

Gaurav Jain

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Research Interests

AI for people: 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.

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. ([Paper](#); [under review at CSCW 2022](#)).
Techniques: Grounded theory, Open coding, Critical incident technique
 - **Map-A11y:** A wearable camera system for blind and visually impaired people to create personalised maps of indoor spaces and navigate independently. ([GitHub](#)).
Frameworks: Robot Operating System (ROS), Swift, Unity, Python
 - **Sports Accessibility from Pixels:** Enhancing gameplay understanding of tennis for blind and visually impaired people using an immersive audio design. ([GitHub](#)).
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
- 2018 **National University of Singapore (NUS)**, Singapore
Academic Intern (Summer), School of Computing
- Training program on Artificial Neural Networks & Big Data Analytics. Batch Topper of the Quiz & Project Presentation.
Frameworks: Python, R, Hadoop, Cloudera, Hive

Publications

- 2022 **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*” Under Review at ACM Conference On Computer-Supported Cooperative Work And Social Computing (CSCW 2022).
[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 **Gaurav Jain***, Shivang Chopra*, Suransh Chopra*, Anil Singh Parihar. “*TransSketchNet: attention-based Sketch Recognition using Transformers*” (Highlight Paper) To appear at 24th European Conference on Artificial Intelligence, ECAI 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.

2016 **Joint Entrance Examination (JEE MAIN'16)**, *Central Board of Secondary Education*
All India Rank 3366 among approx 1.5 million candidates.

Teaching Experience

- 2021–Present **Teaching Assistant**, Columbia University
Graduate Level Courses:
- COMS E6178: Human-Computer Interaction (Spring 2022)
Instructor: Prof. Brian A. Smith
 - COMS W4170: User Interface Design (Fall 2021)
Instructor: Prof. Brian A. Smith
★ **Head Teaching Assistant** ★
 - COMS E6998: Human-Computer Interaction (Spring 2021)
Instructor: Prof. Brian A. Smith

Leadership & Professional Services

- 2021–Present **Peer Reviewer for Academic Conferences**
- ACM CHI 2022
- 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.
- 2017–2020 **Optima, Machine Learning Society**, Delhi Technological University
President (2019–20)
- Organized peer-taught lessons, delivered lectures, and moderated online discussions.

Mentoring & Advising

- 2021–Present **Research Project Students**, Columbia University
- David Cho (M.S.; Spring 2021 – Summer 2021)
 - Yuanyang Teng (M.S.; Spring 2021 – Summer 2021)
 - Jessica Peng (B.S.; Spring 2021)
 - Yunhao Xing (M.S.; Spring 2021)
 - Maryam Aziz (B.S.; Summer 2021; Visiting research intern)
- 2021–Present **Career and Professional Advising**
- Dipti Lohia (B.S.; Fall 2020; Next stop: M.S. in CS at University of Massachusetts)
 - Shivang Chopra (B.S.; Fall 2021; Next stop: M.S. in CS at Georgia Institute of Technology)
 - David Cho (M.S.; Fall 2021)
- 2022 **Women in Science (WISC) Undergraduate Mentoring Program**, Barnard University
- Elaine Su (Sophomore - B.S. in CS and Psychology; Spring 2022)
 - Man Huang Ho (Junior - B.S. in CS; Spring 2022)

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.

References

Brian A. Smith

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Computer Science
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Gurjit Singh Walia

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Defense Research & Development
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Computational & Data Sciences
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