vusal ismayilov - problem set 2

problem 1)

the inputs were used and opened with opencv and pillow accordingly firstly in the __init__ function within the HoughTransform class before proceeding. by using the opencv built in canny edge detector firstly, the edges were extracted and saved in the output folder under the name of image_edges.png. with pillow, however, the image is read as a single channel with the 'L' argument, followed by passed to the according class methods. as was also asked in the description, there are 3 methods hough_lines_acc, hough_peaks, and hough_lines_draw functions were created within the class.

hough_lines_acc function taking an img as argument, is fetching the width, height of that specific image, and then using the math functions, such as, hypot with the w, h input arguments, the max possible radius is calculated. using the theta axis and r axis, rho value was also found. next, while looping through the width and row lines of the dimensions, if the column value is being less than or equal to the threshold value then theta value is multiplied by the value of column and the new rho value for each iteration is achieved. the function returns hough_lines, r_axis, d_rho, and finally the d_theta values at the accordingly.

hough_peaks function on the other hand, takes 4 different input arguments as following: hough_lines, r_axis, d_rho, d_theta. before sliding into the loop, peaks, rhos, and thetas values are declared to be also exactly the same to each other by multiplying the [0] with max_number, which is 9 in this case and hard coded. after the declarations, nested loops were created in order to loops through the x and y coordinates of the given image and return the peaks, rhos, and thetas values at the end.

finally, in the last function, which is hough_lines_draw, by using the sinus and the cosine of the thetas values according to the formula lines are drawn and at the end displayed and written to a file while returning nothing.

input image

output edge detection image

problem 2)
the whole class implemented in problem 1 was developed to have a camera input within a while true loop and use those frames to get processed through the functions rather than just the same local and idle images.