Program 3 GRAD: Canny Edge Detection and Template Matching

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Abstract— **The document contains the description of Program 3 that contains MATLAB implementation for Canny Edge Detection and Template Matching. The algorithm was implemented on a picture of a soda-can and a Waldo image. The results for the algorithm applied on the soda can is presented in the paper.**

Keywords— **Canny Edge Detection, Convolution, Gaussian, Magnitude Gradient, Non Max Suppression, Hysteresis, Template Matching**

I. Pseudocode

- Step 1: Creating horizontal and vertical Intensity Changes
- Step 2: Using Step1, calculating Gxy and angle
- Step 3: Suppressing Gxy
- Step 4: Hysteresis and Edge Linking algorithm

II. Usage

- Please open the "main.m" file using MATLAB, as it is the top level file.
- Press the play button to run the algorithm.
- The program prompts to choose one of the image from the folder. Please do so
- After selecting the paper, the program presents multiple intermediate-stage images
- Then the program prompts if you would love to perform template matching
- Based on if you entered yes/no, the program continues or ends. Press 1 or 2 to make your choice
- IF selected yes, the program asks for the template matching image, please do so
- The program then asks for the hysteresis percentage. This is where you can provide a value (for.eg. 90%)
- The program finally produces the template matching image which means, it would bound the soda-can with a red rectange. This involves the use of Sum of Squared Distance algorithm

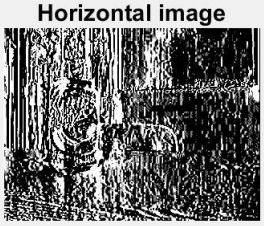
III. Conclusion

All the function works as intended and produces correct output for both Soda can and Waldo image. The second page contains outputs produced by running the algorithm in the Soda can. The algorithm produces correct output for botht First column includes output for images without template matching and the second column includes output after applying template matching.

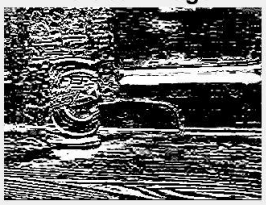
Without Template Matching Images:

Original image

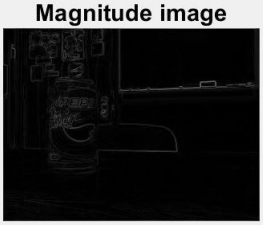
Horizontal image



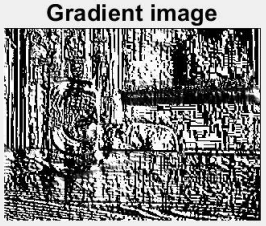
Vertical image



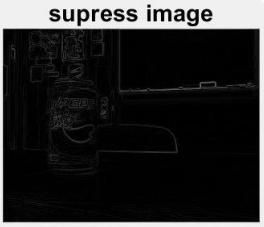
Magnitude image



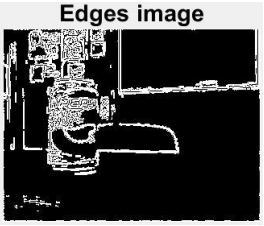
Gradient image



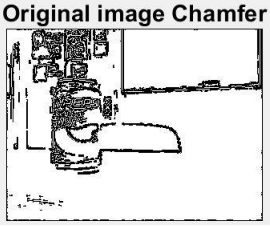
supress image



Edges image



Original image Chamfer



With Template Matching Images:

All the images in the first column + all following images:

Template image

Temp. Horizontal image

Temp. Vertical image

Temp. Magnitude image

Temp. supress image

Temp. Gradient image

Temp chamfer

Temp. Edges image

Although this is just for Soda-Can but also works for, and find Waldo.