MANASI SHARMA

Graduate Student in Computer Science (AI/ML Track) at Stanford University
Areas of Interest: AI, Machine Learning, Reinforcement Learning, Deep Learning, Computer Vision
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EDUCATION

Stanford University, School of Engineering *Sep '21 - Jun '23*
M.S. in Computer Science (AI/ML Track), Current GPA: **3.96/4.00**

Columbia University, Columbia College *Aug '17 - Jun '21*
B.A. Computer Science with concentration in Physics, GPA: **3.81/4.00**

Key Courses: Decision Making under Uncertainty, Interactive Robotics Algorithms, Trustworthy ML, NLP with DL, ML with Graphs, Game Playing, HRI Seminar, DL for CV, Comp. Aspects of Robotics, Data Str. & Algos, Linear Algebra, Prob. & Stats

WORK EXPERIENCE

Alliance Innovation Lab - Silicon Valley (Renault-Nissan-Mitsubishi) *Jun '22 - Sep '22*
Research Intern, Autonomous Systems

- Engineered an end-to-end LiDAR 3D point-cloud classification system in Python & C++ for Nissan Autonomous Vehicles, which achieved >90% accuracy and only ~2% false positive rate on classifying real-world cars, pedestrians, cyclists, etc. *The system is planned for deployment in Nissan Autonomous Vehicles beginning Oct '22.*

Stanford University, School of Engineering *Mar '22 - Jun '22*
Graduate Teaching Assistant for CS231N (Deep Learning for Computer Vision, Prof. Fei-Fei Li)

- Managed weekly 'Discussion Sections' of 75+ students for one of the most popular CS courses at Stanford (>500 students); held office hours, constructed & graded HWs. Received >95% excellent reviews ('Very/Extremely Effective').

Columbia University, Department of Mathematics *Sep '19 - Jun '21*
Undergraduate Teaching Assistant for Calculus III (across 4 semesters)

RESEARCH EXPERIENCE

Stanford University, Stanford Vision Laboratory *Sep '21 - Present*
Research Intern, iGibson Project (Prof. Fei-Fei Li and Prof. Jiajun Wu)

- Led the development of the Knowledgebase for iGibson and BEHAVIOR-1K, an ImageNet-scale robotic simulation benchmark. Paper accepted for CoRL '22.
- Mobilized ~20 crowd-workers to categorize ~5000 "how-to" articles and used zero-shot Natural Language Processing techniques with GPT-3 to generate >97% quality activity definitions in a predicate logic-based language.
- Proposed and designed a 'Modulated Attention Dropout' dataset augmentation technique for Visual Reinforcement Learning using PyTorch that showed a 2% increase on baseline Behavioral Cloning results.

Columbia University, Department of Computer Science and Department of Astronomy *Sep '19 - Jun '21*
Research Intern, Data Science Institute (Prof. Daniel Hsu and Prof. Zoltan Haiman)

- Discovered that 89% of the output of a popular neural network used in Astronomy was counterintuitively attributable to negative image regions (voids, black holes, etc.). Published results in APS Physical Review '20.
- Targeted explainability & trustworthiness of neural networks in the traditional field of Astronomy using Saliency Maps.

California Institute of Technology, Division of Physics, Mathematics and Astronomy *Jun '19 - Aug '19*
Visiting Undergraduate Research Program (VURP) Intern, Palomar Gattini-IR Group (Prof. Mansi Kasliwal)

- Pioneered the development of a flagship image classification system for Caltech's Gattini-IR Telescope using TensorFlow (link) which achieved ~97.5% accuracy on thousands of cosmic transient sources. Published results in PASP '20.
- Deployed the model in the Telescope's data processing pipeline (still active), replacing the manual classification process.

