Sai Harsha Mupparaju

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Education

New York University **2024 - May 2026 (Expected)**

Master of Science in Computer Science. GPA:3.8/4 *New York, USA*

Relevant Courses: Algorithmic Machine Learning, Deep Learning, Cloud Computing and Big Data, AR/VR

BITS Pilani **August 2019 – May 2023**

Bachelor of Engineering in Electronics and Instrumentation, Minor in Data Science. *Goa, India*

Publications

Perceptually Guided 3DGS Streaming and Rendering for Virtual Reality | *WACV 2026*

Simple-RF: Regularizing Sparse Input Radiance Fields with Simpler Solutions | *Accepted with Minor Revisions at TOG*

Factorized Motion Fields for Fast Sparse Input Dynamic View Synthesis | *SIGGRAAPH 2024*

Research Experience

Immersive Computing Lab at NYU **September 2024 – Present**

Graduate Assistant *New York, New York*

- Proposed and implemented a feature-driven camera selection framework to optimize multi-view coverage and reduce rendering overhead in synthetic scene reconstruction.
- Developed an efficient deferred rendering pipeline that identifies the most informative viewpoints without requiring a lighting pass.
- Proposed a content- and gaze-aware Gaussian allocation strategy that integrates perceptual cues (eccentricity + local scene structure) to improve rendering efficiency in VR and edge–cloud systems.
- Designed a lightweight MLP model trained using FovVideoVDP to approximate perceptual sensitivity and guide adaptive Gaussian pruning for optimal quality–compute trade-off.
- Built a synthetic dataset of 4 Blender-generated scenes (≈2000 images) with custom camera rigs for training and evaluation of perceptual allocation strategies.
- Conducted 2-Interval Forced Choice (2IFC) user studies with 16 participants using Unity and a head-mounted display, validating perceptual fidelity and confirming strong alignment with objective FovVideoVDP metrics.

Indian Institute of Science **June 2023 – June 2024**

Research Assistant *Bangalore, Karnataka*

- Developed augmented NeRF models to address depth discontinuities and shape-radiance ambiguity for few-shot NVS. Achieved an 8% SSIM improvement on NeRF-LLFF, NeRF-Synthetic, and MiP-NeRF 360 datasets. Extended the method to newer explicit models: TensoRF and Zip-NeRF.[Website] [GitHub]
- Designed a 4D NVS pipeline using reliable optical flow priors. Improved NeRF efficiency, achieving a 29% better LPIPS metric compared to K-planes.[Website] [GitHub]
- Automated workflows using Shell Scripting and maintained version control with Git, ensuring efficient pipeline execution and reproducibility.

Industry Experience

Dwellci AI **June 2025 – August 2025**

Machine Learning Intern *New York, New York*

- Developed a diffusion-based generative AI architecture for the MVP, 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.
- Built and containerized Flask APIs to facilitate seamless communication between the diffusion model and other microservices in the MVP, ensuring scalable deployment and efficient version control via Docker and Git.

Samsung R&D India **July 2022 – December 2022**

Software Development Intern *Bangalore, Karnataka*

- Enhanced Samsung's voice assistant with an Indirect Question Answering system. Fine-tuned UnifiedQA (T5) on the Circa dataset, achieving 93% accuracy.
- Optimized on-device inference using TensorFlow Lite, ONNX, and model quantization. Reduced inference latency by 40% for Samsung smartphones.

- Designed a Recipe Recommender System using BlazeGraph and Java. Built a Food Knowledge Graph from web-scraped data and food APIs, improving recommendation accuracy by 20% through personalized suggestions.
- Implemented SPARQL queries on RDF data to power the recommender system. Integrated the system into a mobile app as a proof of concept.
- Orchestrated large-scale model training on Samsung's GPU cluster using Slurm Job Scheduler and Git, improving efficiency by 30% and reducing resource costs.

Projects

Micro Facial Expression Recognition | *Python, Pytorch, Numpy, Dlib* **September 2023**

- Developed an innovative Micro Facial Expression model employing Transformer architectures and viable data structures. This model is aimed at uncovering genuine human emotions with applications in mental health, behavioral science, lie detection, and criminal analysis.
- Detected slight muscle movements using transfer learning on Facebook's MViTv2 Vision Transformer by leveraging the RGB-D information from the CASME3 dataset.
- Utilized Dlib to accurately crop and align faces and depth maps, removing unnecessary background details to reduce dataset size.

Retrieval-Augmented Generation (RAG) Model for ROS2 | *Python, PyTorch, Qdrant, MongoDB, HuggingFace*

- Built an intelligent chatbot for ROS inquiries using a fine-tuned quantized Mistral model. Trained on data from GitHub, Stack Overflow, Medium, and YouTube, achieving a 25% reduction in query resolution time.
- Designed a scalable retrieval system using Qdrant for similarity search. Achieved a 40% faster query response time and integrated the system into a Gradio web app.
- Containerized the retrieval system with Docker, enabling seamless deployment and user access.
- Optimized system performance using ClearML, automating workflows and improving answer relevance by 14% (MRR metric).[GitHub]

Technical Skills

Languages: Advanced: Python | Intermediate: Java, C, C++, HTML/CSS, JavaScript, SQL, MATLAB, Latex
Tools/Frameworks: Advanced: PyTorch, Linux, Git | Intermediate: TensorFlow, OpenCV, Spark, Hadoop

Position of Responsibility/Extracurricular

Course Assistant **September 2025 – Present**
Machine Learning *NYU*

- Held weekly 2-hour office hours to assist students with course material, clarify machine learning concepts, and provide guidance on assignments and labs.
- Graded exams, homework assignments, and coding labs, ensuring fair evaluation and timely feedback to support student learning and course quality for a class of ≈60 grad students.

Teaching Assistant **January 2022 – May 2022**
Micro-Processors and Interfacing *BITS Pilani*

- Collaborated with the professor to design, implement, and evaluate weekly laboratory assignments and capstone projects for over 600 students.
- Facilitated bi-weekly office hours to address the students' doubts and guide them through the assignments.

Volleyball **2021 – 2022**
Captain *BITS Pilani*

- Led the university's volleyball club, overseeing a team of over 25 members, and conducted daily practice sessions.
- Facilitated friendly matches with regional colleges and won several tournaments throughout my tenure.
- Actively contributed as a key member of the organizing committee for the college sports fest, with a footfall of 1000+ athletes from all over India.

Awards

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