

Bhuvan Sachdeva

Research Fellow, Sankara Eye Hospital and Microsoft Research

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Education

May 2023 Aug 2019	Delhi Technological University (DTU) B.Tech - Computer Science and Engineering, GPA: 9.2/10	Delhi, India
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Experience

Present Aug 2023	Sankara Eye Hospital Microsoft Research Research Fellow Advisors: Dr. Mohit Jain , Dr. Kaushik Murali , Prof. Vineeth N Balasubramanian Working on automated analysis of cataract surgeries to improve surgical outcomes and building chat-bots for healthcare to assist patients and community healthworkers. Working on understanding Task Transfer in Vision Language Models (VLMs) for perception tasks	Bangalore, India
Mar 2023 Sept 2022	Kroop AI Research Intern Advisor: Prof. Abhinav Dhall Developed facial expression transfer for avatars and deepfake detection using facial landmarks.	Remote
July 2022 May 2019	Prime Video, Amazon Applied Scientist Intern Advisor: Dr. Anil Nelakanti Improved machine translation for Prime Video system using Automatic Post Editing.	Bangalore, India
Apr 2022 June 2021	Kroop AI Research Intern Advisor: Prof. Abhinav Dhall Worked on projects involving face swapping, voice cloning and generating lip movements from audio.	Remote

Select Publications

S=Under Review, C=Conference, W=Workshop, P=Poster/Demo, J=Journal

- [W.1] **Understanding Task Transfer in Vision-Language Models** [🔗]
[Bhuvan Sachdeva*](#), Karan Uppal*, Abhinav Java*, Vineeth N. Balasubramanian
UniReps Workshop: Unifying Representations in Neural Models @ Neurips'25 [Neurips Workshop'25]
- [C.2] **Phase-Informed Tool Segmentation for Manual Small-Incision Cataract Surgery** [🔗]
[Bhuvan Sachdeva*](#), Naren Akash*, Tajamul Ashraf, Simon Mueller, Thomas Schultz, Maximilian WM Wintergerst, Niharika Singri Prasad, Kaushik Murali, Mohit Jain
International Conference on Medical Image Computing and Computer Assisted Intervention [MICCAI'25]
- [J.3] **CataractBot: An LLM-Powered Expert-in-the-Loop Chatbot for Cataract Patients** [🔗]
[Bhuvan Sachdeva*](#), Pragnya Ramjee*, Satvik Golechha, Shreyas Kulkarni, Geeta Fulari, Kaushik Murali, Mohit Jain
Proc. ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies [ACM IMWUT'25]
- [C.1] **ASHABot: An LLM-Powered Chatbot to Support the Informational Needs of Community Health Workers** [🔗]
Pragnya Ramjee, Mehak Chhokar, [Bhuvan Sachdeva](#), Mahendra Meena, Hamid Abdullah, Aditya Vashistha, Ruchit Nagar, Mohit Jain
ACM Conference on Human Factors in Computing Systems [CHI'25]
- [S.1] **Learnings from a Large-Scale Deployment of an LLM-Powered Expert-in-the-Loop Healthcare Chatbot** [🔗]
[Bhuvan Sachdeva*](#), Pragnya Ramjee*, Geeta Fulari, Kaushik Murali, Mohit Jain
[Under Review]

Select Research Projects

Task Transfer in VLMs Advisors: Prof. Vineeth N Balasubramanian ➢ Finetuned Qwen-2.5VL models on 13 perception tasks to analyze cross-task performance transfer. ➢ Proposed <i>Performance Gap Factor (PGF)</i> as a novel metric for quantifying task transferability. ➢ Demonstrated asymmetric transfer patterns and task properties; (results under submission).	Microsoft Research, Jun'25 - Present
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Surgical Anomaly Detection

Sankara Eye Hospital | Microsoft Research, Aug'23 - Present

Advisors: [Dr. Mohit Jain](#), [Dr. Kaushik Murali](#), [Prof. Thomas Schultz](#)

- > Curated a dataset of **400 videos** for **Manual Small-Incision Cataract Surgery (MSICS)** from conventional and smartphone-based systems at **Sankara Eye Hospital**.
- > Built a **SAM-based web application** for surgical instrument labeling, deployed on Azure.
- > Utilized a **conditional decoder** and **semi-supervised setup** to improve **tool segmentation**; accepted at **MICCAI, 2025**.

Machine Translation for Conversational Data

Amazon, May'22 - July'22

Advisor: [Dr. Anil Nelakanti](#)

- > Improved **machine translation** for **conversational data** using **Automatic Post Editing (APE)**.
- > Developed novel **transformer decoder** methods, achieving **5% higher BLEU** scores on the **Flores dataset**.

BYOeB: Build Your Own Expert Bot

Microsoft Research, Aug'23 - Feb'24

Advisor: [Dr. Mohit Jain](#)

- > Developed an **expert-in-the-loop chatbot** framework using Python, supporting **multilingual** and **multi-modal** queries in **Indic** languages.
- > Implemented a **Retrieval-Augmented Generation (RAG)** pipeline for expert-curated query responses.
- > Implement **Query rewriting** for contextualized retrieval and improved responses.
- > Open-sourced the framework via Microsoft at **BYOeB**, adopted by multiple hospitals and organizations, including **CataractBot** and **ASHABot**.
- > **CataractBot** has been used by over **1000 cataract patients** at Sankara Eye Hospital and **ASHABot** has been used by over **50000 ASHAs and ANMs** in Rajashthan; accepted at **IMWUT'25** and **CHI'25**.

Honours and Awards

Secured Rank 98 in Amritapuri Prelims, ACM ICPC, 2020

Ranked 309 out of 7400 participants in Google Kickstart Round B, 2021

Candidate Master on Codeforces: [_bhuvan21](#)

Selected for Amazon Machine Learning Summer School, 2021 and 2022

Selected for Microsoft Engage Mentorship Program, 2021

Other Publications

S=In Submission, C=Conference, W=Workshop, P=Poster/Demo, J=Journal

- [J.2] **Phase recognition in manual Small-Incision cataract surgery with MS-TCN++ on the novel SICS-105 dataset** [🔗]
Simon Mueller, [Bhuvan Sachdeva](#), Singri Niharika Prasad, Raphael Lechtenboehmer, Frank G Holz, Robert P Finger, Kaushik Murali, Mohit Jain, Maximilian WM Wintergerst, Thomas Schultz
Nature Scientific Reports [Scientific Reports]
- [J.1] **Artificial Intelligence in Cataract Surgery: A Systematic Review** [🔗]
Simon Müller, Mohit Jain, [Bhuvan Sachdeva](#), Payal N Shah, Frank G Holz, Robert P Finger, Kaushik Murali, Maximilian WM Wintergerst, Thomas Schultz
Translational Vision Science & Technology [TVST'24]

Teaching and Volunteering Roles

Sankara Eye Hospital

Sep'23 - Nov'23

- > Delivered an *Introduction to AI* course to second-year Ophthalmology fellows, simplifying complex concepts for a medical audience.

Make A Difference (MAD) NGO Fundamental Support Volunteer

Nov'19 - Jun'20

- > Mentored and taught underprivileged children in a government-run center, focusing on their holistic development.

References

- > Dr. Mohit Jain *Principal Researcher, Microsoft Research, India* [🔗]
- > Prof. Vineeth N. Balasubramanian *Principal Researcher, Microsoft Research, India* [🔗]
- > Prof. Thomas Schultz *Professor, Dept. of Computer Science, University of Bonn, Germany* [🔗]
- > Dr. Kaushik Murali *President Medical Administration, Sankara Eye Hospital, India* [🔗]