Digital Image Processing

Assignment 1

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1 INTRODUCTION

The objective of the assignment was to test our knowledge regarding the basics of the Digital Image Processing course. Each question required an image processing technique to be applied in order to achieve what was asked of us in the statement.

2 Question One

The first question asked us to detect a white shape in the given image, identify whether it is a square, rectangle or a random shape and then calculate its perimeter as well as the centroid value. In order to do this, I first converted the original image to a grayscale image. Then I applied thresholding on the image to only detect the white areas in the image. After this a function was used to detect the boundaries of the white region. These boundaries were used to approximate the shape of the object. A check was applied which ruled out a rectangle from a square shape by checking whether all sides were equal or not. Last but not least, the perimeter and centroid on the shape was calculated and displayed.

3 Question Two

The second question asked us to distinguish between the gender of two figures in two different images. The process to differentiate between the two genders was not specified so I used the length of the hair to detect which image contained a boy or girl. The image was first converted to a grayscale image, after which a canny edge detection function was used to draw an edge around all the shapes identified in the image. Then I checked which shape had the longest perimeter, indicating the hair. Lastly, to differentiate between the two genders, the length of the hair was compared. The figure with longer hair was labelled as a girl.

4 Question Three

The third question asked us to distinguish between two images and label the blurred image as well as the original image. As taught in class, the simple method of comparing the variance was used. The variance for both images was calculated and the image with the lower value of variance was labelled as a blurred image and vice versa.

5 Question Four

The fourth question asked us to identify different colored bars in an image and calculate the centroid co-ordinates as well as the area of each bar. To do this, I first converted the image to a grayscale image. After this, I applied an adaptive threshold to separate the image into smaller regions unlike the simple threshold which acts globally. The next step was to identify the edges of each bar and use the edges to calculate the area as well the centroid value for each seperate bar. However, my code was only able to detect 3 bars instead of 4 because it was not able to distinguish between 2 of the bars considering them as one single bar.