TECHNICAL SKILLS

- Programming Languages: Proficient: Python, Java, JavaScript C++/C, ROS, CUDA, LaTeX; Familiar: Julia, SQL, SQLite
- Frameworks: TensorFlow, Keras, PyTorch, Scikit-Learn, NLTK, PyBullet, MeshLab, NetworkX, PyG, OpenCV
- Tools: Colab/GCP, Jupyter Notebooks, Visual Studio, Git, MySQL (Familiar), Figma

PUBLICATIONS

- C. Li, C. Gokmen…, **M. Sharma**…, "BEHAVIOR-1K: A Benchmark for Embodied AI with 1,000 Everyday Activities and Realistic Simulation" in *Conference on Robot Learning (CoRL)*. [Accepted] *June '22*
- J. Matilla, **M. Sharma**, D. Hsu, Z. Haiman, "Interpreting deep learning models for weak lensing" in *Physical Review D, 102(12)*. https://doi.org/10.1103/physrevd.102.123506 *Dec '20*
- K. De, M.J. Hankins…, **M. Sharma**…, "Palomar Gattini-IR: Survey Overview, Data Processing System, on-Sky Performance and First Results." *Publications of the Astronomical Society of the Pacific, vol. 132.* https://doi.org/10.1088/1538-3873/ab6069 *Feb '20*

GRADUATE COURSE PROJECTS

- **Crowd Aware Intent-based Reinforcement Learning** - CS333 (Algorithms for Interactive Robotics)
  Reduced collision rate in crowd navigation by 50% by leveraging human latent intent reinforcement learning (link).
- **Predicting Drug Interactions with Graph Neural Networks -** CS224W (Machine Learning with Graphs)
  Used the Graph Isomorphism Network to exceed 11th place on ogbl-ddli leaderboard (link, selected for course website).
- **Debiasing Models for Out-of-domain Generalization -** CS224N (NLP for Deep Learning)
  Exceeded BERT's performance on out-of-domain question-answering data by 2.5% by using debiasing models (link).
- **Optimizing Wind Turbine Placement Subject to Turbine Wakes -** CS238 (Decision Making Under Uncertainty)
  Applied Q-Learning to windfarms to generate sensible layouts that maximize power, subject to wake constraints (link).
- **LIMES: LIME for Image Segmentation -** CS329T (Trustworthy Machine Learning)
  Devised a LIME algorithm variant for facial segmentation that achieves explainability like gradient-based methods.
- **Monte-Carlo Tree Search Player -** CS227B (General Game Playing)
  Designed a player to play any game, using MCTS, multi-threating, grounding, etc.; placed 8th in the class (link).

LEADERSHIP ROLES

- Graduate Community Chair, Women in Computer Science, Stanford University *Jun '22 - Present*
- Founder & Project Leader, COVID-19 Public Hub website highlighting Columbia research *Apr '20 - Jun '21*
- Corporate Chair, Women in Computer Science, Columbia University *Apr '20 - Jun '21*
- Class 3 Curriculum Developer (AI section), Girls Who Code, Columbia University *Feb '20 - Aug '20*
- Executive Board UG Student Coordinator, Columbia Society for Women in Physics *Sep '18 - Sep '19*
- Captain, 'Columbia Raas' Dance Team (member since Sep 2017), Columbia University *Apr '20 - Jun '21*

HONORS

- 1 of 18 accepted to the GFSD (Graduate Fellowships for STEM Diversity) Program *Mar '22*
- 1 of 50 accepted into Google's CS Research Mentorship Program (CSRMP), Class of 2022A *Feb '22*
- GEM Fellowship Finalist *Jan '22*
- Dean's List (in 6 out of 7 graded semesters, awarded to top 20%), Columbia University *Fall '17 - Fall '20*
- Columbia Undergraduate Research Fellowship (URF), Columbia College Summer Funding Program *May '20*
- Visiting Undergraduate Research Program (VURP) Award, California Institute of Technology *May '19*
- 1 of 25 awarded Laidlaw Undergraduate Research & Leadership Scholarship, Columbia Univ. *'18 - '19*
- Andy Grove Scholarship for Intel Employees' Children, Intel Foundation *Fall '19*

OTHER

- Languages: Hindi (fluent), Spanish (intermediate)