Computer Vision and Pattern Recognition
Project 1

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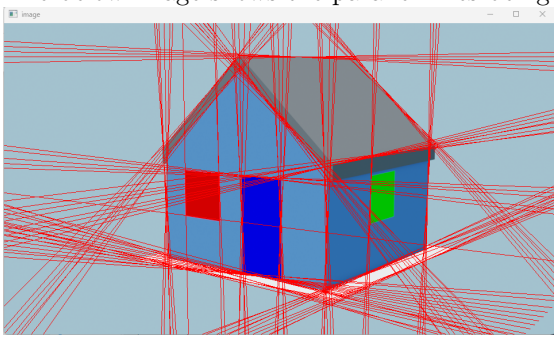
June 19th 2023

1 Description of Solution

1.1 Task 1

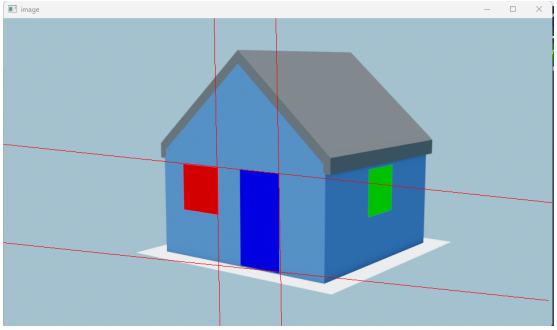
The parallel lines were detected in the image using the opencv library. We got the edges using cv2.Canny and then used cv2.HoughLines to get draw the lines using the points from the edge detected. In the function to getParallelLines we also calculate the slope of the points for each line and store it in the dictionary, thats how we were able to see which are parallel lines because parallel lines have the same slope.

The below image shows the parallel lines being detected in the image.



We got the pair of parallel lines and grouped together into a set of 2 based on if the slope were the same values. 39 parallel pairs were detected. We then manually selected which set we wanted based on which ones were at the front of the house.

The image below shows the 2 parallel set we choose.



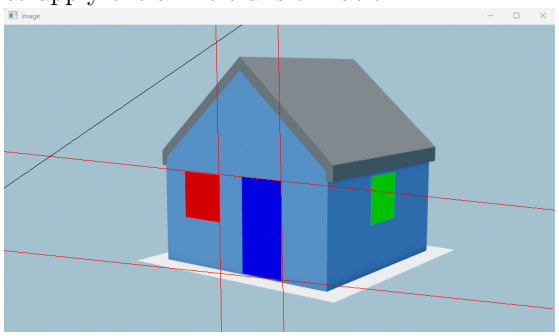
1.2 Task 2

The intersection points of the chosen parallel set was done using the least square method. Based on the index of the chosen parallel set, we stored the rho, theta, slope and key into a dataframe and used the information for the calculations

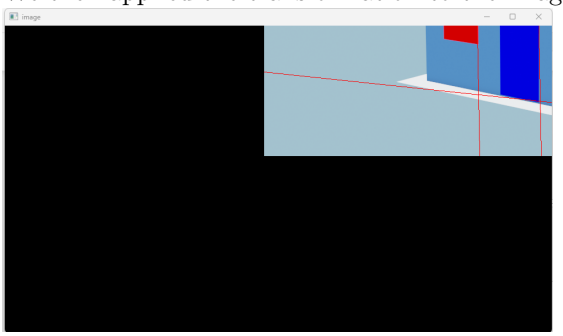
for getting the intersection points using the least square method.

1.3 Task 3

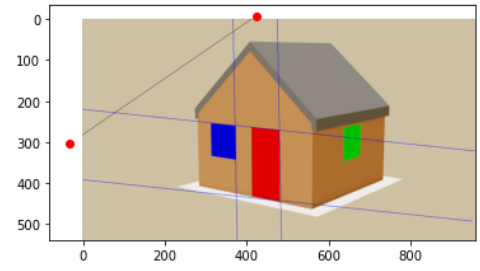
We created a line using the coordinates of the intersection points of the 2 parallel set. We calculated the linear transformation first, then we made a matrix (in our case 2D matrix) from the linear transformation. We then used cv2.warpAffine to apply the affine transformation..



We then applied the transformation to the image.



The below image shows everything, the intersection points, the line connecting the intersection points and the parallel lines.



1.4 Area

Since the window is 1m, then the length and width of the window is 1m by themselves. The door area would be 2m, since the height is double the size of the window height, so the height of the door would be 2m and the width is the same as the window width, so the width of the door is 1m.