Assignment 1

October 11, 2020

In this assignment, we are going to use image processing techniques to extract a gall bladder from an ultrasound image. The given files have the following directory structure:

```
- eval.py
- val
    - img
    - annotation
    - masks
```

The input images are present in the img folder. The gall bladder is marked in the binary mask images (masks directory) and the same information is present in the json format in the annotations directory. An example is shown in Figure 1.

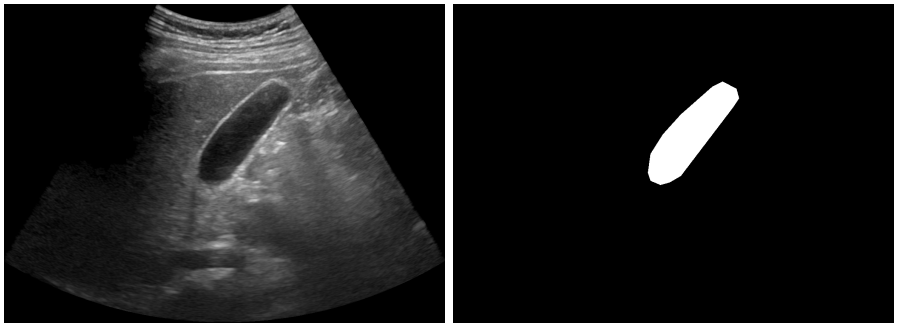

Figure 1: The input ultrasound images containing the gall bladder are shown on the left and the binary mask is shown on the right

Write an algorithm which takes the input images and writes the corresponding binary mask, i.e., grayscale images with 0 where the gall bladder is not present in the image and 255 where the gall bladder is present in the image. Save all the generated masks in the same folder with the names, same as the input file name. Thus, your script should use the following format:

```
python gen_det.py --img_path input_images \
--det_path <out_dir>
```

Note that you are only allowed to use OpenCV, Numpy (cv2, numpy) packages in addition to the standard python libraries. Use Python version 3.7. You can then evaluate your results using:

```
python eval.py --img_path input_images \
--gt_path annotations_path \
--det_path <your_generated_masks>
```

We use the metric Intersection Over Union for evaluating the quality of the masks generated. Using the eval.py script you will be able to generate results for the images provided to you. The final scores will be generated on a held out data using the submitted script. Finally, the submission is to be done on Moodle consisting of a zip file (entry_no.zip) which has the following files:

- *val_masks*: Generated masks using your approach on the val images.
- *gen_det.py*: Python script for generating detections on the test data. Please make sure it uses the format as described above.
- *Report.pdf*: A report containing the methods that you have tried and your final scores on the val data.

Evaluation Rubric

Out of 10 marks, we will have the following distribution:

1. 5 marks - Report, Methods Used, Things Tried
2. 2 marks - Viva
3. 2 marks - For the top 20% scorers on the test set
4. 1 mark - Code readability

Deadline to be announced in class. The assignment has to be done individually.