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

- **Artifitial 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.
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  - RGB to IR Domain Adaptation: Developing novel architecture to leverage unsupervised learning and domain adaptation techniques to train infrared (IR) data using RGB datasets that are not co-registered.
  - 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 designed 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.
- Ortho-Rectification for Geo-locating each pixel of an image captured through drone with spatial and height information using DEM and DSM data for a given region.
- Plant Phenotyping via Computer Vision to analyse the plant characterstics 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 3 conv network to develop a classification model using SGD optimizer and Binary Cross-Entropy loss function to classify if the patient has covid or healthy.
- Fine tuned object detection performance on Synthetic Apperture Radar (SAR) dataset obtained from UMBRA 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.
- 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

- **PES University, Bengaluru**: Delivered a talk about Datasets in Machine learning to 25 faculties.
- **RVCE, Bengaluru**: Hands on Machine learning for around 30 faculties.
- **Ashok Leyland, Bengaluru**: Hands on Machine learning for around 50 employees of Ashok Leyland group from Bangalore.

SKILLS AND EXTRACURRICULARS

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

Volunteer Experience

- **Google Developer Student Clubs Lead - 2020** — Bengaluru, India
  Conducted online and offline technical (Deep Learning) training for about 700 students. — Aug 2020 - Aug 2021
- **Communities in Atria Club Lead - 2021** — Bengaluru, India
  Conducted online and offline technical & soft-skills essential to students for placements. — Aug 2020 - Aug 2021