

Vasundhara Vishwanath Baligar

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EDUCATION

University of Massachusetts Amherst (UMass Amherst) <i>Master of Science in Computer Science</i> Courses: Advanced Machine Learning, Applied Statistics, Empirical Research	Amherst, MA, United States <i>Sep 2025 – May 2027</i>
KLE Technological University <i>Bachelor of Engineering in Electronics and Communication; CGPA: 8.8</i> Courses: Machine Learning, 3D Computer Vision, Signal Processing	Hubli, Karnataka, India <i>Dec 2020 – June 2024</i>

SKILLS

Technical Languages: Python, C/C++, R, MATLAB, Bash/Shell scripting
Frameworks and Tools: PyTorch/(3D), OpenCV, Hugging Face, TensorFlow, Keras, Docker, Apptainer
Data and Visualization: Open3D, MeshLab, Blender, Unity 3D, Matplotlib, NumPy, Pandas, SciPy

RESEARCH EXPERIENCE

Visiting Researcher University of Wyoming HPC Cluster, CUDA, Apptainer	<i>Jan 2025 – June 2025</i>
<ul style="list-style-type: none">Contributed to identifying the 4th type of Unsolvable Problem Detection task in Visual Question Answering (VQA) for 3D heritage sites to evaluate large language model (LLM) responses.Developed a VQA dataset with 1200+ 3D heritage model–question pairs using Generative AI and multi-view icosahedron captures (handling raw point clouds as large as 23M points), followed by human cross-validation. This filled a critical gap as there were no prior datasets for this task.Set up and optimized environments for large-scale 3D LLMs like MiniGPT-3D, LSceneLLM, PointLLM, ShapeLLM to run inference efficiently on high-resolution point clouds.	
Research Intern Indian Institute of Science (IISc) Python, HTML, IoT	<i>Feb 2024 – June 2024</i>

PROJECTS

Mapping User Facial Emotions Onto an Avatar Blender 3D, Real-time Facial Mapping	
<ul style="list-style-type: none">Built a real-time facial motion capture system in Python using OpenCV and Dlib, tracking 68 facial landmarks from a camera and using head pose estimation (solvePnP) to follow face movements smoothly.Added smoothing and range normalization methods to clean up noisy landmark data, making the mouth, brow, and head movements look natural when mapped onto a Blender 3D rig (RIG-Vincent).Connected computer vision to 3D animation controls, turning live camera input into rigged avatar motion in Blender, showing a working perception-to-action loop for human-robot interaction (HRI), XR, and telepresence.	
Surface Texture Mapping (IIT Delhi) PyTorch, CUDA, Open3D	
<ul style="list-style-type: none">Implemented a neural mesh transfer (Mesh Draping) pipeline to project textures across incomplete 3D surfaces, preserving high-frequency geometric detail with progressive positional encoding.Reconstructed partial/incomplete 3D meshes by selecting and aligning keypoints between source and target surfaces, achieving realistic surface deformation and alignment.	
Point Cloud Hole Filling Using Implicit Functions PyTorch3D, Docker, NVIDIA DGX, Meshlab	
<ul style="list-style-type: none">Applied an encoder-decoder Occupancy Network (PointNet + ResNet) to fill holes in sparse/occluded 3D point clouds while retaining its original geometry.Generated synthetic holes across 51,300+ 3D models from all 55 categories of the ShapeNetCore.v2 dataset using kNN for controlled training and evaluation.The model demonstrated strong performance, enabling it not only to fill holes, but also reconstructed partial point clouds with >90% shape accuracy and visibly smoother surfaces compared to baselines.	

PUBLICATIONS

Demand Response Platform with IoT and NILM for Home Energy Management <i>ISGT Asia IEEE PES, Bangalore</i>	Link
Demand Response Based on Anomaly Detection and Non-Intrusive Load Monitoring <i>IEEE PEDES, NITK Surathkal</i>	Link

ACHIEVEMENTS

- Selected among national participants for the Graphics and Vision Summer School at IIT Delhi.
- Ranked within the top 4% of participants at a university-wide hackathon.
- Secured 1st place at University Chess Championship; competed at State-level tournaments.