Bhuvan Sachdeva

Sankara Eye Hospital and Microsoft Research

🌐 https://bhuvan-21.github.io/　　@ sachdeva.bhuvan21@gmail.com　　⌗ github.com/Bhuvan-21　　🎓 Google Scholar

Education

May 2023 **Aug 2019**	**Delhi Technological University (DTU)** B.Tech - Computer Science and Engineering, **GPA: 9.22/10**	**Delhi, India**

Research Experience

Present **Aug 2023**	**Sankara Eye Hospital | (Visiting Researcher) Microsoft Research** *Research Fellow | Advisors: Dr. Mohit Jain, Prof. Vineeth N Balasubramanian, Dr. Kaushik Murali* Working on task transfer in vision–language models for perception tasks, complication detection in cataract surgery, and healthcare chatbots for patient support.	**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: Prof. 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

[C.3]　Understanding Task Transfer in Vision-Language Models　　[✎]
Bhuvan Sachdeva*, Karan Uppal*, Abhinav Java*, Vineeth N. Balasubramanian
IEEE/CVF Conference on Computer Vision and Pattern Recognition \| UniReps Workshop @ Neurips'25　　**[CVPR'26]**

[S.1]　CataractCompDetect: Intraoperative Complication Detection in Cataract Surgery　　[✎]
Bhuvan Sachdeva, Sneha Kumari, ..., Thomas Schultz, Kaushik Murali, Mohit Jain
Under Review at MICCAI'26　　**[MICCAI (Under Review)]**

[C.2]　Phase-Informed Tool Segmentation for Manual Small-Incision Cataract Surgery　　[✎]
Bhuvan Sachdeva*, Naren Akash*, ..., 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　　[✎]
Pragnya Ramjee*, Bhuvan Sachdeva*, ..., Kaushik Murali, Mohit Jain
ACM Journal on Interactive, Mobile, Wearable and Ubiquitous Techonologies　　**[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, ..., Ruchit Nagar, Mohit Jain
ACM Conference on Human Factors in Computing Systems　　**[ACM CHI'25]**

[J.2]　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
European Journal of Ophthalmology　　**[EJO'25]**

[J.1]　Phase recognition in manual Small-Incision cataract surgery with MS-TCN++　　[✎]
Simon Müller, Bhuvan Sachdeva, ..., Mohit Jain, Maximilian WM Wintergerst, Thomas Schultz
Nature Scientific Reports　　**[Scientific Reports'25]**

Select Research Projects

Task Transfer in VLMs　　Microsoft Research, Jun'25 - Present
Advisors: Prof. Vineeth N Balasubramanian

> Finetuned Qwen-2.5VL models (3B, 7B and 32B) on 13 perception tasks to analyze cross-task performance transfer.

> Proposed *Perfection Gap Factor (PGF)* as a novel metric for quantifying task transferability.

> Demonstrated asymmetric transfer patterns and task properties; accepted at **CVPR, 2026.**

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**.
- Developed a multi-stage pipeline to **detect intra-operative complications**; (results under submission).

Machine Translation for Conversational Data　　　　　　　　　　Amazon, May'22 - July'22
Advisor: Prof. 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 and **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**.

Achievements and Awards

Received **MICCAI 2025 Registration Grant** as Young Scientist	2025
Secured **Rank 98** in Amritapuri Region Prelims, **ACM ICPC**	2021
Ranked **309 out of 7400 participants** in Google Kickstart Round B	2021
Candidate Master on Codeforces: _bhuvan21	2021
Selected for **Microsoft Engage Mentorship Program**	2021
Achieved **99.59 percentile** in JEE Mains examination out of 1.5 million candidates	2019

Relevant Coursework

- **Machine Learning:** Artificial Intelligence, Machine Learning, Deep Learning, Reinforcement Learning, Computer Vision
- **Computer Science:** Data Structures, Algorithms, Operating Systems Design, Computer Architecture, Database Management Systems, Software Engineering
- **Mathematics:** Mathematics - 1&2, Probability and Statistics, Discrete Structures, Information Theory and Coding

Teaching and Volunteering Roles

Sankara Eye Hospital　　　　　　　　　　Sep'23 - Nov'23

- Delivered an *Introduction to AI* course for second-year Ophthalmology fellows.

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* [🌐]