Shubham Agrawal

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EDUCATION

Columbia University in the City of New York   New York, NY
Master of Science in Computer Science; Vision, Graphics, Interaction and Robotics track; CGPA: 3.8/4.0   *Aug 2019 - May 2021*

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

EXPERIENCE

Samsung Research America   New York, NY, USA
Senior Researcher, Machine Learning   *March 2023 - Present*
Engineer, Machine Learning Research   *Jun 2021 - March 2023*

- 3D computer vision research: Simultaneous scene understanding and grasp estimation, leveraging foundational visual language models for generalizable scene reconstruction. The research led to multiple publications and patents. (SceneGrasp ⤴ , RIC ⤴)

- Lidar to floorplan: Generated a visually pleasing rectilinear floor plan from a noisy lidar-scan image. (video ⤴). The research technology is now in the production phase for the Samsung Robot Vaccum Cleaner.

- Autonomous table clearing and dishwasher loading - Key components: (a) In-house 6DoF Perception Data collection and labeling tool (video ⤴), (b) instance segmentation, (c) 6DoF pose estimation, (d) glass detection, (e) stereo depth prediction, and (f) sensor fusion

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

- Identify and associate the same objects visible in multiple cameras to create object tracks across time.

Adobe Inc   Noida, India
Member of Technical Staff (C++, JavaScript Software Developer)   *Jul 2017 - Jan 2019*
Research Intern (Machine Learning)   *May 2016 - Aug 2016*

- Implemented CRUD operations for highlight/underline/sticky notes for Adobe PDF Liquid mode ⤴ . Shipped fixes for multiple critical security vulnerabilities (null pointer dereferencing, buffer overflow, JavaScript parameter tampering).

PROJECTS AND PUBLICATIONS

- [2023 IEEE IROS] Real-time Simultaneous Multi-object 3D Shape Reconstruction, 6DoF Pose Estimation and Dense Grasp Prediction: Shubham Agrawal, Nikhil Chavan-Dafle, Isaac Kasahara, Selim Engin, Jinwook Huh, Volkan Isler. , Website ⤴ , Patent award

- [2023 (under review)] RIC: Rotate-Inpaint-Complete for Generalizable Scene Reconstruction: Isaac Kasahara, Shubham Agrawal, Selim Engin, Nikhil Chavan-Dafle, Shuran Song, Volkan Isler. Website ⤴ , Patent award

- [2022 IEEE IROS] SEaT: Scene Editing as Teleoperation: Shubham Agrawal*, Yulong Li*, Jen-Shuo Liu, Steven K. Feiner, Shuran Song. Scene Editing as Teleoperation: A Case Study in 6DoF Kit Assembly. (* = equal contributions). Website ⤴ .

- [2021 PMLR CoRL] Fit2Form - 3D Generative Model for Robot Gripper Form Design: Shubham Agrawal*, Huy Ha*, Shuran Song. Website ⤴ .

- [2022 IEEE IROS] Camera-centric Object Shell Representation for Simultaneous Object Reconstruction and Grasp Prediction: Nikhil Chavan Dafle, Sergiy Popovich, Shubham Agrawal, Daniel Lee, Volkan Isler. arXiv ⤴ , Patent Award

- [2021 IEEE ICRA] AdaGrasp - Gripper Aware Grasping: Zhenjia Xu, Beichun Qi, Shubham Agrawal, Shuran Song. Website ⤴ .

- [2017 ACM SIGSPATIAL] Smart Geo-fencing with Location Sensitive Product Affinity : arXiv ⤴ Patent ⤴

SKILLS

- **Languages | Libraries**: C++, Python, PyTorch, XGBoost, scikit-learn, Ray, ROS, (Isaac Sim, Pybullet, Gazebo) simulators
- **Hardware Experience**: (UR5, Panda, Kinova, Ridgeback) Robots, (WSG50, RG2, BHand) Grippers, RGB-D Cameras, Raspberry Pi

ACHIEVEMENTS & EXTRACURRICULAR

- Course Assistant Fellowship, Columbia University: awarded for stellar academic performance and outstanding work as a TA
- Co-founded TOEFL Infinite ⤴ , an android application for TOEFL and GRE exam preparation with 150K downloads on Google Play
- All India Rank 191, IIT-JEE Advanced 2013 (among 150K candidates)
- Teaching: Computational Aspects of Robotics (Head TA) ⤴ , Applied Machine Learning ⤴ , Advanced Database Systems ⤴
- Research assistantships: Shuran Song Columbia University ⤴ (Sept 2019 - present), Gaurav Sukhatame USC ⤴ (May 2019 - Aug 2019)
- CS Department Senator, University of Southern California
- Ran TCS New York City Marathon 2023. Love music and playing flute in my free time