

Gaurav Jain

gaurav@cs.columbia.edu • <https://gaurav1302.github.io/> • +1 (332) 217-9124

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
<i>Featured Coursework:</i> 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
<i>Featured Coursework:</i> Computer Vision, Soft Computing, Machine Learning, Artificial Intelligence, Digital Image Processing, Swarm Intelligence, Distributed Systems. |

Selected Publications

- | | |
|------|--|
| 2023 | Gaurav Jain , Basel Hindi, Connor Courtien, Conrad Wyrick, Xin Yi Therese Xu, Michael Malcolm, Brian A. Smith. “ <i>Sports Accessibility from Pixels: Enhancing Tennis Gameplay Understanding of Blind and Low Vision Viewers</i> ” Under Review at Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (under review at CHI 2023) |
| 2023 | Gaurav Jain , Yuanyang Teng, David Cho, Yunhao Xing, Maryam Aziz, Brian A. Smith. “ <i>I want to Figure Things Out: Supporting Exploration in Navigation for People with Visual Impairments</i> ” Published in Proceedings of the ACM on Human-Computer Interaction (CSCW 2023)
PDF (preprint) |
| 2020 | Gaurav Jain* , Shivang Chopra*, Suransh Chopra*, Anil Singh Parihar. “ <i>Attention-Net: An Ensemble Sketch Recognition Approach using Vector Images</i> ” 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. “ <i>Deep Neural-Network Based Sinogram Super-resolution and Bandwidth Enhancement for Limited Data Photoacoustic Tomography</i> ” 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. “ <i>Adaptive Weighted Graph Approach to Generate Multimodal Cancelable Biometric Templates</i> ” Published in IEEE Transactions on Information Forensics and Security, vol. 15, pp. 1945-1958, 2020.
PDF • DOI |

* Indicates Equal Contribution

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

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

Community & Professional Services

- 2021–Present **Peer Reviewer for Academic Conferences**
- ACM CHI 2022
 - ACM CHI 2023
- 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

Assistant Professor,
Computer Science
Columbia University
brian@cs.columbia.edu

Gurjit Singh Walia

Senior Scientist,
Defense Research & Development
Organization (DRDO)
gurjit.walia@gmail.com

Phaneendra K. Yalavarthy

Associate Professor,
Computational & Data Sciences
Indian Institute of Science
yalavarthy@iisc.ac.in

Anil Singh Parihar

Associate Professor,
Computer Science
Delhi Technological University
anil@dtu.ac.in