

Shubham Agrawal

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EDUCATION

Columbia University

Master of Science in Computer Science

New York, NY

Aug 2019 - Dec 2020 (expected)

University of Southern California

Master of Science in Computer Science (Transferred out to Columbia University); CGPA: 3.65/4.0

Los Angeles, CA

Jan 2019 - Aug 2019

Indian Institute of Technology Kanpur

Bachelor of Technology in Computer Science; CGPA: 8.7/10.0

Kanpur, India

Jul 2013 - Apr 2017

Relevant Coursework: Recent Advances in Computer Vision, Bayesian Machine Learning, Artificial Intelligence, Machine Learning Tools, Optimizations Techniques, Natural Language Processing, Advanced Algorithms and Data Structures, Operating Systems

EXPERIENCE

Adobe Inc

Member of Technical Staff (C++, JavaScript Software Developer)

Noida, India

Jul 2017 - Jan 2019

- Implemented CRUD operations for highlight/underline/sticky notes for the next generation PDF webview using Javascript.
- Formulated efficient algorithm for modeling an annotation's position across multiple PDF views (with variable structure and content).
- Shipped fixes for multiple critical security vulnerabilities (null pointer dereferencing, buffer overflow, JavaScript parameter tampering).

Robotics Embedded Research Laboratory, University of Southern California

Student Research Assistant (Robotics Research and Web Development)

Los Angeles, CA

May 2019 - Aug 2019

- Worked on differentiable physics simulator which allows parameter estimation for nonlinear dynamical systems using automatic differentiation. Implemented Adjoint Method for getting fast differentials of integrated ODEs using C++ template metaprogramming.
- Implemented simulation visualizer web app using nodejs+gulp+browserify and MVC architecture pattern (without framework). The web app has interactive 3D simulations (Babylon.js), player progress bar, plots, logs, and multi-window support (golden-layout).

Adobe Inc

Research Intern (Machine Learning)

Bangalore, India

May 2016 - Aug 2016 (voluntarily working till Jun 2017)

- Created a novel end-to-end system for automated design of affinity (user's interest) based smart geo-fences for selective targeting.
- To unsheathe interest from sparse location tagged browsing data, the three-step user affinity modeling approach sequentially utilizes pair-wise product-product, user-user, and semantic location-location similarities.
- Users are segmented based on affinity using K-means clustering and CH-index. Final geofences are created by clustering nearby points using DBSCAN and calculating the boundary using α -hull.
- [US Patent US20180232767A1](#). **Conference paper Smart Geo-fencing with Location Sensitive Product Affinity**, ACM SIGSPATIAL 2017

PROJECTS

- Kaggle Diabetic Retinopathy Classification:** Task was to predict the severity of an input image given 3K labeled retina images.
 - Used various preprocessing steps (CLAHE, smoothing, blood vessels segmentation) to remove noise and variable lighting conditions using OpenCV. Experimented with various architectures (ResNet, EfficientNet) and training parameters to improve score using PyTorch.
 - EfficientNet-B2 and TTA gave an optimized kappa score of 0.895 and an overall standing 1311 (total 2943 teams) on the leaderboard.
- Porn Block:** Chrome extension for realtime identification and blurring of sensual images from webpages. Trained VGG-net on scrapped data using KerasJS. Wrote a proxy server to bypass CORS while generating the client-side image matrix.
- Dense Captioning:** Analyzed the work *DenseCap* by Andrej Karpathy et. al. by experimenting with the parameters and design choices of Fully Convolutional Localization Network on Visual Genome dataset. Improved mAP from 5.698 to 5.76 using trainable spatial suppression layer to discard test-time non-maximum suppression.

SKILLS

- Languages:** C++, Python, JavaScript, SQL
- Libraries:** PyTorch, Keras, Scikit-Learn, Stan-Math, Eigen, OpenCV, Numpy, Pandas

ACHIEVEMENTS & EXTRACIRRICULAR

- [US Patent US20180232767A1](#) *Smart Geo-fencing with Location Sensitive Product Affinity*
- All India Rank 191**, IIT-JEE Advanced 2013 (among 150K candidates)
- Received *Academic Excellence Award* for excellent academic performance during 2013-14 curriculum at IIT Kanpur
- Received award of *Best Rookie Team*, and *Design Finalists*, BAJA Student India 2015 (an inter-collegiate all-terrain vehicle design competition)
- Served as CS Department Senator at Viterbi Graduate Student Association, University of Southern California for spring semester, 2019
- Co-created [TOEFL Infinite](#), an android application for TOEFL and GRE exam preparation with 150K downloads on Google Play