

Manjunath D

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EDUCATION

- Atria Institute of Technology** Bengaluru, India
 - Bachelor of Technology - Information Science and Engineering; CGPA: 7.52/10.0 Aug 2018 - Aug 2022
 - Courses:** Linear Algebra, Machine Learning, Data Structures, Analysis of Algorithms, Operating Systems, Networking, Databases

EXPERIENCE

- Artificial Intelligence and Robotics Lab, Indian Institute of Science (IISc)** Bengaluru (Full-time)
 - Research Assistant - Advisor: Prof. Suresh Sundaram** Jan 2023 - Present
 - Continual Learning for Autonomous Vehicles: Developing efficient and robust algorithms to train computer vision models for panoptic segmentation in autonomous vehicles, leveraging continual learning methodologies.
 - Electro Optical-Infrared (EO-IR) Domain Adaptation: Identified challenges of existing work on EO-IR Fusion algorithms due to hardware constraints. Proposed novel architecture to leverage unsupervised learning and domain adaptation techniques to train IR images using EO datasets that are not co-registered.
 - EO-IR Dataset for robust tasks: Performed detailed literature review and identified the challenges of obtaining and use of co-registered EO-IR images on edge devices such as drone due to its computational and power constraints. Proposed a novel dataset to address this challenge.
 - Slant angle Object Detection: Enhanced state-of-the-art models like ReDet and ORCNN to improve robustness for rotated bounding box object detection in aerial imagery.
- Energy and Wetlands Research Group, Indian Institute of Science (IISc)** Bengaluru (Full-time)
 - Project Assistant; Advisor: Prof. T V Ramachandra** Jan 2022 - Dec 2022
 - Maintaining Research Archives: Developed a full-stack web application with the Django framework to manage and publicly share information on biodiversity, energy, and the environment.
 - Biennial Lake-symposium - Lake 2022: Designed and developed a web portal prototype to store and visualize raster data as dynamic overlays on Satellite imagery using GeoServer, PostgreSQL, phpMyAdmin, and Tomcat.

PUBLICATIONS

- IndraEye: Infrared Electro-Optical UAV-based Perception Dataset for Robust Downstream Tasks**
The first-ever multi-sensor, multi-domain slant-angle dataset curated to address challenges related to occlusion and scale variations in object detection and semantic segmentation tasks, benchmarked against other relevant datasets and state-of-the-art (SOTA) algorithms.
Paper link: [Preprint at Arxiv](#) [Project page](#) (Submitted to **ICRA 2025**)

PROJECTS

- Fine tuning ReDet and ORCNN to boost performance on objects by generating synthetic dataset using unreal Engine to address Sim-to-Real gap and improve accuracy scores of tail classes due to long-tail problem.
- Fine tuned object detection performance on Synthetic Aperture Radar (SAR) dataset obtained from UMBRA dataset to improve the performance of recent SOTA foundation model with ViT backbone.
- Implemented 2D LiDAR SLAM with tele-op and frontier exploration in static indoor environments. Simulated turtleBot3 in Gazebo and incorporated RViz for real-time visualization of the LiDAR data, robot pose, and the evolving map.
- Plant Phenotyping via computer vision to analyze the plant characteristics to classify health and diseased plants and identifying the type of disease. Standard ResNet50 backbone was used with Adam Optimizer and CrossEntropy loss function that is trained for 200 epochs with learning rate of 1e-3 to classify the plant diseases.
- Covid Prediction using Chest X-Ray using custom model with only three convolution network to develop a classification model using SGD optimizer and Binary Cross-Entropy loss function to classify if the patient has covid or healthy.
- Automated crop monitoring system using ESP32 and sensors such as temperature, humidity, soil PH, TDS whose values are monitored using NodeRed to the master node through mosquitto to efficiently monitor hydroponics setup.

TEACHING EXPERIENCE

- Delivered a talk on Target Recognition in aerial imagery, Faculty Development Program (FDP) for "Drone Perception".
Location: PES University, Electronic City Campus, Karnataka, Bengaluru (Date: 26/06/2024)
- Delivered a talk on Deep learning for autonomous navigation, Industrial workshop for Ashok Leyland.
Location: Dept of Aerospace Engineering, IISc, Bengaluru (Date: 22/02/2024)
- Delivered a talk on AI perception for Aerial Robotics, FDP for "Unmanned Aerial Vehicles Technology and its Applications".
Location: Dept of Aerospace Engineering, IISc, Bengaluru (Date: 16/09/2023)

SKILLS AND EXTRACURRICULAR

- Programming:** Python, C++, Java, Robot Operating System (ROS/ROS2), LaTeX
- Software/Frameworks:** Docker, Kubernetes, Jenkins, PyTorch, Keras

VOLUNTEER EXPERIENCE

- Google Developer Student Clubs Lead** Bengaluru, India
 - Conducted online and offline technical (Deep Learning) training for about 700 students. Aug 2020 - Aug 2021