

Sri Mihir Devapi Ungarala

Researcher, Robotics Research Center

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Education

August 2019	Birla Institute of Technology and Science (BITS) Pilani	Hyderabad, India
August 2023	B.E. Electronics and Communications Engineering (ECE) - CGPA: 8.2/10	

Research Experience

Present	IIIT Hyderabad Robotics Research Center [🌐]	Hyderabad, India
June 2023	<i>Researcher</i> Working on creating an Object Detection/ Segmentation pipeline that can work even in Adverse Weather Conditions. Working on Deep learning-based path planning algorithm for Drones.	
January 2023	<i>Research Intern (Bachelor Thesis)</i> Advisors: <i>Dr. K Madhava Krishna, Dr. Joyjit Mukherjee</i> Worked on creating a Multi-agent SLAM pipeline.	

Technical Skills

- > Python, C++, C, MATLAB
- > Pytorch, Tensorflow, ROS
- > Arduino, RaspberryPi

Publications

- [S.1] **DiffPrompter: Differentiable Implicit Visual Prompts for Semantic-Segmentation in Adverse Condition**
Sanket Kalwar*, Mihir Ungarala*, Shruti Jain*, Aaron Monis, Krishna Reddy Konda, Sourav Garg, K Madhava Krishna
[In Submission]

Select Research Projects

Differentiable Implicit Visual Prompts fr Semantic-Segmentation in Adverse Condition August'23 - September'23
Advisors: *Dr K. Madhava Krishna, Dr Sourav Garg*

- > Conducted an analysis on how Visual Prompts can be used for better generalization in adverse weather conditions.
- > Extracted weather related representations and used them to create prompts which are weather invariant for improved segmentation.
- > Experimented on different variations of architecture for improvement in performance and generalization in out-of-distribution scenarios.
- > [Link](#) to project website

Semantic Segmentation using Segment Anything Model(SAM) June'23 - August'23
Advisors: *Dr K. Madhava Krishna, Dr Sourav Garg*

- > Worked extensively on SAM's embedding space
- > Worked on using semantic property in SAM's embeddings to do semantic classification without incorporating any learning methods
- > [Link](#) to GitHub

Drone Dynamics modelling Using Deep Learning September'23 - Current
Advisors: *Dr K. Madhava Krishna, Dr Arun Kumar Singh*

- > Trained a neural network in accordance with Koopman Theory that can project state space vector of drone to higher dimensional space where drone dynamics are linear
- > Working on exploiting the linear characteristics of new state space for tracking and path planning using Convex Optimization.

Advisor: Dr K. Madhava Krishna, Dr Joyjit Mukherjee

- > Conducted a thorough literature study to understand different SLAM as well as Multi-agent SLAM algorithms to understand the key differences between them and, the limitations, novelty, and scope of each algorithm.
- > Worked primarily on inter-robot and intra-robot loop closures and worked on pose-graph optimization.
- > This work is part of DRDO funded project
- > [Link](#) for Thesis Report and Code

Course Projects

Face Retrival

BITS F441: Sel Topics from CS - Computer Vision

- > The idea of the project is to create an image retrieval pipeline based on faces which is inspired by a feature of Google Photos.
- > Implemented a Siamese network-based face recognition network that acts as a binary classifier saying whether query and target images are the same or not which is different from the general, Euclidean distance-based approach.
- > [Link](#) to GitHub

Image colorization

BITS F312: Neural Networks and Fuzzy Logic

- > Used Convolutional Auto-encoders for colorizing grayscale
- > Instead of directly predicting in RGB color-space, predictions are done in Lab color-space i.e., given the L-channel of a grayscale image, predicting a,b channels of RGB image as the L channel of RGB image and the grayscale image is the same.
- > [Link](#) to GitHub

Relevant Courses and certificates

- > **BITS F312: Neural Networks and Fuzzy Logic:** Grade(Letter grade/10 scale): A-/9
- > **BITS F464: Machine Learning:** Grade(Letter grade/10 scale): A-/9
- > **BITS F441: Sel Topics from CS - Computer Vision:** Grade(Letter grade/10 scale): B/8
- > **Deep Learning Specialization in Coursera by Andrew Ng:** [Certificate Link](#)
- > **Reinforcement Learning:** MOOC by David Silver