Bindita Chaudhuri

bindita91@gmail.com • https://bindita.github.io

Areas of Interest

Computer Vision (Generative AI), Computer Graphics (3D humans, 3D perception), Deep Learning

Work Experience

Research Scientist, Meta (Reality Labs) **July 2021 - present**

- ***Generative AI***
  - Developed an image-to-video synthesis method by encoding videos with 3D-VQGAN and using masked generative transformers to predict the tokens for future frames conditioned on image tokens.
  - Exploring a text-to-video synthesis approach guided by depth maps for temporally consistent long-form videos.
- ***3D Humans***
  - *Mentoring a Research Intern* on a project involving text/speech driven 3D human prediction for embodied AI. Learning a NeRF to reconstruct 3D humans conditioned on 3D body motion predicted from text/speech.
- ***3D Faces***
  - Designed a novel multimodal coarse-to-fine approach to detailed 4D face geometry reconstruction from in-the-wild videos for AR/VR applications by leveraging both audio and visual information.
  - Developed a network consisting of a memory module and a generative adversarial module to accumulate spatio-temporal information from in-the-wild videos for dynamic face texture completion free from self-occlusions.
  - Created a differentiable neural renderer based loss for real-time speech-driven 3D facial animation in order to handle various emotions and non-speech vocalizations.
  - Improved texture recovery from synthetic face accessories using a StyleGAN based encoder-decoder architecture.

Research Intern, Facebook Reality Labs Research **June - Nov, 2020**

- Designed a novel region-adaptive variational autoencoder to synthesize photorealistic editable texture maps for 3D humans for virtual try-on applications [CVPR paper].
- Added independent geometry and texture controllability feature for semi-supervised 3D human data generation to overcome the issue of limited 3D textured human data availability.

Researcher (part-time), Microsoft Cloud&AI **Jan 2019–May 2020**

High-fidelity personalized face avatar generation and stabilized face tracking for in-the-wild videos [ECCV paper].

Research Intern, Microsoft Research **Mar - Sep, 2018**

- Researched and developed a novel *real-time* multi-task learning framework for joint 2D face detection and 3D facial motion retargeting of multiple faces as a step towards immersive virtual communication [CVPR paper].
- Developed model was deployed in the **Puppets** feature of **SwiftKey** for Android phone users [media].

Graduate Technical Intern, Intel Labs **June - Sep, 2017**

Proposed a spatial transformer based deep neural network for optical flow prediction and image super-resolution for frame interpolation/view synthesis from HD multi-camera array images. U.S. patent granted.

Education

Ph.D., Computer Science, University of Washington **2016–2021**

- *Thesis*: Deep Facial Expression Modeling and 3D Motion Retargeting from 2D Images

M.Tech., Electrical Engineering, Indian Institute of Technology Bombay **2014–2016**

- *Thesis*: Region-based Retrieval of Remote Sensing Images using Graph-Theoretic Approaches

B.E., Electronics and Telecommunication Engineering, Jadavpur University **2010–2014**

- *Thesis*: Low Cost Low Bandwidth Virtual Education Platform Design for Underserved People (SIGHT, IEEE)

Publications

Conference Proceedings

1. **Semi-supervised Synthesis of High-Resolution Editable Textures for 3D Humans**
Bindita Chaudhuri, Nikolaos Sarafianos, Linda Shapiro, Tony Tung
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2021 [webpage]

2. **Personalized Face Modeling for Improved Face Reconstruction and Motion Retargeting**
Bindita Chaudhuri, Noranart Vesdapunt, Linda Shapiro, Baoyuan Wang
IEEE European Conference on Computer Vision (ECCV), 2020 [**Spotlight**] [webpage]

3. **Joint Face Detection and Facial Motion Retargeting for Multiple Faces**
Bindita Chaudhuri, Noranart Vesdapunt, Baoyuan Wang
IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019 [webpage]

4. **GestureCalc: An Eyes-Free Calculator for Touch Screens**
Bindita Chaudhuri, Leah Perlmutter*, Justin Petelka, Philip Garrison, James Fogarty, Jacob O. Wobbrock, Richard E. Ladner (*equal contribution)*
ACM SIGACCESS Conference on Computers & Accessibility (ASSETS), 2019 [pdf] [code/app demo]

5. **Learning to Generate 3D Stylized Character Expressions from Humans**
Deepali Aneja, Bindita Chaudhuri, Alex Colburn, Gary Faigin, Linda Shapiro, Barbara Mones
IEEE Winter Conference on Applications of Computer Vision (WACV), 2018 [webpage]

Journal Articles and Patents

6. **Multi-Label Remote Sensing Image Retrieval using a Semi-Supervised Graph-Theoretic Method**
Bindita Chaudhuri, Begüm Demir, Subhasis Chaudhuri, Lorenzo Bruzzone
IEEE Transactions on Geoscience and Remote Sensing, vol. 56, no. 2, pp. 1144-1158, Feb 2018 [webpage] [pdf]

7. **Region-Based Retrieval of Remote Sensing Images using an Unsupervised Graph-Theoretic Approach**
Bindita Chaudhuri, Begüm Demir, Lorenzo Bruzzone, Subhasis Chaudhuri
IEEE Geoscience and Remote Sensing Letters, vol. 13, no. 7, pp. 987-991, July 2016 [pdf]

8. **View interpolation of multi-camera array images with flow estimation and image super resolution using deep learning**
Bindita Chaudhuri, Fan Zhang, Oscar Nestares
US Patent 10,547,823, 2020 [pdf]

Technical skills

- *Languages*: Python, C/C++, Swift
- *Frameworks*: Pytorch, Tensorflow, Hugging Face

Academic Projects

- Local collision avoidance using laser sensor data for a nano-drone
- Video reconstruction from compression, stabilization and real-time tracking of non-rigid objects
- Study of electromagnetic radiation effects at various locations in Kolkata [The Times of India article]

Honors and Awards

- *People's Choice Award*, UW Research Day (link)
- *University Gold Medal & 7 others*, JU (details)
- *Department Academic Excellence Award*, IIT Bombay
- *The Supriya Basu Scholarship & 2 others*, JU (details)

Academic Activities

- *Reviewer* (Publons profile) of ACM TOG, SIGGRAPH Asia, CVPRW, IEEE VR, ICLRW etc.
- *Teaching Assistant*, UW (CSE) and IIT Bombay (EE)
- *Area Chair (student)*, UW CSE Graduate Admissions Committee, 2020