

Bipasha Sen

+91 8108980291 | bipasha.sen@research.iiit.ac.in | <https://bipashasen.github.io/>

Education

Massachusetts Institute of Technology

Sep '23 - Present

Ph.D. in EECS (CSAIL)

Ida M. Green Fellowship

International Institute of Information Technology, Hyderabad

Aug '21 - Mar 2023

Masters by Research (Center for Visual Information Technology, Robotics Research Center)

10.0/10.0

- **Selected Courses:** CS7.503 Mobile Robotics (Depth), MA8.401 Topics in Applied Optimization (Depth), CS7.504 - Differential Privacy, Group and Individual Fairness (Depth)
- **Thesis:** Improved Representation Spaces for Videos

K.C.College of Engineering, University of Mumbai

Jul 2012 - Jun 2016

B.E. in Computer Engineering

8.13/10.0, Distinction

- **Best Outgoing Student award by the Dean**
Based on outstanding senior year research, academic contributions, and representing the school at national venues.
One out of 620 graduating students

Research Experience

Massachusetts Institute of Technology

Graduate Research Assitant

Sep 2023 - Present

[advised by **Prof. Pulkit Agrawal**]

Mila / Université de Montréal

Visiting Research Student - Robotics and Embodied AI Lab (REAL) Center

May 2023 - Sep 2023

[advised by **Prof. Liam Paull** and **Prof. Florian Shkurti**]

International Institute of Information Technology - Hyderabad

Research Fellow - Robotics Research Center

Nov 2021 - Present

[advised by **Prof. Madhav Krishna** and **Prof. Srinath Sridhar**]

- Leading a team of 4 undergraduate researchers and solving table-top rearrangement and planning challenges such as 3D generalization (NeurIPS 2023), rotation invariant shape-completion (ICRA 2023), and RL based manipulation (CASE 2023).

Research Fellow - Center for Visual Information Technology

Feb 2021 - Mar 2023

[advised by **Prof. CV Jawahar** and **Prof. Vinay Namboodiri**]

- Working on diverse topics such as few-shot domain adaption (BMVC 2022), video-to-video face-swapping (WACV 2023), user-study for lipreading training platforms (WACV 2023), representation space for video-based generative tasks using hypernetworks and implicit neural representations (TMLR 2022), and ethical generative modeling.

Microsoft, India

Jul 2016 - Feb 2021

Research Scientist 2 - MSAI (Microsoft's Search and Assisted Intelligence) - Outlook Platform

- Lead a team of 2 data scientists and 1 data science intern to work on Outlook's document recommendation pipeline.
 - **Inline Suggested Attachments**
 - * Built a high-precision classification model for suggesting of potential document as attachments to a half-composed email. Correct suggestions generated by our pipeline reduced the number of clicks to attach a file by 25%.
 - **Meeting Insights Relevance**
 - * Built a high-recall classification model for the recommendation of relevant email and documents to meetings with a 34% improvement over the existing pipeline.
- Worked on several other diverse topics such as (1) Named entity recognition in emails, (2) Detecting trips and loops in hotel/cab/train/airplane through 3rd-party booking emails, (3) Bing Instant Answers experience for Game of Thrones (GOT) season 7, (4) News recommendation, (5) Natural language photo retrieval, and (6) Meeting Summarization on Teams.

International Institute of Information Technology - Hyderabad

Oct 2019 - Jul 2020

Visiting Researcher - Speech and Vision lab, LTRC

[advised by **Prof. Anil Kumar Vuppala**]

Microsoft, India

Dec 2015 - Feb 2016

Research Scientist - Intern (Search Technology Center India)

- **Conversational Shopping Assistant Bot**
 - Built a conversational bot tasked for proactively engaging the users and assisting them in placing an order.
 - *Project demoed to David Ku (former CVP and CTO of Microsoft AI+R).*

