Robot vision - assignment 5

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task 1

task 1a

We easily solve this task by using the command np.convolve with argument same for x and y direction before we find the magnitude image. The algorithm was also tested on images with known gradients to ensure it works.

task 1b

Here we create a Gaussian 1-D kernel with size being decided as 6 times the standard deviation. We then convolve the image with the kernel as in the last task.

task 1d

I ended up using a edge threshold of 0.01 and a blur sigma of 3 for image 2. The resulting images can be seen below

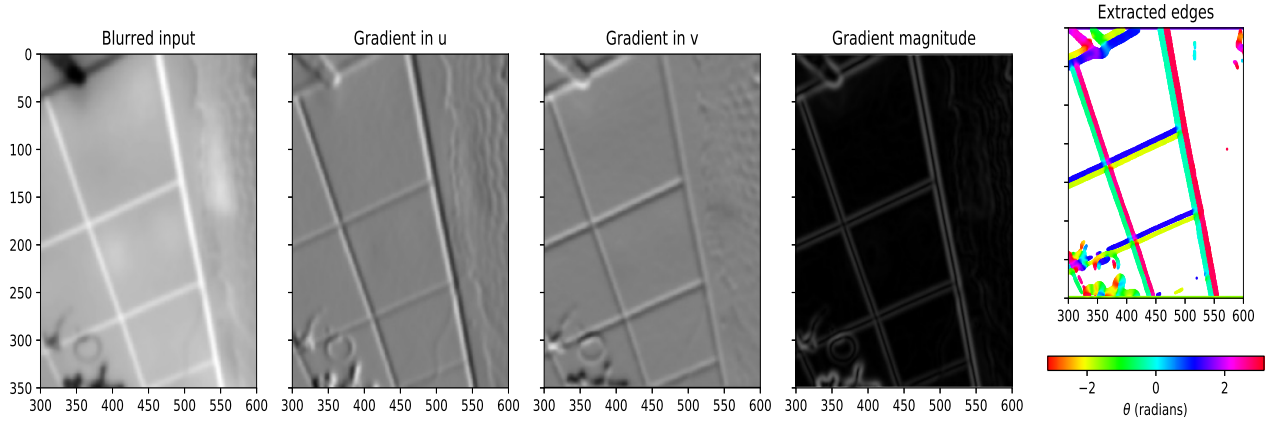

Figure 1: All gradients and detected edges

2

For this task we start with calculating ρ from the formula

$$\rho = u * cos(\theta) + v * sin(\theta) \tag{1}$$

we then create the histogram and store the xedges and yedges to be able to recover the θ and ρ-values later where i is the index and bins is the resolution of the histogram. Inspecting the resulting histogram gives us an idea of values to choose for voting threshold and window size. In the images we want about 8 lines so we set the threshold pretty high so few lines get voted through the algorithm. From the voting algorithm we get the row and column indexes of the most voted values of ρ and θ. We then recover the values of θ and ρ by calling xedges[peak$_c$$ols[i]]andyedges[peak_rows[i]]respectively.$

doing what is described above yields the results which can be seen below. Amount of bins used was 1000, voting threshold was set to 19 and window size to 140

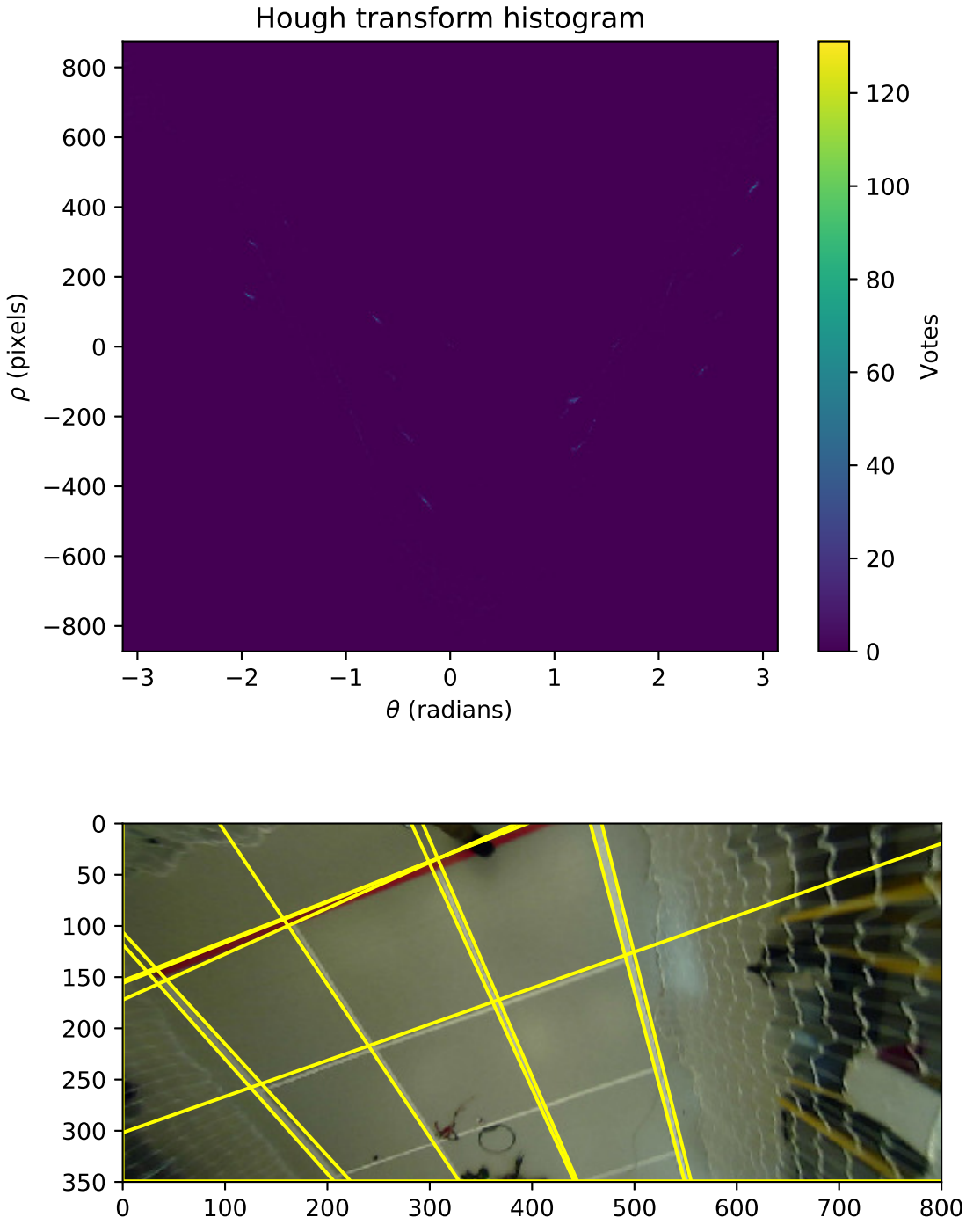

Figure 2: dominant lines reprojected