

CA4007 Image Processing – Lab Exam March 2nd 2020

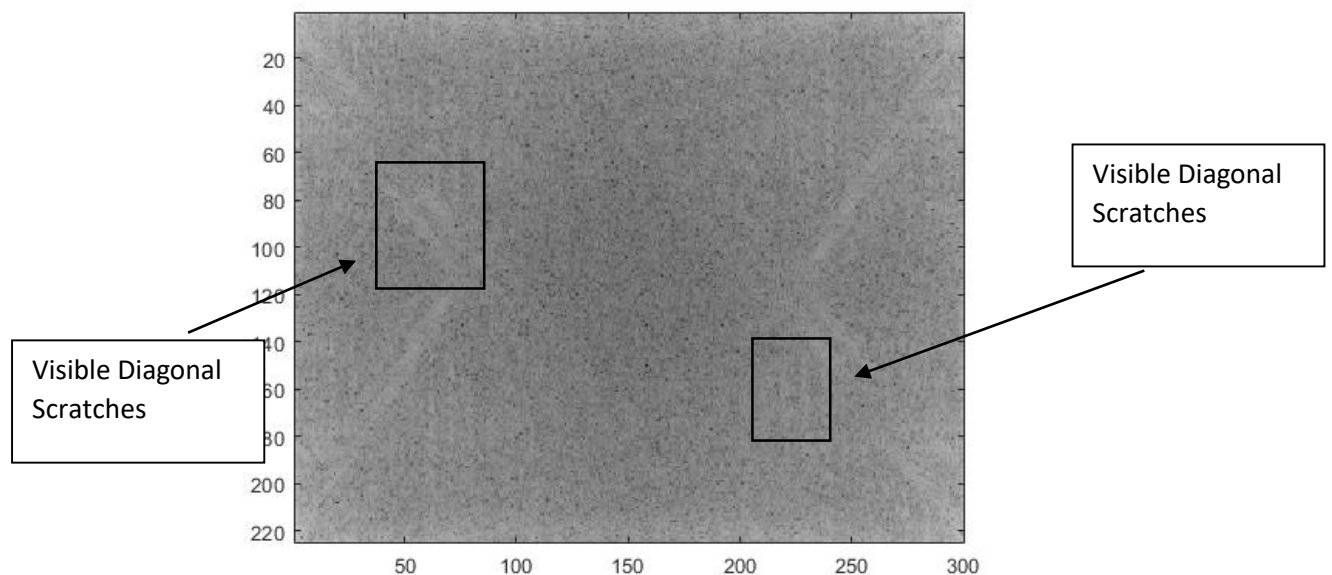
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Image(florence.mat)

The image we are working on in the lab exam is Florence.mat which is a structure in the Italian city of Florence.

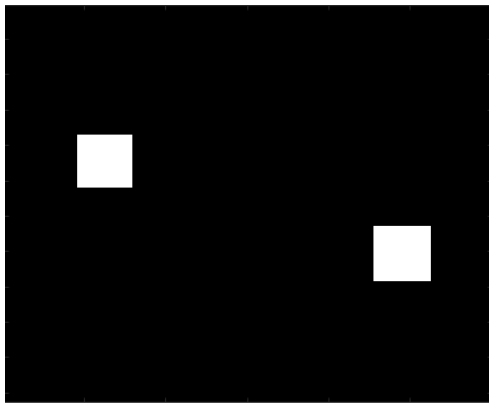


The Log of the image. We can see that there are scratches heading diagonally and other variations in parallel groups.

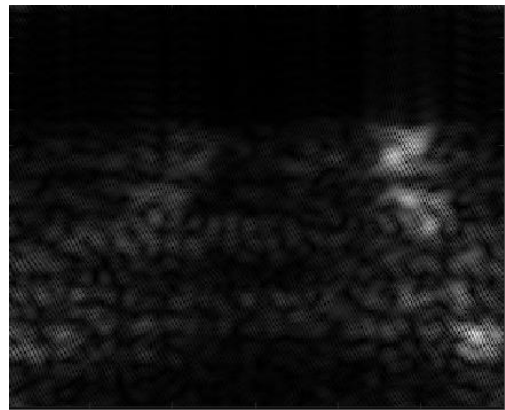
Code: `image(256*log(abs(y))/(max(max(log(abs(y))))));`

Where y is the fourier transform of the image.

Mask 1

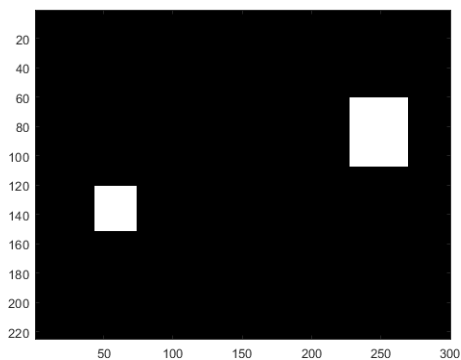


Resulting Image

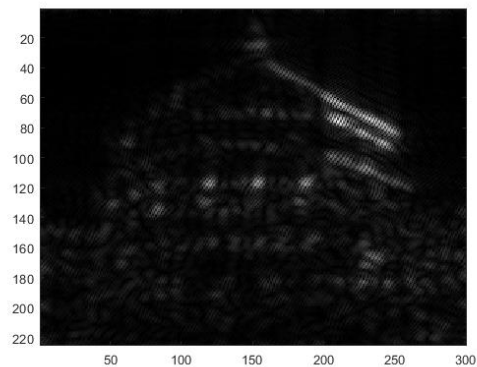


The result for our first mask showed a vague shape of the most prominent building. It is interesting to notice that the right side of the resulting image is brighter which is the same in the original image and the bottom right building.

