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	Sep 2020 – May 2025
Columbia University, USA	(expected)
Advisor: Brian A. Smith	

M.S. in Computer Science	Sep 2020 – May 2022
Columbia University, USA	

B.S. in Computer Science	Aug 2016 – May 2020
Delhi Technological University, India	

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   Sep 2020 – Present
Graduate Research Assistant
Led research projects and advised 15+ graduate and undergraduate students.

Delhi Technological University, New Delhi, India   Jan 2019 – May 2020
Undergraduate Research Assistant
Designed and implemented a Transformer-based network for sketch recognition.

Indian Institute of Technology, New Delhi, India   Sep 2018 – Feb 2020
Research Intern
Developed a scale-invariant deep learning network for breast cancer detection.

Indian Institute of Sciences, Bangalore, India   May 2019 – Aug 2019
Summer Research Fellow
Developed a sinogram super-resolution network for photoacoustic tomography.

Defense Research & Development Organization, New Delhi, India   Feb 2018 – Nov 2019
Research Assistant
Designed a graph fusion approach for cancelable multimodal biometric system.

Selected Press

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

Awards & Recognitions

Gary Marsden Travel Award, ACM SIGCHI   2023
Travel support to present paper at CHI 2023 in Hamburg, Germany.

Greenwoods Fellowship, Columbia University   2020
Funding to cover tuition fee and research assistant stipend.

Summer Research Fellowship, Indian Academy of Sciences   2019
Funding for summer internship at the Indian Institute of Science, Bangalore.

Community & Professional Services

Reviewer for **CHI, UIST, CSCW**   Since 2021

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

Grad Application Mentor for **Pre-Submission Application Review Program**   2020
Columbia University
Mentored PhD applicants from underrepresented backgrounds.

Teaching & Mentoring Experience

Teaching Assistant, Columbia University
COMS W4170: *User Interface Design*   2021-2023
COMS E6178: *Human-Computer Interaction*   2020-2023

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.