SHYAMSUNDAR PRABHAKAR INDRA

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DOMAIN SKILLS : Computer Vision | Robotics | Machine Learning | VR/AR | LLMs | Software Development | Reinforcement Learning | CUDA programming

EDUCATION

◆ University of Maryland, College Park — *MD, USA*

Master of Engineering in Robotics | **GPA : 4.00/4.00** — *Aug 2022 - Grad. May 2024*

- **Teaching : Graduate Teaching Assistant**, Computer Aided Design, Spring 2023 | **Student Athlete**, Collegiate Badminton Team
- **Key Courses:** 3D Computer Vision | Geometric Computer Vision | Extended Reality (XR) | Foundations of Deep Learning | C++ Robot Programming

◆ BITS Pilani, Pilani campus — *Rajasthan, India*

Bachelor of Engineering (Hons.) in Mechanical Engineering | **GPA : 8.20/10.00** — *Aug 2016 - May 2020*

- **Bachelor's Thesis** on Pedestrian Path Prediction using Bi-LSTM for level 2 AV's path planning augmentation under Dr. BK Rout at the CRIS | link
- **Key Courses:** Machine Learning | Object Oriented Programming using JAVA | Intro. to Programming using C | Intro. to Robotics

KEY SKILLS & CERTIFICATIONS

Certifications	Accelerated Computing in CUDA C/C++ · CUDA for Multi-GPU Workload Scaling · Generative AI using LLMs
Programming	**Advanced:** Python | **Intermediate:** C/C++, C# | **Beginner:** SQL, Java, Matlab
ML/DL Libraries	PyTorch | PyTorch3D | TensorFlow | Keras | Scikit-Learn | Open3D | OpenCV | Numpy | PyBullet | OpenAI Gym | Pandas
Dev Utilities	ROS | GitHub | Linux | Carla | Unity | Gazebo | Blender | Docker | AWS SageMaker | AWS EC2 | Apache Spark | MySQL | VSCode | LaTeX

EXPERIENCE

◆ Renesas Electronics America Inc. (Reality AI before acquisition) — *Columbia, MD, USA*

Artificial Intelligence / Machine Learning Engineer Intern — *June 2023 - May 2024*

Summary : Software development for automated AI deployment platform tailored for embedded devices

- End-to-end **development of ML and CNN pipelines** using PyTorch and Scikit for **automated embedded AI deployment Python software**.
- Researched and implemented **PyTorch model size optimization** using weights decomposition, achieving a **52% size reduction**.
- Implemented **rigorous testing procedures** like **unit tests**, integrated with **CI/CD pipelines using GitHub Actions**, to ensure robustness & flexibility.
- Collaborated to **deploy & integrate** ML pipeline into cloud infrastructure within an **MLOps cycle**, following **Agile** development methodology.
- Developed **SVM-based anti-spoofing model** with **96% accuracy (in-house dataset)** and deployed it on a Renesas embedded device. | website

◆ Vision & Learning Lab - University of Maryland, College Park — *College Park, MD, USA*

Graduate Student Researcher | Guide : Dr. Jia-Bin Huang — *Feb 2023 - June 2023*

Summary : Ideation & modeling for text-to-3D animations genAI using 3D GANs, CLIP & GAN inversion.

- Conducted literature survey for usage of **3DGANs, GAN Inversion and CLIP models** for **text-to-3D animation generation.**
- Setup a **PyTorch pipeline** for integration of **EG3D with GAN Inversion** for text-based manipulation of the latent space using CLIP.

◆ Robert Bosch Centre for Cyber Physical Systems - IISc Bangalore — *Karnataka, India*

Robotics Research Intern | Guide : Dr. Shishir Kolathaya — *Jan 2022 - Aug 2022*

Summary : 3D obstacle detection and lower level controller development for level 3 autonomous vehicle.

- Built a **LiDAR based 3D object detection model** using transfer learning to advance autonomy in a **WIPRO sponsored level-3 Autonomous Vehicle**.
- Developed a **low-level python control package** working with the perception stack using **Control Barrier Functions (CBFs)** for obstacle avoidance.
- Verified the controller and the 3D object detection model in **Carla** and published a conference paper on the controller. | video | paper

◆ International Institute of Information Technology, Bangalore — *Karnataka, India*

Computer Vision Research Intern | Guide: Dr. G.N. Srinivasa Prasanna — *Jan 2021 - Aug 2021*

Summary : Perception stack and prototype development for autonomous farm robot.

- Developed a **YOLO-based object detection model** for **plant leaf counting**, enhancing crop health monitoring for a **farm robot**. | website
- Contributed to the development of a deep learning model to **detect and track fast-moving objects**, such as **coins in a carrom game**.
- Led a team of 5 interns to **design and 3D-print** essential parts for the farm robot, contributing to **prototype development**.

KEY PROJECTS

- **TerpBot**: Custom RPi based Mobile Robot with monocular YOLO + depth estimation based perception & dynamic planning **(C++, Python)** | website
- **Multi-Mesher**: Single Image to 3D Mesh generative model using Diffusion based Zero123 & PointNet architectures **(Python, PyTorch)** | website
- **CUDA Image Processing**: CUDA Parallel Computing based Image Processing pipelines like Gaussian Blur, Edge Detection etc. **(C++, CUDA)** | github
- **Diabetes Classification**: Logistic regression based binary classification on a big data diabetes dataset using Spark **(Python, Apache Spark)** | github
- **Masked Autoencoder Inpainting**: A Transformer-based Autoencoder for Collaborative Robot Perception by Image Inpainting **(PyTorch)** | paper
- **Neural Radiance Fields**: Implicit 3D reconstruction and novel view synthesis using NeRFs and Volume Rendering **(Python, PyTorch3D** | github
- **VR Hostage Rescue Game**: Virtual Reality game built on Unity engine, simulating a Hostage Rescue mission on Meta Quest 2 **(C#, Unity)** | website
- **American Sign Language (ASL) Detection**: CNN and LSTM based ASL Detector for Letters from video feeds **(Python, PyTorch)** | website
- **Aruco based Maze Completion**: ROS project for navigating a TurtleBot through a maze environment using Aruco markers in Gazebo **(C++)** | github

PUBLICATIONS

Control Barrier Functions in UGVs for Kinematic Obstacle Avoidance: A Collision Cone Approach | Indian Control Conference (Oct. 2023)

Analysis of Vibration based Windmill Coupled Micromachined Energy Harvester | Journal of Vibroengineering (Nov. 2019)