Multimedia Project SoSe 23

Assignment 6

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Please take a look at assignment 0 on how to submit your work.

Exercise 6.1 Non Maximum Suppression   10 Points

(a) Implement non maximum suppression (NMS) in a function
    `def non_maximum_suppression(boxes_scores, threshold)`
    For this exercise, use 0.3 as the IoU threshold.

(b) To test your method, you will need a set of boxes and corresponding scores. As we do
    not have a working neural network at this point, use the given network output (from the
    file `model_output.txt`) to test your non maximum suppression. The lines in the network
    output file are formatted like:

    `{image_number}␣{x1}␣{y1}␣{x2}␣{y2}␣{score}`

    After non maximum suppression, draw all boxes with a score higher than 0.5 for every
    image that exists in the output file. Submit the resulting images.

Exercise 6.2 Inference   5 Points

Implement a function `def batch_inference(model, images, device, anchor_grid)` that
performs inference on a given batch of images. For every image in the batch, the function must
return a list of box-score-tuples. Thus, the output is a list of lists of tuples of `AnnotationRect`
and score (`float`).

Use NMS to filter the output of the network. A good NMS-threshold is 0.3 (IoU).

Exercise 6.3 Evaluation 5 Points

(a) Create a function `def evaluate(...)`. You can decide which arguments it should receive. This function evaluates the trained model on the full validation set. Use the `batch_inference` function.

(b) Calculate the average precision on the validation set. The `evaluate` function must return the AP as a `float`. Further, **submit** a PR curve and interpret it.

(c) Repeat the training from last assignment, but this time evaluate the performance (average precision) regurlarly using your `evaluate` function and plot your scores.

Exercise 6.4 External Testing 5 Points

Write a function `def evaluate_test(...)`. You can decide which arguments it should receive. This function evaluates a model on the full test dataset and produces a text file containing the detecions on the test set. Use the `batch_inference` function.

Submit your detections for the test dataset: Create an account on our challenge website which you can find under `https://mmc027.informatik.uni-augsburg.de:8888/`. The nickname will be visible to others on the leaderboard but your RZ name will be hidden and is only visible to the staff.

Once you have created an account, log in with your chosen credentials and click on "New Submission". Upload the detection file as described on the website. If a row with your nickname appears on the leaderboard, the upload was successful. After you have submitted a detection file, you have to wait for 12 hours until you can submit again.

If your highest score is less than 0.10, you will get no points on this exercise. If your highest score is less than 0.60, you will get at most 3 points on this exercise.