KIRAN SUVAS PATIL

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EDUCATION

University of Maryland - College Park | M.Eng. in Robotics – 3.88/4   📅 Aug 2022 – Expected May 2024

KLS Gogte Institute of Technology - Belagavi | B.E. in Electronics & Communication – 8.45/10   📅 Aug 2015 – May 2019

SKILLS

C   C++   Python   MATLAB   Git   PyTorch/PyTorch3D   TensorFlow   Keras   sklearn   OpenCV   ROS/ROS2   MoveIt   Gazebo   CAD   Blender   Docker   LaTeX

TECHNICAL EXPERIENCE

Perception and Robotics Group, UMD | Graduate Research Assistant   📅 May 2023 – Aug 2023

- Built an underwater oyster detection system that utilized the YOLOv8 segmentation model, trained on the "Curvy-Oysters" dataset, to identify oysters in seabed images.
- Modeled an underwater environment with an oyster bed in Blender to produce realistic underwater images for testing. Applied UnderwaterGAN over the synthetically generated images to enhance the underwater imagery.

Dept. of Computer Science & Engineering, IIT Bombay | Summer Intern ○ ▶   📅 May 2018 – July 2018

- Designed and implemented a multi-robot system for autonomously solving jigsaw puzzles, including firmware development for Firebird V (ATMEGA 2560-based robot), localization using Aruco markers, and path planning exploration.
- Developed Python software for robot localization using Aruco markers and Xbee communication. Additionally, explored diverse path-planning algorithms for the multi-robot setup.

PROJECTS

Occlusion Resilient Object Detection for Industrial Settings | Blender, Python, ROS2, C++, Gazebo   📅 Feb 2024 – Present

- Leveraged Blender for 3D modeling and scripting to generate a synthetic dataset exceeding 60k images, employed for training a YOLOv9 object detection model.
- Working on deploying the trained model within the ARIAC industrial gazebo environment.

RecolorNeRF | PyTorch3D ○   📅 Dec 2023

- Decomposed neural radiance field into layers with associated learnable color palettes for efficient and user-friendly color editing of 3D scenes. Optimized the model by integrating UNet architecture into the pipeline.
- For analysis, crafted a custom NeRF dataset employing InstantNGP for efficient generation and employed Dense Prediction Transformer (DPT) for improved quality.

Terraformers - UMDs University Rover Challenge team | Software subteam lead   📅 May 2023 – Dec 2023

- Guided the software sub-team to achieve the rover's software requirements. Simulated motion planning for the rover's 6DOF manipulator arm. Constructed an autonomous navigation perception system for the rover's localization.

PointNet | PyTorch3D ○   📅 Dec 2023

- Executed PointNet, a deep net architecture on point clouds (as unordered point sets) for 3D Classification and Segmentation. Additionally performed a robustness analysis on the learned model.

Single View to 3D | PyTorch3D ○   📅 Oct 2023

- Generated 3D models from RGB images using R2N2 ShapeNet dataset. Explored various loss and decoder functions for regressing voxels, point clouds, and meshes.

ARIAC - Agile Robotics for Industrial Automation Competition by NIST | ROS2, C++, MoveIt ○   📅 Jan 2023 – May 2023

- Programmed a robotic solution for industrial automation challenges. Developed a competitor control system (CCS) for communicating with the competition environment and facilitating task execution (Kitting, Assembly, Combined).

Hungry Bird - eYRC 2018 | ROS, Python, V-REP, OpenCV ▶   📅 Oct 2018 – Mar 2019

- Implemented motion-planning for navigating a Bird (Drone-PlutoX) through a sequence of trees(hoops). Fine-tuned PID controller for the Drone, and used ROS to communicate/control it
- Localized drone using an overhead camera and Whycon markers. Also, the entire drone flight was emulated in V-REP.

Harvester Bot - eYRC 2017 | Embedded C, Python, OpenCV ▶   📅 Oct 2017 – Mar 2018

- Engineered an autonomous pick-n-place robot with OpenCV-based fruit recognition that can pluck and deposit the required fruits on an abstract farm.
- Designed firmware for Firebird V enabling line following. Established robot-camera communication using RPi and UART.

CERTIFICATION

- First Principles of Computer Vision - by Columbia University   Coursera
- Deep Learning Specialization - by DeepLearning.AI   Coursera