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

COURSEWORK (* Ongoing) :
Foundations of Advanced Deep Learning*
Cognitive Robotics*
3D Vision
Robot Programming using C++
Advances in Extended Reality (XR)
Perception in Robots
Path Planning in Robots
Adv. Geometric Computer Vision
Intro. to Robot Modelling

BITS PILANI

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

KEY COURSEWORK:
Machine Learning
Object Oriented Programming with JAVA
Intro. to Robotics
Intro. to Programming using C

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 • Implicit Neural Representation • 3D Reconstruction • 2D to 3D Modeling • Object Detection & Segmentation • 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**) | LINK
- 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 **TerpBot**, a unicycle model based **autonomous mobile robot**, from scratch, with wheel odometry and one monocular camera for perception. Implemented its planning stack to navigate complex maps 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.