Weekly Report 1

Group-6 Project-1

Problem Statement:

Object detection techniques (in the case of small objects) on the AU Drone dataset.

● Aerial imaginary small object detection

● Various Deep Learning Models/Approaches to study: QueryDet, HoughNet, SyNet

● Training Set: Visdrone 2019 detection

● Test Set: AU drone Dataset

Brief Description:

In aerial imagery, small object detection is a very challenging task [1]. There are various deep learning-based models already available to solve this problem. We have our own aerial images/videos of Ahmedabad Road traffic. In this project, students will use several existing models to evaluate their performance on our dataset. Performance metrics will be mAP@0.5, mAP@0.75, mAP@0.95, and confusion matrix. Available deep learning models

Some of the techniques we came across that might help:

Sahi (Slicing Aided Hyper Inference)

Object detection and instance segmentation are by far the most important applications in Computer Vision. However, the detection of small objects and inference on large images still need to be improved in practical usage. Here comes the SAHI to help developers overcome these real-world problems with many vision utilities.

A lightweight vision library for performing large scale object detection & instance segmentation.

Tiling approach during training and inference

State-of-the-art object detectors allow only the fixed size of image and change the input image size according to it. This change may deform the small objects in the image. The tiling approach helps when an image has a high resolution than the model's fixed input size; instead of scaling it down, the image is broken down into tiles and then used in training. The same approach is used during inference as well.

Feature Pyramid Network (FPN)

Use a feature pyramid network to learn features at a multi-scale: e.g., Twin Feature Pyramid Networks (TFPN), Extended Feature Pyramid Network (EFPN). FPN helps to sustain features of small objects against convolution layers.