Gaurav Jain

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Research Interests

Leveraging AI for Accessibility. My thesis focuses on using AI, specifically computer vision and deep learning, to address accessibility problems. To this end, 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

Sep 2020–May 2025 (*expected*)	**Columbia University**, New York, US Ph.D. in Computer Science | *Specialization*: Human-Computer Interaction *Advisor*: Prof. Brian A. Smith
Sep 2020–May 2022	**Columbia University**, New York, US MS in Computer Science | GPA: 4.06/4.00
Aug 2016–May 2020	**Delhi Technological University**, New Delhi, India B.Tech in Computer Science | GPA: 9.38/10.0

Selected Publications

2023	**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, CHI 2023 Extended Abstracts. PDF
2023	**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
2020	**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
2020	N. Awasthi*, **G. Jain***, 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 | Code
2020	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

**Indicates Equal Contribution*

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.

Research Experience

2020–	**Columbia University**, New York, NY *Graduate Research Assistant*, Computer-Enabled Abilities Lab (CEAL) • Design, develop, and evaluate systems that leverage AI and computer vision for solving accessibility problems to help blind and low-vision people better experience the world. *Frameworks*: Python (TensorFlow, PyTorch, OpenCV), Grounded theory, ROS, Swift, Unity
2019–20	**Delhi Technological University**, New Delhi, India *Undergraduate Research Assistant*, Machine Learning Research Lab • Design and implement a transformer-based deep neural network architecture for sketch recognition. *Frameworks*: Python (TensorFlow)
2018–20	**Indian Institute of Technology (IIT)**, New Delhi, India *Research Intern*, School of Information Technology • Develop a deep learning-based breast cancer detection model for scale-invariant detection of masses and calcifications. Supported by All India Institute of Medical Sciences (AIIMS). *Frameworks*: Python (TensorFlow), MATLAB
2019	**Indian Institute of Science (IISc)**, Bangalore, India *Summer Research Fellow*, Department of Computational and Data Sciences • Develop a deep learning-based approach for sinogram super-resolution and bandwidth enhancement for limited data photoacoustic tomography. *Frameworks*: Python (PyTorch), MATLAB (k-Wave Toolbox)
2018–19	**Defense Research & Development Organisation (DRDO)**, New Delhi, India *Research Assistant*, Scientific Analysis Group • Designed a graph based fusion approach for a multimodal biometric system that fuses fingerprint, face and iris scans in a highly secure and cancelable manner. *Frameworks*: MATLAB

Awards & Honors

2023	**Gary Marsden Travel Award**, *ACM SIGCHI* Received travel support to present my paper at CHI 2023 in Hamburg, Germany (details).
2020	**Greenwoods Fellowship**, *Computer Science Department, Columbia University* Received funding to cover tuition fee and research assistant stipend for fall 2020 (details).
2019	**Summer Research Fellowship**, *Indian Academy of Sciences* Received funding for a summer research internship at the Indian Institute of Science Bangalore (details).

Teaching & Mentoring Experience

2021–Present	**Teaching Assistant**, Columbia University • COMS W4170: **User Interface Design** (Fall 2021, Fall 2022) • COMS E6178: **Human-Computer Interaction** (Spring 2021, Spring 2022, Spring 2023)
2020–Present	**Project Lead**, Columbia University • Mentored 15+ undergraduate and graduate students across several projects as the lead researcher.

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Coummunity & Professional Services

2021–Present	**Peer Reviewer for Academic Conferences** • ACM CHI 2022, 2023 • ACM CHI Late-Breaking Work (LBW) 2022, 2023
2022	**Women in Science (WISC) Undergraduate Mentoring Program**, Barnard University *Mentor, Semester-wise career mentorship for undergraduates* • Mentored undergraduates to help prepare a roadmap toward their career goals.
2020	**Grad Application Mentor**, Department of Computer Science, Columbia University *Volunteer, Pre-Submission Application Review Program (2020)* • Reviewed PhD application materials and offered advice to students from underrepresented backgrounds and low access to research mentoring.

References

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