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Individual Final Report
xView

Introduction

xView is the largest available sets of overhead imagery to date, with the over one million objects across 60 classes in over 1,400 km2 of imagery. The images are from the complex scenes around the world, annotated with more than one million bounding boxes representing a diverse range of 60 object classes. The reason why we chose the xView data is the solution of the image in this dataset is 0.3 meters per pixel, and that means this is the highest resolution that we can get from satellites currently. The motivation of this project is to build a deep convolutional neural network. (CNN)

My individual work

Most of my work in this project is focused on data pre-processing and testing the model. Data preprocessed via chipping. Every 1 km2 image is around 3,000 pixels2. Due to the size and object density, it was really hard to pass the entire image into a neural network, therefore, we decided to chip each image into 500x500 chips. The chips will be plotted, and each class will be present in the image and also visualize the chips with their labels. The chips can be shifted and rotated. We got original data from xView; however, the code is not working until Diana helped to broke out chip_path and chip_name and some bugs.
We tested the three pre-trained xView baseline models (vanilla, multi-res, and multires_aug) on our own computer as well as code for inference and scoring, respectively. The set-up process was spent some time. MultiRes performed the best, with an mAP of 0.2590. and Vanilla performed the worst with an mAP of 0.1456. The interpolated mAP metric used for primary evaluation to measure the overlap between the true bounding boxes and predicted bounding. We start with a set of ground truth rectangles, a set of predicted rectangles and the confidence score between each rectangle. In the end, I will test and evaluate our new model through the inference code, and scoring code, and compare with other three pre-trained xView models.

I was copied the most of code for data pre-processing part from the internet; however, my computer needs more help to set up. After Diana modified some important part, it is working on my computer. I would say over 85% code is found or copied from the internet.

Reference

xView Competition website: https://challenge.xviewdataset.org
xView dataset and ground truth geojson: https://challenge.xviewdataset.org/download-links
Pretrained Tensorflow models: https://github.com/DIUx-xView/baseline/releases
xView Pre-Processing code: https://github.com/DIUx-xView/data_utilities
xView Baseline TensorFlow code: https://github.com/DIUx-xView/baseline
xView Baseline Docker container: https://hub.docker.com/r/xview2018/baseline/tags