Mask 2

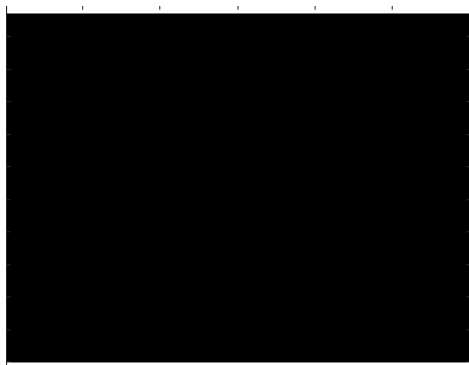


Resulting Image



By masking out two of the diagonal scratches, we have found that this makes the edges and contour of the building more visible in the image. We believe this is because the diagonals are perpendicular to the shapes we see in our resulting image. The design of the building is blurred out.

Mask 3



Resulting Image

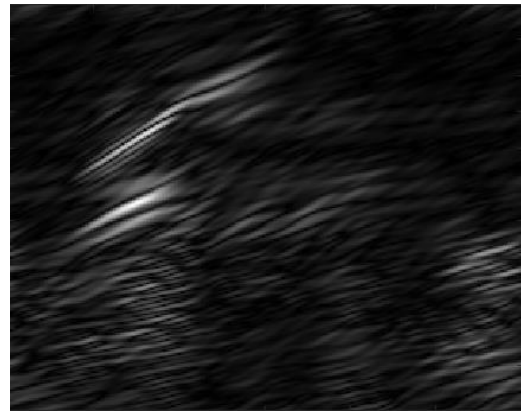


In masking the horizontal frequencies in the mask, we have made the image seem blurred as there are no horizontal edges in the resulting picture. The mask above lets through only high frequency waves travelling in the horizontal direction. The filter should detect only vertically aligned objects.

Mask 4

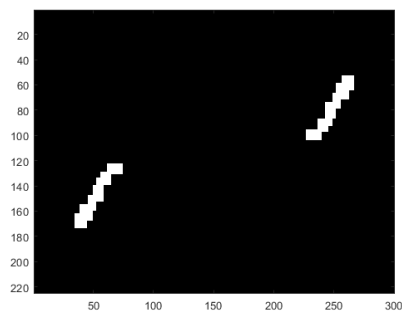


Resulting Image

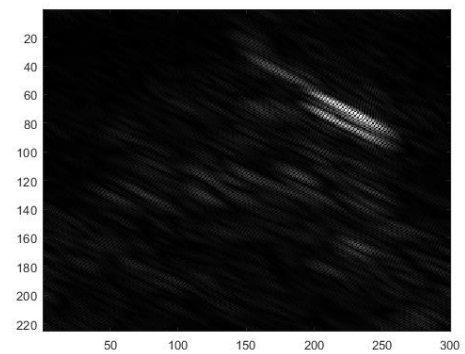


This mask hides the diagonals in the bottom right and top left corners. A very interesting image results from this mask. You can make out the top left of the most prominent building. The rightmost building can be made out by its edges as it has a similar frequency and angle.

Mask 5

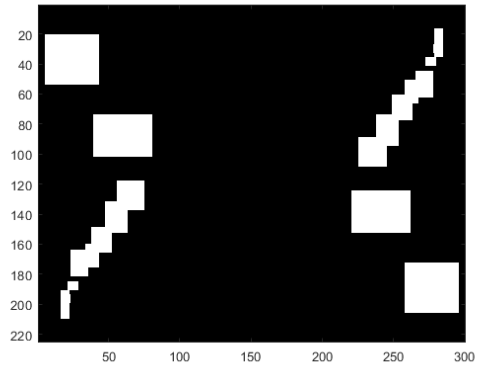


Resulting Image

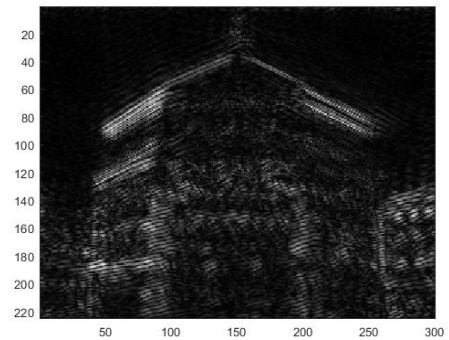


The diagonals in the bottom left and top right selected in the mask above show that these structures affect the right slanted side of the building as they are perpendicular to the shapes in our mask.

Mask 6



Resulting Image



Using another custom mask to include *all* of the diagonal structures in the fourier transform, we can confirm our theory that the diagonals represent the slanted edges on the buildings, with the top left and bottom right masks representing the other side of the building's angles.