems India Pvt. Ltd. *July 2017 - ongoing*

Member of Technical Staff

- Developed POC of a unified **smart tool** for all annotation types (highlight, underline, strikethrough, polygons, and free pen). Trained a CNN for detecting type of tool given images of user drawings. Idea got selected for shipping with the March Release of Adobe Acrobat
- Developed an efficient algorithm for the synchronization of sticky comments between PDFNext(HTML based PDF format) and Classic PDF inside Adobe Acrobat. The challenge was to associate user click on HTML document to the most relevant textual/graphical content.
- Fixed more than ten critical security vulnerabilites (buffer overflow vulnerabilities, javascript parameter tempering). Severity ranged from crash of the application on launching malicious pdfs to giving full read/write permissions of user to the attacker.

Adobe Systems India Pvt. Ltd. *May - July 2016*

Research Intern *(**project page** , **pres**)*

- The aim was to assist marketers in creating **smarter geo-fences**. The project was focused on segmenting users based on their geo-distributions of mobile app activity, identifying points-of-interest and then suggesting geo-fences customized to each user segment.
- 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 f1 score (24.89%) was significantly higher than geofence designed using Matrix Factorization (18.16%).
- Project was showcased in **Adobe Tech Summit, 2017** (talk video)

Pariksha.co *May - July 2015*

Research and Developement Intern

- Engineered an algorithm that adaptively recommend questions depending upon student's performance and question ratings
- Modeled and programmed scalable adaptive question recommender system using the GO language and MongoDB database as a micro service
- Implemented Pariksha Practice Section for adaptive content and a Gamification engine with impact on more than 50K students

Projects

Densecap with NMS Convenet *Aug. - Nov. 2016*

Course Project under Dr. Gaurav Sharma ***report*** , ***pres***

- Reproduced the results of paper *DenseCap: Fully Convolutional Localization Networks for Dense Captioning* on smaller 2 GB GPU which required a lot of optimizations(Originally, 12 GB Titan X GPU was used)
- 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.

Multiple Kernel Learning

Jan. - Apr. 2015

Undergraduate project under Dr. Harish Karnick — ***report***

- 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

Low rank model for neural networks

Aug. - Nov. 2016

Course Project under Dr. Purushottam Kar — ***report***

- 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.

Poisson Matrix Factorization

Jan. - May 2017

Course Project under Dr. Piyush Rai — ***report***

- Implemented and compared Scalable Hierarchical Poisson Factorization and Nonparametric Bayesian Matrix Factorization
- Tried to expand the work by incorporating metadata and interactive sampling.

Automatic Abstract Generation for Research Papers

Aug. - Nov. 2016

Course Project under Dr. Harish Karnick — ***report***

- 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

Jan. - Aug. 2016

Course Project under Dr. Harish Karnick — ***code***, ***report***

- 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

Scholastic Achievements

2013 **All India Rank 191 ,** IIT-JEE Advanced (among 150,000 candidates)

2014 **Academic Excellence Award,** (awarded to top 7% students in the institute)

2015 **Best Rookie Team,** BAJA Student India, an inter-collegiate all terrain vehicle design competition

2013 **All India Rank 1234,** JEE Mains (among 1,400,000 candidates)

Teaching

Academic Mentor, Introduction to Electrodynamics (PHY103)

July 2014 - Apr. 2015

Counselling Service, IIT Kanpur

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

Courses

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

Systems Computer Architecture, Principles of Database Systems, Operating Systems, Compiler Design, Computer Networks, Computer Security, Computer Organization

Theory Advanced Algorithms, Data Structures and Algorithms, Theory of Computation, Linear Algebra, Probability and Statistics

Extracurricular Activity

IITK Motorsports, BAJA Student India

Oct. 2013 - Jan. 2015

Chassis Head

- 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