Assignment 1

Goal:

As said in the description we have to compute the prior distribution for facial/non-facial region depending on the likelihood computed during the training period. Next we need to compute the posterior probability for the detected facial mask by using prior values.We then check with the testing images and calculate precision and recall.

Detailed steps how the algorithm works:

- In image detection and prediction models we first do the training of the images and then we use test cases to predict it.

Training

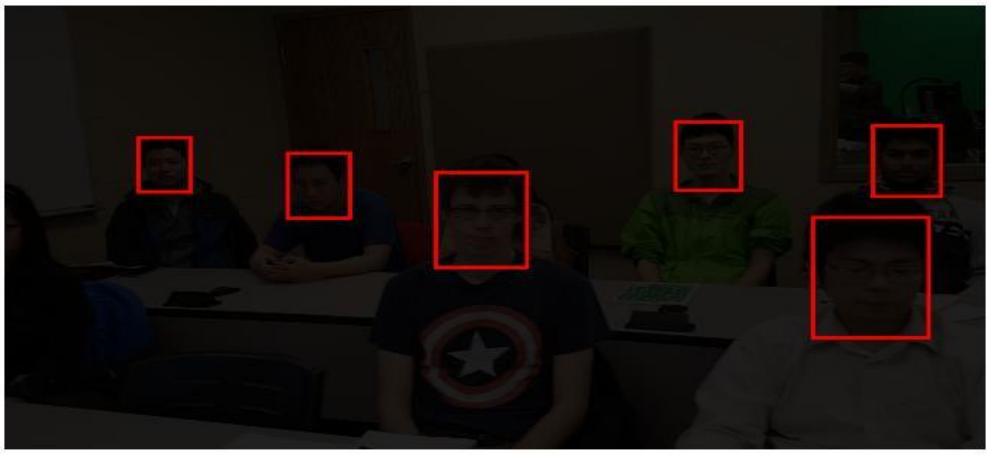
- During training we try to calculate the maximum likelihood of the pixel being detected as a skin, and depending on the prior we do testing and check if the probability of matching pixels is 1.
- We have already a set of vertices assigned to mark rectangle to mark facial regions and each pixel of the rectangle is a mask value.
- Next we check if the mask value i.e the pixel value is one or not.As we use RGB here it has 0-255 pixels after this we reduce the range to 0-32 to iterate over the training images

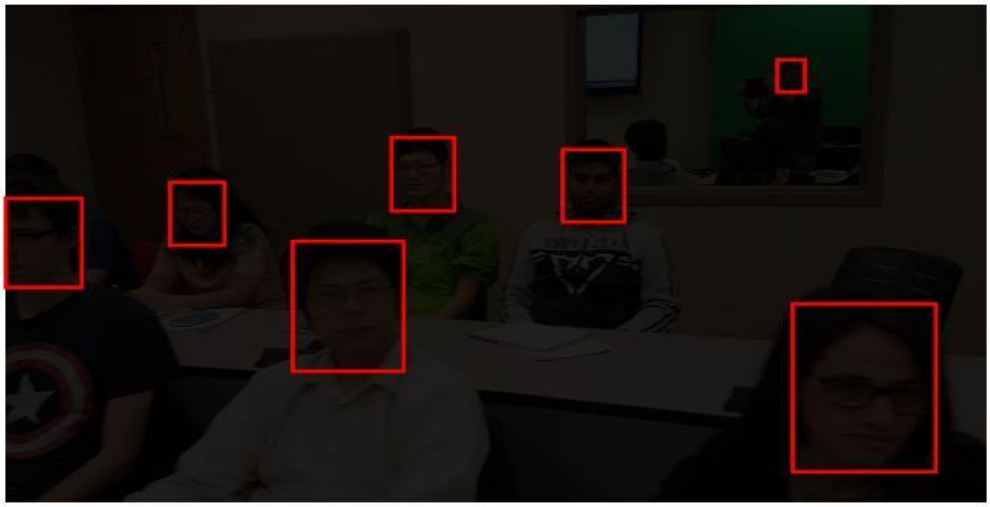
Testing

- First step is checking the pixel value if the value is 1 then the pixel has exactly matched and in this way all the pixels repeateadly
- Later precision is then calculated which is the ratio of total True Positives and the sum of True Positives and False Positives
- The recall is calculated which the ratio of True Positives and the sum of True Positives and False Negatives.