Peer-Reviewed Publications and Patents

*Equal contribution / **Highlighted Papers**

1. **ConceptGraphs: Open-Vocabulary 3D Scene Graphs for Perception and Planning**
Qiao Gu*, Ali Kuwajerwala*, Sacha Morin*, Krishna Murthy Jatavallabhula*, **Bipasha Sen**, Aditya Agarwal, Kirsty Ellis, Celso Miguel de Melo, Corban Rivera, William Paul, Rama Chellappa, Chuang Gan, Joshua B. Tenenbaum, Antonio Torralba, Florian Shkurti, Liam Paull
Under Review at ICRA 2024
2. **EDMP: Ensemble-of-costs-guided Diffusion for Motion Planning**, [[preprint](#)]
Kallol Shah*, Vishal Mandadi*, Jayaram Reddy*, Ajit Srikanth, Aditya Agarwal, **Bipasha Sen (in advising capacity)**, Arun Singh, K. Madhava Krishna
Under Review at ICRA 2024
3. **HyP-NeRF: Learning Improved NeRF Priors using a HyperNetwork**, [[preprint](#)]
Bipasha Sen*, Gaurav Singh*, Aditya Agarwal*, Rohith Agaram, K. Madhava Krishna, Srinath Sridhar
Neural Information Processing Systems (NeurIPS), 2023
4. **Disentangling Planning and Control for Non-prehensile Tabletop Manipulation**
Vishal Mandadi, Kallol Saha, Dipanwita Guhathakurta, Mohammad Nomaan Qureshi, Aditya Agarwal, **Bipasha Sen (in advising capacity)**, Dipanjan Das, Brojeshwar Bhowmick, Arun Kumar Singh, Madhava Krishna
International Conference on Automation Science and Engineering (CASE), 2023
5. **Uncovering hidden biases against Indian independent artists in the perception of music quality by Indian Audience**
Bipasha Sen*, Aditya Agarwal*, Vinoo Alluri
International Conference on Music Perception and Cognition (ICMPC), 2023
6. **SCARP: 3D Shape Completion in ARbitrary Poses for Improved Grasping**, [[project page](#)]
Bipasha Sen*, Aditya Agarwal*, Gaurav Singh*, Srinath Sridhar, K. Madhava Krishna
International Conference on Robotics and Automation (ICRA), 2023
Robot Representations For Scene Understanding, Reasoning and Planning Workshop (RSS-W), 2023
7. **INR-V: A Continuous Representation Space for Video-based Generative Tasks**, [[project page](#)]
Bipasha Sen*, Aditya Agarwal*, Vinay Namboodiri, C V Jawahar
Transactions on Machine Learning Research (TMLR), 2022
8. **Towards MOOCs for Lip Reading: Using Synthetic Talking Heads to Train Humans in Lipreading at Scale**
Aditya Agarwal*, **Bipasha Sen***, Rudrabha Mukhopadhyay, Vinay Namboodiri, C V Jawahar
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2023
9. **FaceOff: A video-to-video face swapping system**, [[project page](#)]
Aditya Agarwal*, **Bipasha Sen***, Rudrabha Mukhopadhyay, Vinay Namboodiri, C V Jawahar
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2023
10. **Approaches and Challenges in Robotic Perception for Table-top Rearrangement and Planning**, [[paper](#)]
Aditya Agarwal*, **Bipasha Sen***, Shankara Narayanan*, Vishal Mandadi*, Brojeshwar Bhowmick, K Madhava Krishna
Arxiv, 2022
11. **Personalized One-Shot Lipreading for an ALS Patient**, [[paper](#)]
Bipasha Sen*, Aditya Agarwal*, Rudrabha Mukhopadhyay, Vinay Namboodiri, C V Jawahar
British Machine Vision Conference (BMVC), 2021
12. **SYSTEM AND METHOD FOR AUTOMATICALLY GENERATING SYNTHETIC HEAD VIDEOS USING A MACHINE LEARNING MODEL**
C V Jawahar, Aditya Agarwal, **Bipasha Sen**, Rudrabha Mukhopadhyay, Vinay Namboodiri
US Patent App. 18/120,375, 2023
13. **Reed: An Approach Towards Quickly Bootstrapping Multilingual Acoustic Models**, [[paper](#)]
Bipasha Sen*, Aditya Agarwal*, Mirishkar Sai Ganesh, Anil Kumar Vuppala
Spoken Language Technology (SLT), 2021
14. **An Approach Towards Action Recognition using Part Based Hierarchical Fusion**, [[paper](#)]
Aditya Agarwal*, **Bipasha Sen***
International Symposium on Visual Computing (ISVC), 2020

15. **AiGraph for Meeting Insights Relevance**, [[short-paper](#)]
Bipasha Sen, Prakash Pandey, Rajeev Gupta, Vipin Vangala
Microsoft Machine Learning & Data Sciences Conference Synapse (MLADS Synapse), 2020

