KIRAN SUVAS PATIL

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EDUCATION

University of Maryland - College Park | M.Eng. in Robotics – 3.9/4   📅 Aug 2022 – 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   NumPy   Pandas   Matplotlib   OpenCV   Scikit-Learn   Jupyter   ROS/ROS2   MoveIt   Gazebo   Blender   Maya   Open3D   CloudCompare   AWS   Linux   SQL   HuggingFace   3D-CAD   SolidWorks   Fusion360   Docker   Kubernetes   LaTeX   Arduino   Raspberry Pi   Jetson

TECHNICAL EXPERIENCE

Robotics Algorithms & Autonomous Systems (RAAS) Lab , UMD | Research Assistant   📅 Feb 2024 – May 2024

- Adapted Neural Implicit Scalable Encoding SLAM, originally designed for RGBD images, to work efficiently with RGB images alone, enhancing its applicability to outdoor environments.
- Integrated a depth estimation module into the SLAM framework, enabling accurate depth perception using monocular RGB images. Conducted extensive tests in real-world outdoor environments.

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

- Built an underwater oyster detection system employing the YOLOv8 segmentation task. Modeled an underwater environment with an oyster bed in Blender to produce realistic underwater images for testing.
- Applied Deep-WaveNet over the rendered scene to enhance the underwater imagery, improving the mAP by 18.65%.

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 – May 2024

- Generated a large synthetic dataset exceeding 60k images using Blender for 3D modeling and scripting. Trained a YOLOv9 model on this data, achieving a strong mAP@0.5 score of 0.67 for object detection in occluded environments.
- Deployed the trained model onto the backend of a ROS node to enable object detection within the ARIAC 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, improving LPIPS by 40.83%.
- For analysis, crafted a custom NeRF dataset employing InstantNGP for efficient generation and used Dense Prediction Transformer (DPT) for improved quality.

Terraformers - UMDs Univ Rover Challenge team | Software subteam lead | ROS2, Arduino, Jetson   📅 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 | Open3D, PyTorch3D 🔗   📅 Dec 2023

- Executed PointNet, a deep net architecture on point clouds (as unordered point sets) for 3D Classification & Segmentation, achieving a test accuracy of 97.58% & 88.52% respectively. Also, conducted a robustness analysis on the learned model.
- Automated 3D Shape Detection, Segmentation, and Clustering for point-clouds using Open3D with python.

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).

All Terrain Rescue Bot - B.E. Final Year Project | ROS, C++, Python, SolidWorks, Jetson, Arduino, RPi   📅 Jan 2019 – May 2019

- Designed and developed modular, wireless-controlled robot prototype for traversing challenging terrains.
- Built the robot using SolidWorks for design and Eagle for custom PCBs. ROS enabled communication while live-streaming, perception, and thermal capabilities were deployed with a Jetson Nano for enhanced functionality.

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.

CERTIFICATION

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