Shubham Agrawal

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Education

Columbia University in the City of New York — New York, NY
Master of Science in Computer Science; CGPA: 3.8/4.0 — *Aug 2019 - May 2021 (expected)*

Indian Institute of Technology Kanpur — Kanpur, India
Bachelor of Technology in Computer Science; CGPA: 8.7/10.0 — *Jul 2013 - Apr 2017*

Experience

Tesla Inc — Palo Alto, USA (remote)
Autopilot Intern (Non Disclosure Agreement) — *Jun 2020 - Aug 2020*

- Worked on identifying and associating same objects visible in multiple cameras to create object tracks across time. Wrote verification scripts for object tracks outlier rejection component

Adobe Inc — Noida, India
Member of Technical Staff (C++, JavaScript Software Developer) — *Jul 2017 - Jan 2019*

- Implemented CRUD operations for highlight/underline/sticky notes for next generation PDF webview using Javascript. Formulated efficient algorithm for modeling an annotation's position across multiple PDF views (with variable structure and content)

Adobe Inc — Bangalore, India
Research Intern (Machine Learning) — *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. **US Patent** US20180232767A1 . **Conference paper** Smart Geo-fencing with Location Sensitive Product Affinity , ACM SIGSPATIAL 17

Projects

- **Fit2Form: 3D Generative Model for Robot Gripper Form Design**: Given an object to be grasped, generate a pair of fingers for parallel jaw gripper that maximize the design objectives (i.e., grasp success, stability, and robustness). Grasp success on unseen test set- general purpose baseline 25.8%, task specific baseline 78%, Fit2Form 88.9%. **First author CoRL 2020 conference paper**. **Arxiv Paper** . **Website** .
- **Automatic Differentiation and Continuous Sensitivity Analysis of Rigid Body Dynamics**: Worked on physics simulator that allows parameter estimation for nonlinear dynamical systems using automatic differentiation. Implemented Adjoint Method for getting fast differentials of integrated ODEs using C++ template metaprogramming. **Arxiv Paper** .
- **3D Style transfer**: from 2D images to 3D meshes for novel view synthesis. Two 3d mesh representations are used: neural-mesh-renderer and deep-voxels which provide a differentiable way to render mesh images from multiple viewpoints. Using these representations, we optimize the original mesh by applying style loss to the generated images. Code , Report .
- **Kaggle Diabetic Retinopathy Classification**: Predicted the severity of an input image given 3K labeled retina images. Used several pre-processing steps (CLAHE, smoothing, blood vessels segmentation) to remove noise and variable lighting conditions using OpenCV. EfficientNet-B2 and TTA gave an optimized kappa score of 0.895 and an overall standing 1311/2943 on leaderboard. Code .
- **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. Code .

Skills

- **Languages**: C++, Python, JavaScript
- **Tools**: PyTorch, Scikit-Learn, Numpy, Pandas, UR5 Robot, (WSG50, RG2, BHand) Grippers, RGB-D Camera

Achievements & Extracirricular

- **US Patent US20180232767A1** Smart Geo-fencing with Location Sensitive Product Affinity
- **Course Assistant Fellowship**, Columbia University: awarded for stellar academic performance and outstanding work as a TA
- Selected for **Advanced Master Research Specialization** at Columbia University offering one fully - funded semester of research
- **All India Rank 191**, IIT-JEE Advanced 2013 (among 150K candidates)
- Course assistantships: Computational Aspects of Robotics , Applied Machine Learning , Advanced Database Systems
- Research assistantships: Shuran Song Columbia University (Sept 2019 - present), Gaurav Sukhatame USC (May 2019 - Aug 2019)
- Received *Academic Excellence Award* for excellent academic performance during 2013-14 curriculum at IIT Kanpur
- Received *Best Rookie Team Award*, 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