Gaurav Jain

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Research Interests

Leveraging AI for Accessibility: Human-computer interaction (HCI), computer vision, accessibility, deep learning

Education

2020–Present	**Columbia University, Graduate School of Arts and Sciences**, New York, NY **Ph.D.** in Computer Science | GPA: 4.06/4.00 Specialization: Human-Computer Interaction Advisor: Dr. Brian A. Smith *Featured Coursework*: User Interface Design, Human-Computer Interaction, Computational Aspects of Robotics, Representation Learning
2016–2020	**Delhi Technological University**, New Delhi, India **B.Tech** in Computer Science | GPA: 9.38/10.0 *Featured Coursework*: Computer Vision, Soft Computing, Machine Learning, Artificial Intelligence, Digital Image Processing, Swarm Intelligence, Distributed Systems.

Skills

Proficient with C, C++, Python (TensorFlow, PyTorch, Keras, OpenCV), MATLAB, LaTeX, Linux, ROS, Swift, Unity, Balsamiq, Figma. *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) • Beyond Guidance: A qualitative study to investigate how navigation assistance systems should support exploration in navigation for people who are blind and visually impaired. *Techniques*: Grounded theory, Open coding, Critical incident technique • Map-A11y: A wearable camera system for blind and low vision people to create personalised maps of indoor spaces and navigate independently using a smartphone application. *Frameworks*: Robot Operating System (ROS), Swift, Unity, Python • Sports Accessibility from Pixels: Enhancing gameplay understanding of tennis for blind and low vision viewers using computer vision-based gameplay recognition and immersive audio design. *Frameworks*: Python (Tensorflow, PyTorch, OpenCV), Unity
2020	**Université Clermont Auvergne**, Clermont-Ferrand, France *Summer Research Intern*, Endoscopy and Computer Vision (EnCoV) • Patient-specific organ tracking in laparoscopic images by deep learning ([GitHub](#)). *Frameworks*: Blender, Gmsh, Elmer, Paraview, Python (PyTorch)
2019–20	**Delhi Technological University**, New Delhi, India *Undergraduate Research Assistant*, Machine Learning Research Lab • Designed and implemented a Transformer-based deep neural network architecture for sketch recognition. Published paper at ECAI 2020 ([Paper](#)), and IEEE Trans. CDS ([Paper](#)). *Frameworks*: Python (TensorFlow)

2018–20	**Indian Institute of Technology (IIT)**, New Delhi, India
	Research Intern, School of Information Technology
	• Developed 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
	• Deep Neural-Network Based Sinogram Super-resolution and Bandwidth Enhancement for Limited Data Photoacoustic Tomography. Paper published in IEEE Transactions (Paper).
	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. Paper published in IEEE Transactions (Paper).
	Frameworks: MATLAB

Selected Publications

2023	**Gaurav Jain**, Basel Hindi, Connor Courtien, Conrad Wyrick, Xin Yi Therese Xu, Michael Malcolm, Brian A. Smith. "*Sports Accessibility from Pixels: Enhancing Tennis Gameplay Understanding of Blind and Low Vision Viewers*" Under Review at Proceedings of the SIGCHI Conference on Human Factors in Computing Systems 2023 (CHI 2023)

2023	**Gaurav Jain**, Yuanyang Teng, David Cho, Yunhao Xing, Maryam Aziz, Brian A. Smith. "*I want to Figure Things Out: Supporting Exploration in Navigation for People with Visual Impairments*" (to appear) Published in Proceedings of the ACM on Human-Computer Interaction (CSCW 2023)
	PDF

2020	**Gaurav Jain***, Shivang Chopra*, Suransh Chopra*, Anil Singh Parihar. "*Attention-Net: An Ensemble Sketch Recognition Approach using Vector Images*" Published in IEEE Transactions on Cognitive and Developmental Systems, 2020.
	PDF ● DOI

2020	Navchetan Awasthi*, **Gaurav Jain***, S. K. Kalva, Manojit Pramanik, Phaneendra K. Yalavarthy. "*Deep Neural-Network Based Sinogram Super-resolution and Bandwidth Enhancement for Limited Data Photoacoustic Tomography*" Published in IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control (Special issue on Deep Learning in Medical Ultrasound), 2020.
	PDF ● DOI ● CODE

2019	Gurjit Singh Walia, **Gaurav Jain**, Nipun Bansal, Kuldeep Singh. "*Adaptive Weighted Graph Approach to Generate Multimodal Cancelable Biometric Templates*" Published in IEEE Transactions on Information Forensics and Security, vol. 15, pp. 1945-1958, 2020.
	PDF ● DOI

* *Indicates Equal Contribution*

Awards & Honors

2020	**Greenwoods Fellowship**, *Department of Computer Science, Columbia University*
	Received funding of $15,400 +$ tuition fee for the fall semester (2020).

2019	**Summer Research Fellowship**, *Indian Academy of Sciences, Govt. of India*
	Received funding for summer research internship at the Indian Institute of Science, Bangalore.

Teaching Experience

2021–Present **Teaching Assistant**, Columbia University
Graduate Level Courses:
- COMS W4170: User Interface Design (Fall 2021, Fall 2022)
  Instructor: Prof. Brian A. Smith

- COMS E6178: Human-Computer Interaction (Spring 2021, Spring 2022)
  Instructor: Prof. Brian A. Smith

Coummunity & Professional Services

2021–Present **Peer Reviewer for Academic Conferences**
- ACM CHI 2022

2022 **Women in Science (WISC) Undergraduate Mentoring Program**, Barnard University
Mentor, Semester-wise career mentorship for undergraduates
- Mentored two undergraduates to help orient them towards their career goals.

2020 **Grad Application Mentor**, Department of Computer Science, Columbia University
Volunteer, Pre-Submission Application Review Program (2020)
- Reviewed PhD application material for students with less access to research mentoring.

References

Brian A. Smith
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