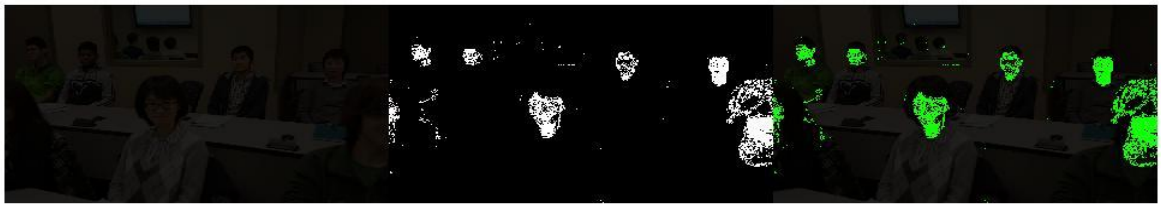
Results:

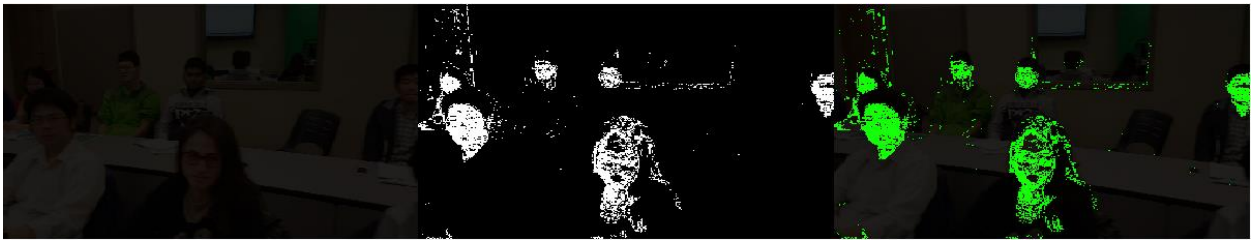
Images annotated and given by Professor Yin



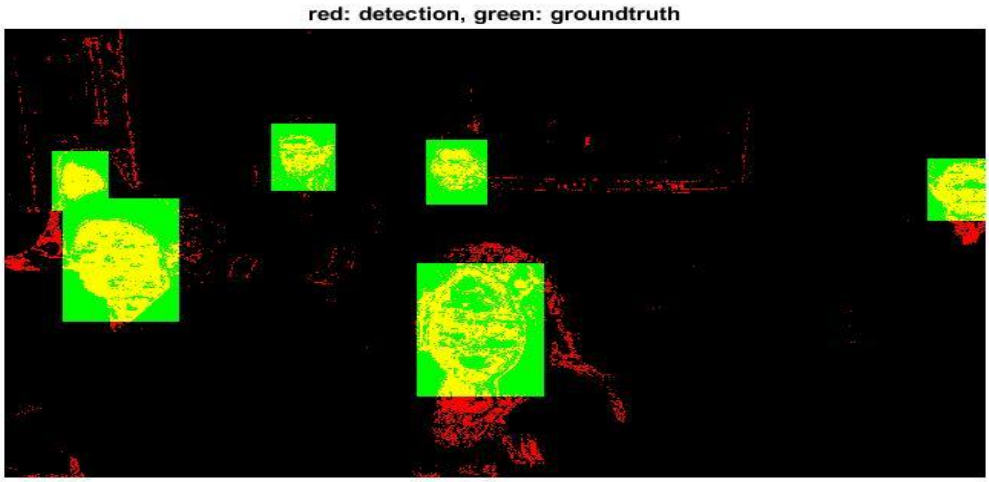


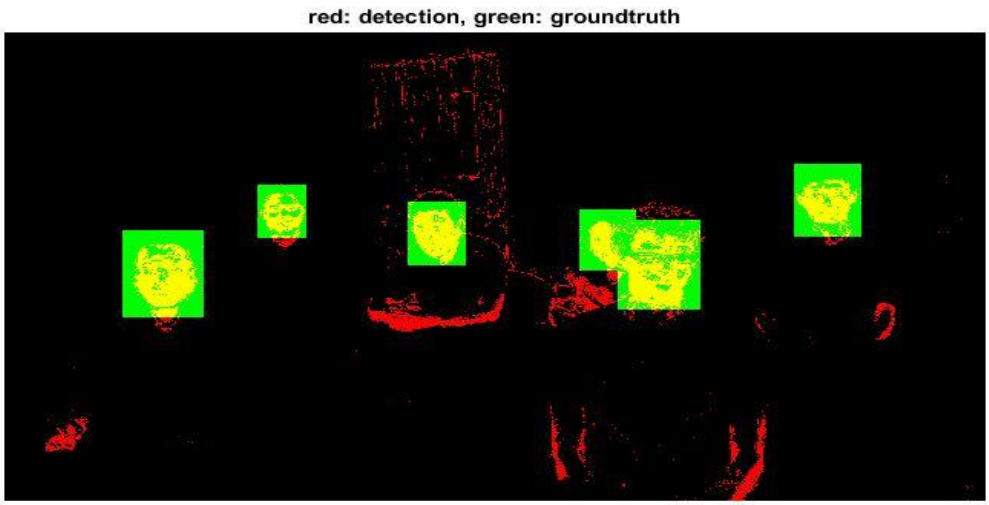
The rectangles denote the facial regions





