# Sri Mihir Devapi **Ungarala**

**Researcher, Robotics Research Center**

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## Education

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

## Research Experience

**Present – June 2023** | **IIIT Hyderabad | Robotics Research Center** [🌐] — **Hyderabad, India**
*Researcher*
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** | *Research Intern (Bachelor Thesis)| Advisors: Dr. K Madhava Krishna, Dr. Joyjit Mukherjee*
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

**Data Driven Path Planning for Drone** 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 integrating it with Model Predective Control for path planning.
- Prior to this, worked on Diffusion based methods.

**Distributed/Multi-Agent SLAM** January'23 - June'23

*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