

# ADITI SHANMUGAM

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## Technical Skills

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**Core Competencies:** Machine Learning, Deep Learning, Computer Vision, Image Processing, Data Visualization

**Programming Languages:** Python, C++, LaTeX

**Tools and Frameworks:** Pytorch, Keras, TensorFlow, OpenCV, Git, onnxruntime, TensorRT

## Experience

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### Inferigence Quotient

April 2022 – Present

Computer Vision Engineer (July '22 - Present), Intern (April - July '22)

Bangalore, India

#### System for Tracking And Recognition of Targets - iSTART

- Developed a robust object recognition and tracking pipeline to be deployed within Unmanned Aerial Vehicles (UAVs) by implementing tracking algorithms such as DeepSort with custom-trained YoloV7 models.
- Used frameworks and libraries such as OpenCV, TensorRT, and onnxruntime in C++ to architect and develop the system, optimizing it for deployment on Jetson devices.

#### Real-time Georeferencing of Aerial Infrared (IR) Video - GeoAIR

- Employed Python and OpenCV to develop a pipeline to perform precise frame registration, aligning UAV-captured images with satellite imagery for accurate geo-location.
- Incorporated template matching algorithms with sparse, and dense optic flow to achieve close to 90% frame registration and delivered performance on HD videos with latency below 500ms, and throughput of 25fps, on a moderate capacity GPU.

### Visual Computing Lab, Indian Institute of Science (IISc)

May 2021 – April 2022

Research Intern

Bangalore, India

#### Source Free Multi-Label Domain Adaptation - SF-MLDA

- Played a key role in the development of an innovative framework for performing Source-Free Multi-Label Domain Adaptation (SF-MLDA).
- Successfully integrated a co-teaching based algorithm called Divide-Mix to handle noise in training data within the SF-MLDA framework, resulting in a 7.0% improvement in accuracy.

#### Superpixel Masking and Image Inpainting - SMAI

- Assisted in the development of two networks inspired by GANs and Autoencoders respectively for anomaly detection, localization and correction.
- Experimented with structural loss and reconstruction loss to establish a correlation on image inpainting and reconstruction.
- Enhanced the pipeline by incorporating multi-exposure fusion techniques for synthetic image regeneration, achieving an impressive 80.0% overall accuracy rate.

### Fellowship.ai

January 2021 – April 2021

Data Science Fellow

Bangalore, India (Remote)

#### Zero-shot food detection

- Created an end-to-end functional web application using streamlit performing zero-shot object detection for food in an in-oven setting.
- Leveraged a state-of-the-art Contrastive Language-Image Pre-training model - CLIP by OpenAI to achieve a final Top-1 accuracy of 97.22% and Top-3 accuracy of 100.0% on a custom dataset containing only 16 images per class.
- Established baselines with ResNet50 and ResNet101 networks by transfer learning and training from scratch on custom datasets.

## Education

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### BMS Institute of Technology and Management

August 2018 – July 2022

Visveswaraya Technological University - B.E Electronics and Telecommunications

Bangalore, Karnataka