SAI HARSHA MUPPARAJU

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EDUCATION

New York University — New York, USA
Master of Science in Computer Science **GPA: 3.778** — *Sept 2024 - May 2026*

Birla Institute of Technology and Science — Goa, India
Bachelor of Engineering in Electronics and Instrumentation Engineering with minor in Data Science — *Aug 2019 - Jun 2023*

PUBLICATIONS

** : indicates equal contribution*

1. **Perceptually Guided 3DGS Streaming and Rendering for Virtual Reality**
   Sai Harsha Mupparaju*, Yunxiang Zhang*, Kenneth Chen, Jenna Kang, Xinyu Zhang, Maito Omori, Kazuyuki Arimatsu, Qi Sun
   Winter Conference on Applications of Computer Vision ***(WACV) 2026***
2. **Simple-RF: Regularizing Sparse Input Radiance Fields with Simpler Solutions** [Paper] [Website]
   Nagabhushan Somraj, Sai Harsha Mupparaju, Adithyan Karanayil, Rajiv Soundararajan
   Conditionally Accepted to ACM Transactions on Graphics ***(ACM TOG)***
3. **Factorized motion fields for fast sparse input dynamic view synthesis** [Paper] [Website]
   Nagabhushan Somraj, Kapil Choudhary, Sai Harsha Mupparaju, Rajiv Soundararajan
   ACM special Interest Group on Computer Graphics and Interactive Techniques ***(SIGGRAPH) 2024***

RESEARCH INTERNSHIPS

Immersive Computing Lab @ NYU — Graduate Assistant | September 2024 - Present
Prof. Qi Sun, Department of Computer Science and Engineering — *New York, USA*

Visual Information Processing Lab @ IISc — Research Intern | June 2023 - June 2024
Prof. Rajiv Soundararajan, Department of Electrical Communication Engineering — *Bangalore, India*

Natural Language Understanding Group @ Samsung R&D — Research Intern | July 2022 - December 2022
Godawari Sudhakar Rao — *Bangalore, India*

APPCAIR @ BITS Pilani — Student Researcher | September 2023 - March 2024
Prof. Tanmay Tulsidas Verlekar, Department of Computer Science and Information Systems — *Goa, India*

SELECTED RESEARCH EXPERIENCE

Free Viewpoint Video for Gaming — NYU | September 2024 - Present
4D Reconstruction — *Guided by: Prof.Qi Sun*

- Developed a SIFT-based camera selection algorithm to choose spatially and temporally optimal cameras for generating free-viewpoint game videos around the player's third-person perspective.
- Implemented a low-compute G-buffer pipeline to identify key frame content and drive a streamable 4D free-viewpoint video generation system.

Perceptual Rendering for Virtual Reality — NYU | September 2024 - August 2025
Augmented Reality/Virtual Reality — *Guided by: Prof.Qi Sun*

- Developed a perceptually-guided Gaussian Splatting framework that uses eccentricity and local scene content to adaptively prune Gaussians.
- Designed a lightweight MLP-based perceptual predictor that guides the Gaussian pruning to reduce rendering cost while maintaining visual quality.
- Validated perceptual fidelity through user studies with 16 participants, confirming strong alignment with objective quality assessments.
- Developed a high-quality multi-view dataset to facilitate controlled experimentation on perceptual sensitivity.

Augmented models for sparse-input Novel View Synthesis — IISc | June 2023 - May 2024
Sparse Input 3D reconstruction — *Guided by: Prof. Rajiv Soundararajan*

- Developed a framework that uses simpler augmented radiance models to regularize the depth of the main radiance model.
- Extended the method to other explicit and implicit radiance field representations, achieving state-of-the-art performance on real-world and synthetic datasets.