Awards and Achievements

- Awarded a travel grant of YEN 30000 by ICMPC7-APSCOM17 June 2023
- Awarded a travel grant of \$2250 by ICRA RAS for ICRA 2023 March 2023
- Awarded a travel grant of \$500 by VUB to act as a Social Media Ambassador for ICRA 2023 January 2023
- Awarded a travel grant of \$2000 by Microsoft Research for WACV 2023 September 2022
- Prize money of \$1000 (to the team) - 3rd in ICRA 2022's Robotic Manipulation Competitions May 2022
- Spot award for 'Innovation and Impact' by Microsoft MSAI. January 2021
- Awarded Dean's Best Outgoing Undergraduate Student (One out of 620 graduating students) March 2016
- Awarded Dean's Best Entrepreneur (founder of TheBhaad that hosted 5000+ users) March 2015
(Undergrad, 50+ nominees)

Additional Talks and Wins

- Official "Social Media Ambassador" for RAS-ICRA 2023! May 2023
- Presenting "INR-V: A Continuous Representation Space for Video-based Generative Tasks" at Vision India, Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP) Dec 2022
- Taking a session on "Computer vision challenges in robotic table-top rearrangement and planning" at 6th Summer School on AI with a focus on Computer Vision & Machine Learning [[talk recording](#)] Aug 2022
- Taking a session at MLADS (internal Microsoft conference) 2020 on Quick Bootstrapping of Multilingual Models and AiGraph July 2020
- 3rd in Microsoft One Week Hackathon - Mobile Endpoint (3k+ participants) Aug 2016
- 126th in TCS CodeVita '15 Round 2 (19800+ participants) Feb 2016

Academic Contributions

- Teaching Assistant for CS7.503 Mobile Robotics (course taught by Prof. K. Madhav Krishna) Aug. - Nov. 2022
- Coordinator for **6th Summer School on AI** (conducted by CVIT) Aug. 2022
- Tutor at Robotics Research Center (RRC) Summer School 2022 May. 2022
- Tutor at CSE-DU Machine Learning-AI Workshop (conducted by IIIT-H, IIT-H, and IIT-Delhi) Mar. 2022
- Coordinator for **5th Summer School on AI** (conducted by CVIT) Aug. 2021

Mentoring

IIIT-H: 4 undergraduate research students (Gaurav Singh, Vishal Reddy Mandadi, Dipanwita Guhathakurta, Nomaan Qureshi) and 3 research assistants (Shankara Narayanan, Yuvnish Malhotra, Kallol Shah)

Microsoft: 2 data scientists (Srimukha Paturi and Sourav Maity) and 1 research intern (Jay Paranjape)

Reviewing

ICRA 2023, NeuralFields Workshop @ ICLR 2023, **SIGGRAPH Asia** 2023

Past Relevant projects

Reinforced and Collaborative Music Recommendation 2016
 Undergraduate Thesis

- Developed an agent that recommended music from the song-library on the mobile phone. The agent continuously learned and evolved based on collaborative (users with similar behavioral patterns) feedback.

Anterior Segment Imaging (MIT Media Lab's REDX Camp) [[poster](#)] 2015

- REDX is an interdisciplinary platform to enable collaboration between world-renowned medical professionals and engineers to build solutions for society's most pressing healthcare challenges.

- In collaboration with India's leading Eye-Institute, LVPI, developed a low-cost, solid-state device with no moving parts, as a replacement for heavy and bulky Ophthalmic Slit Lamp. It captured and reconstructed a 3D visual model of a patient's cornea (the anterior segment of the eye) reflecting the abnormalities in the cornea.

TheBhaad: Cloud-Based Group-Oriented file-sharing network [[video](#)]

2014

- Single-handedly developed a fully-fledged cloud-based file-sharing network with windows like user-interface specifically designed for undergraduate students and professors. Features: Secure folder/file upload and storage, Groups, Search, Contacts, Groups (Classrooms), Personalized Document Alignment, Discussion Forum.

Skills

Languages	Python, Spark.net, SQL, C#, C/C++, HTML, CSS, jQuery
Framework	Pytorch
Techonologies	Apache Spark and HDInsight, Full-Stack Web Development
Tools	draw.io, TLC (The Learning Code), Adobe Premiere Pro

More to know?

I am a musician: vocalist, guitarist, and composer. I've toured around India along with my previous band, Andrometa. I've also traveled to 6 countries, 11 states solo over a period of 5 months and interviewed 70+ independent music bands (180+ artists) about their struggles as independent artists that broadened my perspective of life and passion.