SHYAMSUNDAR PRABHAKAR INDRA

College Park, MD, USA | ☎ +1 (240) 398 0284 | ✉ Email: shyampi@umd.edu | LinkedIn: Shyamsundar P I | Portfolio: Shyam-pi

Domain Skills : Computer Vision (CV) • Machine Learning (ML) • Deep Learning (DL) • Robotic Software • Motion Planning • Virtual Reality

EDUCATION

UNIVERSITY OF MARYLAND
M.Eng. in Robotics
Aug 2022-Jun 2024 | College Park, MD
GPA: 4.00 / 4.00
Roles: TA - ENME272 Spring 2023

BITS PILANI
B.E. in Mechanical Engineering
Aug 2016-Jul 2020 | Rajasthan, India
GPA: 8.20 / 10.00

KEY COURSEWORK

GRADUATE (* Ongoing)
3D Vision
Robot Programming using C++
Human Robot Interaction
Advances in Extended Reality (XR)
Perception in Robots
Path Planning in Robots
Adv. Geometric Computer Vision
Control of Robotics Systems
Intro. to Robot Modelling

UNDERGRADUATE
Machine Learning
Object Oriented Programming
Intro. to Robotics

ACHIEVEMENTS

• **All India Rank 1073** in JEE Mains 2016 - 1.2 million candidates appeared for the exam.
• Placed in the **top 0.04 percentile** in JEE Advanced 2016 (Entrance exam to the prestigious IIT institutions).

SKILLS

Programming
Python • C++ • MATLAB • Java • C • C#

ML & CV Libraries
PyTorch • TensorFlow • Keras • Scikit • NumPy • OpenCV • PIL • Darknet • Pandas

CV Applications
Generative Models • Object Detection & Tracking • Depth Estimation

Development Tools
ROS • Unity • Gazebo • Simulink • RViz • Carla • Colab • JSP • CSS

EXTRACURRICULARS

• **Badminton Player, UMD College Park -** Men's doubles player in the competitive team of the university (Present).
• **Track & Field Athlete, BITS Pilani -** Medal winner in various 100m, 200m, 4x100m and long Jump collegiate events (2016 - 2020).
• **President - PTM, BITS Pilani** - Tamil cultural association of the university (2017-2018).

EXPERIENCE

Renesas North America Ltd. | Artificial Intelligence Engineer Intern
May 2023 – Present | Columbia, MD

- Developed a **SVM based lightweight ML anti-spoofing model**, that can reject spoof inputs in voice authentication systems. (**Scikit**) | VIDEO
- Working on **embedded deployment** of the model on a Renesas Edge device. (**C**)
- Involved in **creating Machine Learning and CNN pipelines** for the company's automated AI deployment software. (**Python**)

UMD Vision & Learning Lab | Graduate Student Researcher
Feb 2023 – Aug 2023 | Guide: Dr. Jia-Bin Huang | College Park, MD

- Worked on CLIP based generation of 3D meshes using **GAN Inversion** and **3D-GAN**.

Robert Bosch Centre - IISc Bangalore | Robotics Research Intern - Remote
Jan 2022 – Aug 2022 | Guide: Dr. Shishir Kolathaya | Bangalore, India

- Implemented a **LIDAR based 3D object detection model** for a level-3 Autonomous Vehicle sponsored by **WIPRO**. (***PyTorch***)
- Developed a **low-level control package** communicating with the **perception stack** using **Control Barrier Functions (CBFs)** for obstacle avoidance. (***Python***)
- Verified the controller in an autonomous driving simulator. (***Carla***) | VIDEO

IIIT Bangalore | Computer Vision Research Intern - Remote
Jan 2022 – Aug 2022 | Guide: Dr. G.N. Srinivasa Prasanna | Bangalore, India

- Utilized a **YOLO** architecture from **Darknet** framework to predict plant leaf count and monitor crop health. **(*Transfer Learning)***
- Involved in **3D modelling** of parts for the farm robot.)
- Mentored five new interns to model an **autonomous robotic assembly line**.

Centre for Robotics & Intelligent Systems - BITS Pilani | Undergrad Thesis
Jan 2020 – Jul 2020 | Guide: Dr. B.K.Rout | Pilani, India

- Successfully defended **thesis** on **DL applications in CV** for **level-3 autonomous vehicles**.
- Implemented and trained a **Bi-Directional LSTM Network** on temporal tracking data to predict the path of pedestrians **1 second** into the future. (***TensorFlow***, ***Keras***)

KEY PROJECTS

Multi-Mesher: Diffusion Driven 2D to 3D Mesh Reconstruction | Link
A **PointNet** based model which uses a per shape optimization approach alongside single-view to multi-view synthesis using **Zero123** Diffusion model for single image-to-3D generation.

American Sign Language Detection | Link
Implemented a **CNN and LSTM** based American Sign Language (ASL) Detector for Letters from video feeds, and showcased its capability with a custom GUI.

TerpBot with Path Planning and Dynamic Obstacle Avoidance | Link
Created a **unicycle** model based autonomous mobile robot called TerpBot from scratch. It perceives with just one monocular camera using a MiDaS based **monocular depth estimation** model, and has **wheel odometry** for localization. It can navigate complex environments using **RRT* global planner**, and evade dynamic obstacles using a **Potential Field based local planner**.

Image Completion using Masked Autoencoders for Perspective Shifting | Link
Utilized a **multimodal mask autoencoder**, which takes RGB image and depth data of a scene to reconstruct the RGB scene from a different perspective, by completing the occluded patches.

Volume Rendering and Neural Radiance Fields | Link
Implemented a simple **volumetric differential renderer** and a **Neural Radiance Field (NeRF)** for implicit **3D representation and novel view synthesis** leveraging its capabilities.

PUBLICATIONS

[1] "Control barrier functions in ugvs for kinematic obstacle avoidance: A collision cone approach," *arXiv preprint*, 2022.

[2] "Analysis of vibration based windmill coupled micromachined energy harvester," *JVE Journals*, 2019.