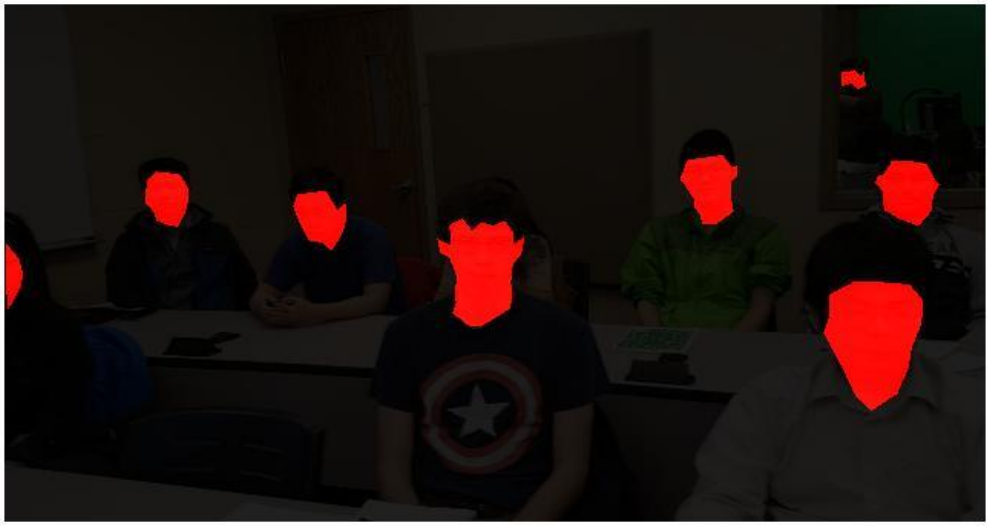
Ground truth is denoted by the green masks shown in the above images

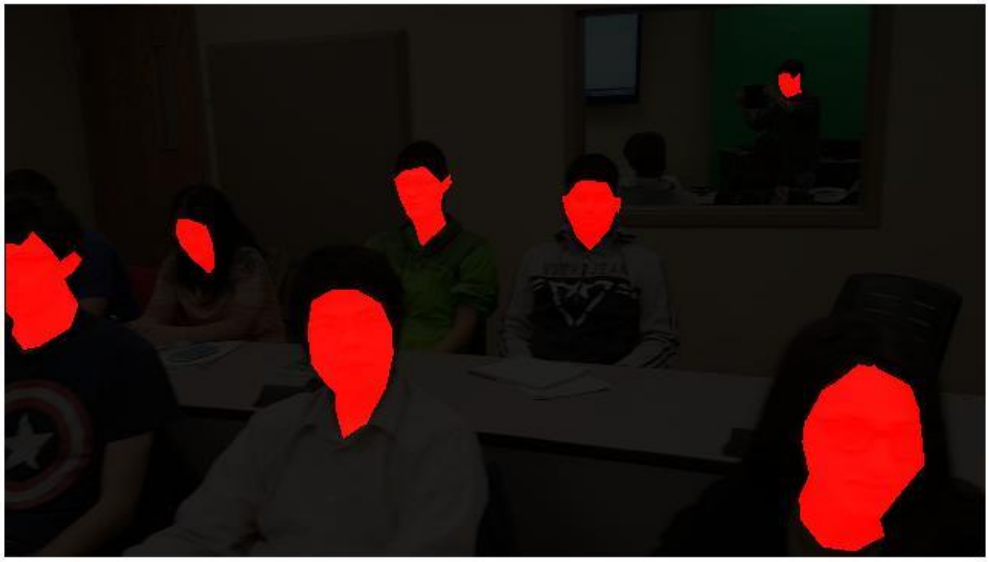




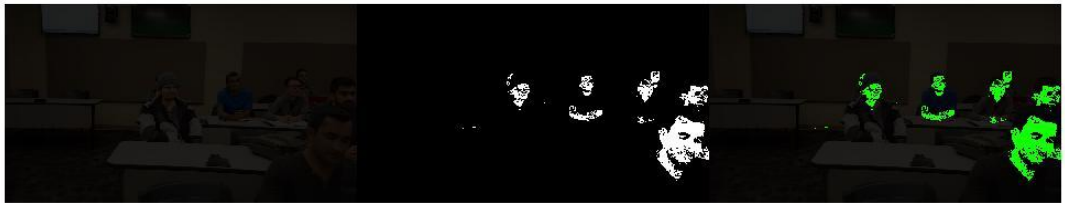
Yellow color shows the facial regions which are detected

