

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). [PDF](#)
- [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. [PDF](#)
- [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. [PDF](#)
- [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. [PDF](#)
 *Among Most Popular Articles: Top 10 in March 2020, Top 50 in Sep 2020, Top 30 in Dec 2020, and Top 40 in Feb 2021.*
- [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. [PDF](#)

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). [PDF](#)
- [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). [PDF](#)

*Equal contribution

Research Experience & Internships

Columbia University , New York, USA 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 Coverage

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 (\$500).</i>	2023
Greenwoods Fellowship , Columbia University <i>Funding to cover tuition fee and research assistant stipend (\$15,400).</i>	2020
Research Excellence Award , Delhi Technological University <i>Recognized for publishing research at journals with high impact factor (\$1200).</i>	2020
Summer Research Fellowship , Indian Academy of Sciences <i>Funded summer internship at the Indian Institute of Science, Bangalore.</i>	2019

Community & Professional Services

External Reviewer

ACM CHI	2021-2023
ACM CHI LBW	2021-2023
ACM UIST	2023
ACM CSCW	2022

Women in Science (WISC) Mentoring Program, Barnard University 2022
Mentored undergraduates to help prepare a roadmap toward their career goals.

Pre-Submission Application Review Program, Columbia University 2020
Advised PhD applicants from underrepresented backgrounds.

Teaching & Mentoring Experience

Teaching Assistant, Columbia University
COMS W4170: *User Interface Design* Fall 2021/22
COMS E6178: *Human-Computer Interaction (Research Seminar)* Spring 2021/22/23

Research Lead, Columbia University 2020 – Present
Uttam Gurram (*M.S. student, Columbia University*)
Aditi Patil (*M.S. student, Columbia University*)
Lindsey Weiskopf (*M.S. student, Columbia University*)
Arjun Nichani (*M.S. student, Columbia University*)
Mingyu Xie (*M.S. student, Columbia University*)
Basel Hindi (*M.S. student, Columbia University*)
Michael Malcolm (*B.S. student, SUNY at Albany*)
Conrad Wyrick (*B.S. student, University of Florida*)
Xinyi Xu (*B.S. student, Pomona College*)
Connor Courtien (*B.S. student, Hunter College*)
Yuanyang Teng (*M.S. student, Columbia University*)
David Cho (*M.S. student, Columbia University*)
Yunhao Xing (*M.S. student, Columbia University*)
Maryam Aziz (*B.S. student, University of Connecticut*)
Jessica Peng (*B.S. student, Columbia University*)

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.