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CSCI 431

Homework 8

Abstract

We try to detect lines within an image by using the Hough transform technique. The image set consisted of many tic-tac-toe boards, drawn in blue.

Approach

First, I read in the image using imread. I convert the image to binary using edge(). Since the images are all in a blue color, I use only the red channel of the image, which should be sufficient to find all the lines. The edge function uses the Sobel edge detector, which seemed to work well with the given images. Then, the binary image was run through the Hough transform algorithm to return the matrix containing all the possibilities, along with lists of the thetas and rhos. The matrix is then put into the houghpeaks() to find the peaks within the matrix. Since there are usually four lines in a tic-tac-toe board, I specified to find four peaks.

The results are finally passed to the houghlines() function to find the lines, given the peak information. I specified the parameters for the FillGap to be a large number so that lines that had the same theta and rho would all be connected together, instead separated into smaller segments. I plotted the lines over the original image using some of the example code from the MatLab documentation.

Analysis

Some of the parameters of the houghline function were modified in order to detect some of the lines. In the houghpeaks() function, I changed the threshold to 0 in order to detect some of the horizontal lines. In the houghlines() function, I changed the FillGap number to 1000 in order to make sure that line segments were connected. Prior to this, the lines displayed were disconnected, even though they were a part of the same line.

Conclusion

To find the lines, I needed to process the image first to get lines to detect. One method was to use the edge function to find the edges in the image. This would give the Hough transform points to use to detect line segments. From there, using the peaks from the hough matrix, I found the long lines from the image and plotted them over the image to highlight the lines.