CV 703: Project

This project carries **50% of the total weightage (50 out of 100) in the course**. The project has an implementation component, a technical report component, a teaser video, and an oral presentation. To finish the project, all components need to be done. *The whole project (code + test set results + report + teaser) should be finished by the end of week 14 (November 23rd, 2021). The oral presentations will be conducted on week 15 (December 1st and December 2nd, 2021).*

Deadlines:

Code + Technical report + Test set results + teaser video ------ Week 14 (November 23rd, 2021).

Oral Presentation ------ Week 15 (December 1st and December 2nd, 2021).

Project Description:

The project is to train and evaluate an object detection method on the satellite images taken from the iSAID dataset. The iSAID dataset comprises satellite images having 15 different object categories. The task is to detect instances of these 15 object classes. The iSAID dataset is provided here and locally under '/apps/local/shared/CV703/datasets/iSAID'. Please use these links to download the dataset. In addition to the images, the dataset also contains the annotations which are in json/coco format. The final submitted test results should follow the same format.

Dataset Description: As mentioned above, the dataset consists of 15 object categories. The dataset is split into three parts: **Training, Validation and Test**. *Only the **Training** and **Validation** set annotations are provided. The **Test set** annotations are withheld. During the method development, it is recommended to perform the training on the **Training Set** and the **Validation set** is recommended to be used for validating the performance of the method. **The final results at the end need to be submitted on the Test Set.** Note that the project evaluation is only going to be on the **Test set results**. The results on the **Test Set** can be sent/submitted to the lab supervisors at most **3 times**. Therefore, please carefully use the 3 **Test Set** result submission option. For evaluating on the **Test Set**, a detection method can be trained on the **combined Training + Validation Set**.*

Project Task: The task in this project is to achieve improved detection accuracy while being computationally efficient. Therefore, we strive to achieve an optimal tradeoff between detection accuracy and speed. A reference code (for the two-stage Faster-RCNN) is provided in the notebook. The implementation uses the Detectron2 platform. ***Please note that this is just a reference repo/implementation and you are free to choose any code base of any object detector (two-stage or single-stage) of your choice.***

Project Deliverables: There are five deliverables: a completed code, Test Set results, a technical report, a teaser video, and an Oral Presentation. The completed code in the form of python files and trained models should be submitted in a zipped folder. The technical report is expected to describe the contributions, architecture design, implementation details and a discussion about the results (e.g., object detection in satellite images performance and qualitative results) obtained from the completed implementation. The technical report should not be longer than **8** pages. The technical report should be in CVPR template (shared on the Moodle).

Submission Procedure:

Three of the required materials (code, teaser video, and technical report) should be submitted in one zipped folder. In case the zipped folder exceeds the Moodle upload limit, please contact the lab supervisors. The Test set results should be directly sent via email to the Lab Supervisors. Finally, the oral presentation will be conducted on Week 15 during CV703 Lecture timings.

Example Evaluation: For performance evaluation (detection accuracy), we use the bounding box mean Average Precision (mAP). You can either use the Detectron2 evaluator or iSAID devkit evaluator.

Example evaluation result:

AP	AP50	AP75	APs	APm	APl
37.146	58.004	40.294	22.517	44.185	51.254

Assessment Criteria:

1: Novelty (demonstrated by improvement in performance over the defined baseline along with appropriately documenting it in the technical report).

2: Performance comparison, in terms of both detection accuracy and efficiency (parameters and inference time).

3: A well-written technical report (similar to a technical paper) with introduction, related work, method, experiment and conclusion sections.

4: An oral presentation with a clearly defined problem statement, contributions and experimental results.