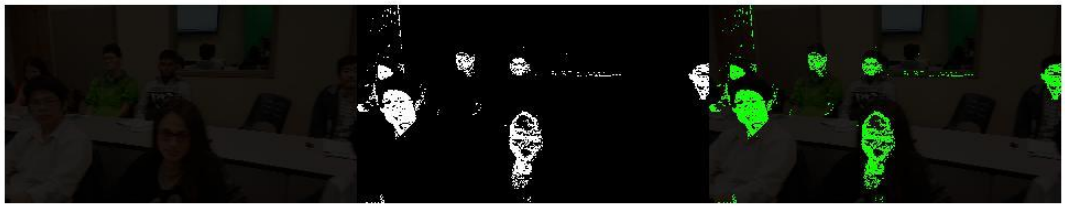
Images annotated by Wenjin:



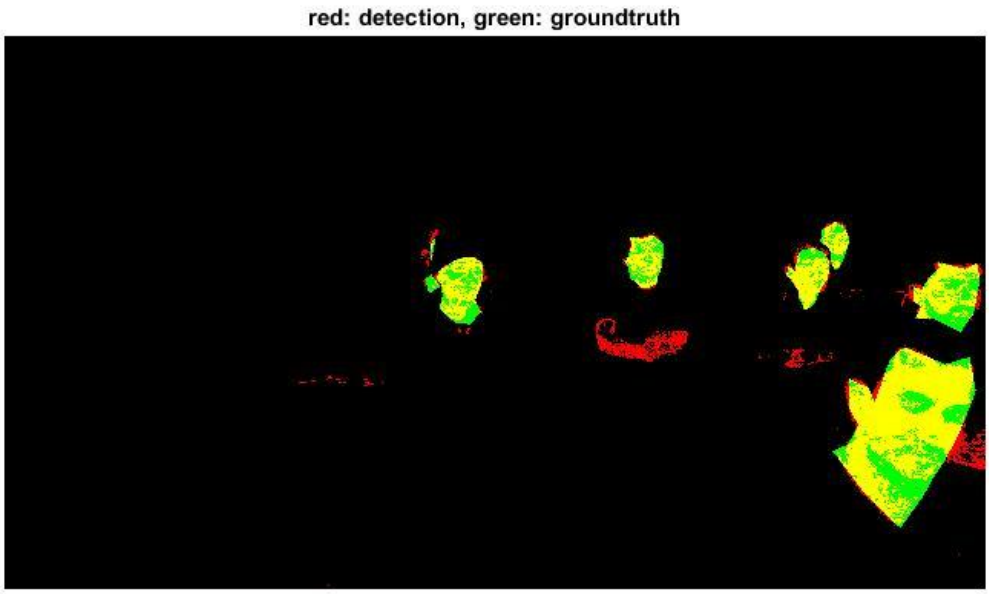


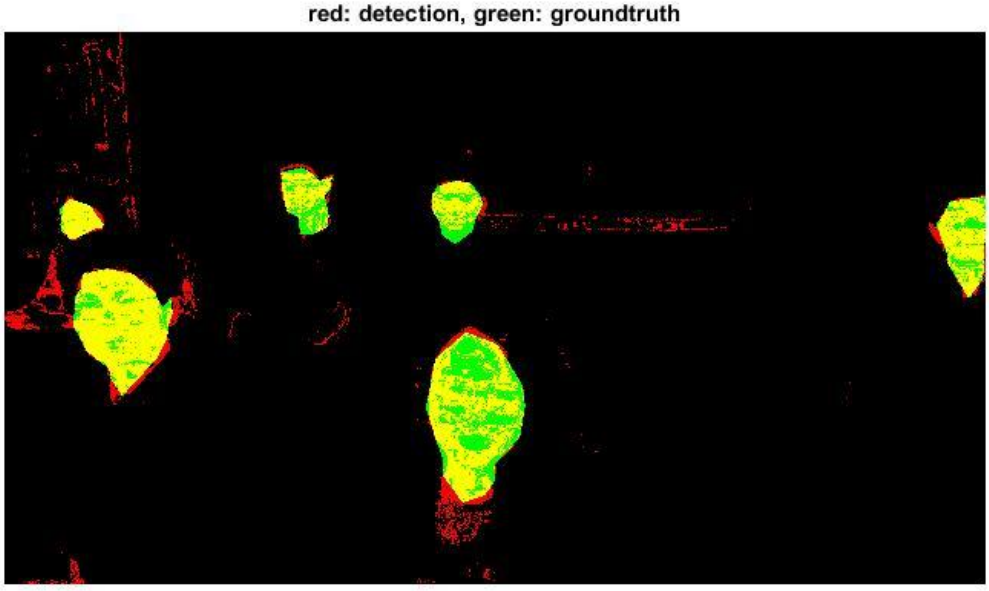
Annotated images which are inputs





Green color represents Ground Truth images





Final outputs which are the overlapped images