Programming Assignment-I

Computer Vision

Implementation

* Created a function for gaussian blur by creating a gaussian kernel of size 15x15.
* Convolution function with zero padding implemented with the images. Image is converted to grayscale if it has 3 channels.
* Gaussian blur takes place over the image matrix. The image’s X component of the convolution with gaussian is in fig 2 and the Y component in fig 3.
* Output of gaussian blur is used and first derivative of gaussian is obtained and the formula

Text, letter

Description automatically generatedis used abd X(I’x) and Y(I’y) directions are created to and convoluted with X component and Y component of the image respectively to give fig 4 and fig 5.

* Gradient Magnitude is calculated using the formula M(x,y) = sqrt(I’x(x,y)^2 + I’y(x,y)^2).The gradient orientation is also calculated by using the formula theta = arctan(Iy1/ Ix1) .The output of the magnitude is shown in fig 6.
* Non maximum suppression(fig7) and then hysteresis thresholding is applied and final map is obtained in fig 8.

A picture containing calendar

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Analysis and Result

* Multiple different values for sigma were tested namely 1,2 and 3.
* In the case of this particular image the sigma value of 2 has the best output.

Sigma=1
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Sigma=3

Sigma=2

Sigma=1