Sparse Input Dynamic View Synthesis — IISc | September 2023 - January 2024
Sparse Input 4D reconstruction — *Guided by: Prof. Rajiv Soundararajan*

- Developed an explicit motion model as a factorized 4D representation that can take advantage of the spatio-temporal correlation of the motion field.
- Designed reliable motion priors to regularize the motion model using sparse flow across cameras and dense flow within cameras.

WORK EXPERIENCE

Dwellci AI June 2025 - August 2025
Machine Learning Intern *Guided by: Dr. Hesam Shams*

• Developed a diffusion-based generative AI architecture for the Minimum Viable Product, enabling automatic floorplan generation from textual and visual room connectivity inputs.

• Designed and implemented a novel input-extraction pipeline that converts architectural bubble diagrams into model-ready spatial requirements, bridging traditional architectural workflows with generative design.

Samsung R&D India July 2022 - December 2022
Research Intern *Guided by: Godavari Sudhakar Rao*

• Improved a voice assistant's ability to understand and answer indirect questions, and optimized its on-device performance for faster, more efficient inference.

• Built an intelligent recipe recommendation system powered by a structured food knowledge base, enabling more accurate and personalized suggestions.

PROJECTS

Micro Facial Expression Recognition BITS Goa | September 2023 - December 2023
Emotion Recognition *Guided by: Prof. Tanmay Tulsidas Verlekar*

• Developed a micro–facial expression recognition model to detect subtle emotional cues with applications in mental health, behavioral science, and security.

• Built an efficient data pipeline for precise face extraction and alignment, enabling high-quality analysis of subtle muscle movements.

Scalable Multi-Tenant Database NYU | September 2025 - Present
Cloud Computing and Big-Data Systems *Guided by: Dr. Sambit Sahu*

• Built a scalable AWS multi-tenant DB system using SQLite shards with API-based schema management, queued migrations, and automated replication/failover across Lambda, DynamoDB, and S3.

• Implemented hot–cold storage tiering (EFS/S3), Redis caching, and automated rehydration to ensure low-latency access, high availability, and cost-efficient operation at scale.

RAG System for ROS2 September 2024 - December 2024
Retrieval-Augmented Generation *Guided by: Dr. Pantelis Monogioudis*

• Developed a ROS-focused RAG chatbot using a fine-tuned quantized Mistral model and a Qdrant-based retrieval pipeline, improving query resolution and response speeds by over 25–40%.

• Built scalable deployment with Docker, Gradio, and MongoDB, and optimized relevance and workflow automation using ClearML, boosting answer quality by 14% (MRR).

TEACHING SERVICES

Course Teaching Assistant

- **CS-GY 6923 - Machine Learning - NYU (Fall 2025, Spring 2026)** *By Prof. Pavel Izmailov*
  Guided a class of ≈60 graduate students by holding weekly office hours to clarify machine learning concepts and provide guidance on assignments and labs, while grading exams, homework, and coding labs to ensure fair evaluation and timely feedback that supported student learning and course quality.
- **CS F241 - Micro-Processors and Interfacing - BITS Goa (Spring 2023)** *By Prof. Anupama Karuppiah*
  Actively involved in designing and implementing weekly lab assignments and capstone projects for 600+ students, and conducted bi-weekly office hours to guide students through assignments and address questions.

AWARDS & ACHIEVEMENTS

- Recipient of NYU Graduate School of Engineering Scholarship for all 2 years of M.S. ($8000 total)
- Recipient of Kotak IISc Pre-Doctoral Fellowship , 2024 ($6000 total)
- Recepient of Prime Minister Scholarship Scheme(PMSS) (Govt of India) for all 4 years of B.E. ($1500 total)

POSITIONS OF RESPONSIBILITY

• **Vice-Captain, Volleyball Team:** Led the university volleyball club, managing 25+ members, conducting daily practices, organizing intercollegiate matches and tournaments, and contributing to a national-level sports fest hosting 1000+ athletes.

• **Student Mentor, Peer Mentorship Program:** Mentored 10 freshmen at BITS Goa, guiding them through academic and campus life challenges.