

SHYAMSUNDAR PRABHAKAR INDRA

Ph. no. : +1-240-398-0284 • Email : pi.shyamsundar@gmail.com • Website : shyam-pi.github.io • LinkedIn : linkedin.com/in/shyam-pi

EDUCATION

- University of Maryland | **Master of Engineering in Robotics** | GPA : 4.00 / 4.00 Aug 2022 - May 2024
• **Key Courses:** 3D Computer Vision (CV) | Geometric CV | Deep Learning | C++ Robot Programming College Park, MD, USA
- BITS Pilani | **Bachelor of Engineering in Mech. Engineering** | GPA : 8.20 / 10.00 Aug 2016 - May 2020
• **Bachelor's Thesis :** CV based Pedestrian Path Prediction using Bi-LSTM for L2 Autonomous Vehicle Rajasthan, India

EXPERIENCE

- Renesas Electronics America Inc. | MD, USA | **Machine Learning Engineer Intern** Jun 2023 – May 2024
• Built a Python edge AI deployment platform with end-to-end ML pipelines catered to time-series & image data from Renesas edge devices' sensors, enhancing deployment speed by 64% & reducing manual work by 80%, saving over 100 man-hrs/month.
• Integrated ONNX Runtime in the platform, improving model inference speed by 40% & reducing training time by 30%.
• Reduced the edge deployment memory usage size of PyTorch Neural Nets by 52% by implementing Low-Rank Adaptation (LoRA).
• Developed and deployed a Support Vector Machine (SVM) model for voice authentication on a Renesas edge device, using a 500 samples in-house dataset collected manually, achieving 96% accuracy on 100 unseen people from the wild.
- UMD Vision & Learning Lab | MD, USA | **Graduate Computer Vision Researcher** Feb 2023 – Jun 2023
• Performed literature review on 3DGANs, GAN Inversion, & CLIP models for a novel text-to-3D facial animations genAI model.
• Solved an intermediate problem of text based 3DGAN image editing by creating a model integrating EG3D with GAN Inversion for text-based manipulation of latent space using CLIP, trained using the EmotiW (facial emotions) dataset.
• Evaluated the intermediate approach using PSNR, SSIM and CLIP similarity scores to ensure latent space editing success.
- Robert Bosch Centre - IISc | Bangalore, India | **Robotics Research Intern** Jan 2022 – Aug 2022
• Developed LiDAR-based 3D object detection model for WIPRO sponsored L3 AV, achieving mAP values of 73% (cars) & 72% (pedestrians) on KITTI3D dataset, by training on Waymo Open dataset & self-curated Carla dataset of 10000 synthetic samples.
• Engineered Control Barrier Functions (CBFs) based lower level controller python software package, which along with the 3D object detection, gave around 92% successful collision avoidance over 50 simulated scenarios in Carla.
• Verified the controller by ROS deployment on a Copernicus UGV, resulting in a published conference paper on the same.
- International Institute of IT | Bangalore, India | **Computer Vision Research Intern** Jan 2021 – Aug 2021
• Curated & annotated around 2000 plant images using Azure Image Labeling tool for YOLO model training using transfer learning.
• Achieved 94.6% accuracy on a publicly available leaf dataset, by training a YOLO leaf detection model for leaf counting, hence enhancing a farm robot's crop health monitoring capabilities.
• Led a team of 5 junior interns and accelerated completion of farm robot prototype development and ROS perception stack deployment with the leaf detection model on the same, within 22 days.

SELECTED PROJECTS

- TerpBot : Custom RaspberryPi (RPI) based Autonomous Mobile Robot** | (*RaspberryPi, ROS2, C++, Python, PyTorch*) | [\[website\]](#)
• Built custom RPi + ROS based autonomous mobile robot from scratch with wheel odometry & monocular camera for perception.
• Deployed ROS perception stack with YOLO object detection & monocular depth estimation to create a synthetic 2D point cloud.
• Achieved an RMSE of 0.26 meters (based on 100 real samples) on the 2D point cloud with real-time inference latency of 30 ms.
- Multi-Meshner : Single Image to 3D Mesh Generative Model** | (*Python, PyTorch, PyTorch3D*) | [\[website\]](#)
• Designed novel model based on PointNet backbone to directly generate colored 3D meshes (first of its kind) from single images.
• Used per-shape optimizing training guided by SDS loss, with synthetic multi-view images generated by diffusion based Zero123.
- Fine-Tuned Llama3 based Anomaly Detection** | (*Python, PyTorch, Pandas, Transformers, Unsloth*) | [\[github\]](#)
• Preprocessed NIH devices dataset, prepared 5000 prompt-result pairs to fine-tune 8B Llama3 LLM for intelligent data formatting.
• Utilized BERT for vector dataset generation, & implemented PCA + Isolation Forests anomaly detection on it, with 93% accuracy.

SKILLS & CERTIFICATIONS

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| Certifications | Accelerated Computing in CUDA C/C++ CUDA for Multi-GPU Workload Scaling Generative AI using LLMs |
| Programming | Python C++ C CUDA C# Java Matlab SQL |
| ML Tools | PyTorch PyTorch3D TensorFlow Keras Transformers Sklearn NumPy Pandas OpenCV PyBullet |
| Dev Tools | ROS2 Git Linux Gazebo Docker ONNX Runtime AWS SageMaker AzureML Unity Spark MongoDB |