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HW05

Abstract

To more successfully segment images, we can use morphology to modify the image so that there is less noise to make it difficult to segment. Using dilation and erosion, we can segment and count the different color Othello pieces from the image. We can also use edge detection to analyze an image. We test different filters in order to see what happens to the image when it is used.

Morphology

1. To detect the black pieces in the Othello image, we essentially do the reverse of the example code. The major difference in this version is getting rid of the spots on the black Othello pieces from the reflecting light. First, I resized the given image to a lower resolution so that the regions were easier to work with. Second, since the im operations all change the 1's in a binary image, I had to use the complement so that the affected regions were effectively the black pieces. Then, I used imclose to first dilate the piece into the holes from the light, then erode the excess to create the regions. Finally using bwlabel resulted in the 4 pieces shown in the image.

Edge Detection

2. From the Sobel filter, we can see a thicker circle. The black pieces also have the specks of reflecting light shown as an edge, since it is a contrasting color from the rest of the piece. The angle to the edge shows that for the black pieces, the top of the piece has a negative angle and the bottom has a positive angle. The opposite happens for the white pieces.

   With the Laplacian filter, the edges are a lot more blurred on either the top or the bottom. There are still specks in the middle of the black pieces due to the light reflection.

   With the LoG filter, there is a more pronounced edge. However, it clearly shows two edges, one where the edge of the piece is, one where the piece dips inward.

   The Sobel filter only shows one edge, which would make it easier to deal with. It doesn't show where the edge is flat on the outside, unlike the Laplacian.