

Gaurav Jain

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<https://gaurav1302.github.io/>

Research Interests

My thesis focuses on using AI, specifically computer vision and deep learning, to address accessibility problems. I design, develop, and evaluate systems that help blind and low-vision (BLV) people better experience the world around them. My work aims to support new forms of interaction for BLV people when navigating unfamiliar environments and accessing digital media, such as videos.

Research areas:

Human-Computer Interaction, Human-AI Interaction, Accessibility, Computer Vision, Deep Learning

Education

Ph.D. in Computer Science

Columbia University, USA
Advisor: Brian A. Smith

Sep 2020 – May 2025
(expected)

M.S. in Computer Science

Columbia University, USA

Sep 2020 – May 2022

B.S. in Computer Science

Delhi Technological University, India

Aug 2016 – May 2020

Publications

Full Conference and Journal Publications

- [5] **G. Jain**, Y. Teng, D. Cho, Y. Xing, M. Aziz, B. Smith. “*I want to Figure Things Out: Supporting Exploration in Navigation for People with Visual Impairments*” in Proceedings of the ACM on Human-Computer Interaction (CSCW 2023).
- [4] **G. Jain***, S. Chopra*, S. Chopra*, A. S. Parihar. “*SketchFormer: transformer-based approach for sketch recognition using vector images*” in Multimedia Tools and Applications, 2021.
- [3] **G. Jain***, S. Chopra*, S. Chopra*, A. S. Parihar. “*Attention-Net: An Ensemble Sketch Recognition Approach using Vector Images*” in IEEE Transactions on Cognitive and Developmental Systems, 2020.
- [2] **G. Jain***, N. Awasthi*, S. K. Kalva, M. Pramanik, P. K. Yalavarthy. “*Deep Neural-Network Based Sinogram Super-resolution and Bandwidth Enhancement for Limited Data Photoacoustic Tomography*” in IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control, 2020.
- [1] G. S. Walia, **G. Jain**, N. Bansal, K. Singh. “*Adaptive Weighted Graph Approach to Generate Multimodal Cancelable Biometric Templates*” in IEEE Transactions on Information Forensics and Security, 2020.

Workshop Papers, Posters, and Demos

- [2] **G. Jain**, B. Hindi, C. Courtien, C. Wyrick, X. Xu, M. Malcolm, B. Smith. "Towards Accessible Sports Broadcasts for Blind and Low-Vision Viewers" in Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Extended Abstracts (CHI 2023).
- [1] **G. Jain***, S. Chopra*, S. Chopra*, Anil Singh Parihar. "TransSketchNet: Attention-based Sketch Recognition using Transformers" in Proceedings of the 24th European Conference on Artificial Intelligence (ECAI 2020).

*Equal contribution

Research Experience & Internships

Columbia University , New York, US Graduate Research Assistant <i>Led research projects and advised 15+ graduate and undergraduate students.</i>	Sep 2020 – Present
Delhi Technological University , New Delhi, India Undergraduate Research Assistant <i>Designed and implemented a Transformer-based network for sketch recognition.</i>	Jan 2019 – May 2020
Indian Institute of Technology , New Delhi, India Research Intern <i>Developed a scale-invariant deep learning network for breast cancer detection.</i>	Sep 2018 – Feb 2020
Indian Institute of Sciences , Bangalore, India Summer Research Fellow <i>Developed a sinogram super-resolution network for photoacoustic tomography.</i>	May 2019 – Aug 2019
Defense Research & Development Organization , New Delhi, India Research Assistant <i>Designed a graph fusion approach for cancelable multimodal biometric system.</i>	Feb 2018 – Nov 2019

Selected Press

Clearing the Way: Using AI to help blind and low vision users 'see' Columbia University, Columbia Engineering Magazine	2021
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Awards & Recognitions

Gary Marsden Travel Award , ACM SIGCHI <i>Travel support to present paper at CHI 2023 in Hamburg, Germany.</i>	2023
Greenwoods Fellowship , Columbia University <i>Funding to cover tuition fee and research assistant stipend.</i>	2020
Summer Research Fellowship , Indian Academy of Sciences <i>Funding for summer internship at the Indian Institute of Science, Bangalore.</i>	2019

Community & Professional Services

Reviewer for CHI , UIST , CSCW	Since 2021
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Mentor for Women in Science (WISC) Mentoring Program Barnard University <i>Mentored undergraduates to help prepare a roadmap toward their career goals.</i>	2022
Grad Application Mentor for Pre-Submission Application Review Program Columbia University <i>Mentored PhD applicants from underrepresented backgrounds.</i>	2020

Teaching & Mentoring Experience

Teaching Assistant , Columbia University	
COMS W4170: <i>User Interface Design</i>	2021-2023
COMS E6178: <i>Human-Computer Interaction</i>	2020-2023
Research Lead , Columbia University	2020 – Present
Uttam Gurram (<i>M.S. student, Columbia University</i>)	
Aditi Patil (<i>M.S. student, Columbia University</i>)	
Lindsey Weiskopf (<i>M.S. student, Columbia University</i>)	
Arjun Nichani (<i>M.S. student, Columbia University</i>)	
Mingyu Xie (<i>M.S. student, Columbia University</i>)	
Basel Hindi (<i>M.S. student, Columbia University</i>)	
Michael Malcolm (<i>B.S. student, SUNY at Albany</i>)	
Conrad Wyrick (<i>B.S. student, University of Florida</i>)	
Xinyi Xu (<i>B.S. student, Pomona College</i>)	
Connor Courtien (<i>B.S. student, Hunter College</i>)	
Yuanyang Teng (<i>M.S. student, Columbia University</i>)	
David Cho (<i>M.S. student, Columbia University</i>)	
Yunhao Xing (<i>M.S. student, Columbia University</i>)	
Maryam Aziz (<i>B.S. student, University of Connecticut</i>)	
Jessica Peng (<i>B.S. student, Columbia University</i>)	

Skills

Proficient with C, C++, Python (TensorFlow, PyTorch, Keras, OpenCV), MATLAB, LATEX, Linux, ROS, Swift, Unity, Balsamiq, Figma, AWS Mechanical Turk. Familiar with R, Hive, Cloudera, Docker, Blender, Paraview, HTML, CSS, Javascript, Affinity Photo.