Arpit Agarwal

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RESEARCH INTEREST	Tactile sensing, robotic manipulation, robotics simulation and robotic control

INDUSTRIAL EXPERIENCE

NVIDIA, Project Isaac   Pittsburgh, Pennsylvania
AI/ Robotics Engineer   Jul 2018 – Aug 2019
- Part of Simulation technology Robotics team, focused on sim-to-real transfer using Reinforcement learning and optimal control
- Focused on developing dynamic control algorithms for legged locomotion and robotic manipulation.
- Contributed to early version of Isaac Gym, tool for accelerating robotic simulation for prototyping robotic algorithms.

Intel, Data Center AI   Santa Clara, California
Rendering Research Internship   May 2023 – Aug 2023
- Part of GPU research group on advanced graphics
- Focused on applying machine learning techniques to physics-based rendering

EDUCATION

Carnegie Mellon University, School of Computer Science   Pittsburgh, Pennsylvania
PhD in Robotics Engineering   2019 – Ongoing
- Focus : Robotic manipulation; tactile sensing; Computer Graphics
- Build simulation pipeline for vision-based tactile sensors using physics-based light transport simulation
- Experience with Mitsuba (0.6, 2.0, 3.0) framework and cuda backend
- Have experience with Nvidia OptiX 7.0 raytracing API
- Have experience in modelling and characterizing appearance models (BRDF) of metal pigments in real world using computational imaging

Carnegie Mellon University, School of Computer Science   Pittsburgh, Pennsylvania
M.S. in Robotics Engineering   Aug 2016 – Jul 2018
- Cumulative GPA: 4.04 / 4.0
- **Masters Thesis**: Deep Reinforcement Learning with Skill Library: Exploring with Temporal Abstractions and coarse approximate Dynamics Models [pdf]
- Courses Taken: Planning, Reinforcement Learning, Computer vision, Machine learning(PhD), KDC.

Indian Institute of Technology Kanpur   Kanpur, India
B.Tech. in Electrical Engineering   Jun 2012 – May 2016

PUBLICATIONS

- Vision-based tactile sensor design using physically based rendering [Under submission]
  Arpit Agarwal[1], Achu Wilson[1], Timothy Man[1], Edward Adelson[3], Ioannis Gkioulekas[1], Wenzhen Yuan[2]
  Affiliations: 1 - Carnegie Mellon University, 2 - UIUC, 3 - MIT

- A Standardized Design Approach for Vision-based Tactile Sensors based on real2sim2real [Under submission]
  Robotics Science and Systems 2024
  Arpit Agarwal[1], Amin Mirzaee[2], and Wenzhen Yuan[2]
  Affiliations: 1 - Carnegie Mellon University, 2 - UIUC

- Scalable, Simulation-Guided Compliant Tactile Finger Design
  International Conference on Soft Robotics 2024
  Yuxiang Ma[3,*], **Arpit Agarwal**[1,*], Sandra Q. Liu[3,*], Wenzhen Yuan[2], Edward Adelson[3]
  Affiliations: 1 - Carnegie Mellon University, 2 - UIUC, 3 - MIT
  - Authors contributed equally

- Robotic Defect Inspection with Visual and Tactile Perception for Large-scale Components [Pre-print]
  International Conference on Intelligent Robots and Systems 2023
  Arpit Agarwal[1], Abhiroop Ajith[2], Chengtao Wen[2], Veniamin Stryzheus[3], Brian Miller[3], Matthew Chen[3], Micah K. Johnson[4], Jose Luis Susa Rincon[2], Justinian Rosca[2] and Wenzhen Yuan
  Affiliations: 1 - Carnegie Mellon University, 2 - Siemens Corporations, 3 - Boeing, 4 - GelSight Inc.

- Simulation of Vision-based Tactile Sensors using Physics based Rendering [IEEE Xplore]
  International Conference on Robotics and Automation 2021
  Arpit Agarwal, Timothy Man and Wenzhen Yuan

- Grasp Stability Prediction with Sim-to-Real Transfer from Tactile Sensing [Pre-print]
  International Conference on Intelligent Robots and Systems 2022
  Zilin Si, Zirui Zhu, **Arpit Agarwal**, Stuart Anderson and Wenzhen Yuan

- Improving Grasp Stability with Rotation Measurement from Tactile Sensing [Pre-print]
  International Conference on Intelligent Robots and Systems 2021
  Raj Kolamuri, Zilin Si, Yufan Zhang, **Arpit Agarwal** and Wenzhen Yuan

- Model Learning for Look-ahead Exploration in Continuous Control [Pre-print]
  AAAI Conference on Artificial Intelligence 2019 **(Oral Presentation)**
  Arpit Agarwal, Katharina Muelling and Katerina Fragkiadaki

- Reinforcement Learning of Active Vision for Manipulating Objects under Occlusions[PDF]
  Conference on Robot Learning, 2018
  Ricson Cheng, **Arpit Agarwal** and Katerina Fragkiadaki

OTHER RESEARCH EXPERIENCE	**Cornell University**

- Graduate Research Scholar, Computer Science Department   May 2015 – Jul 2015
  - **Supervisor**: Ashutosh Saxena, Caspar.ai
  - Learning natural language grounding to robot instructions and user-context aware planning in home settings
  - Focus: Learning, Natural Language Processing, Planning
  - **RaQuel: Robot Query Language**, target robotic language using functional programming contructs for getting information from RoboBrain Demo
  - Focus: Functional programming, cloud robotics, database systems

CONFERENCE REFEREEING
IROS 2018, 2019, Humanoids 2018 and ICRA 2018, 2020, 2021, RAL 2022, 2023

COMPUTING SKILLS
Robots: Kinova **Jaco 2** (7 DoF robotic arm), Ghost Robotics **Minitaur** (4 Legged dynamic UGV), Rethink Robotics **Baxter** (7 DoF manipulator arm)
Deep Learning Frameworks: PyTorch
Computing Languages: C++, Python, ROS, Matlab, OpenCV, PCL
Operating Systems Windows, Linux(Ubuntu)
Utilities Git, LaTeX