CV - Homework 2 - Check tube labels

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1 Problem

Given a photo with labeled glue tubes determine:

- if a glue tube is labeled if a label is centered
- if a label is straight

2 Algorithm

- Load Image
- Divide image into 5 pieces of equal width. After this action we'll have one bottle on each piece Grayscale image
- Perform Gaussian smoothing to remove noise Perform Canny algorithm to detect edges
- Find all contours
- Find tube left and right edges as most left and most right contour points.
- From tube left and right edges select top and bottom contour points as tube corners Find label corner points as closest to the tube corners inner points with some margin If there are any label corners found - the bottle is labeled
- if there are only left or only right corners found and line from top to bottom corner is parallel to a tube side - the label is straight
- if there are all four contour points and both label sides are parallel to a tube sides - the label is straight

- if there are all four contour points average distance between left label side and left tube side equals the same distance for the right side - the label is centered

3 Illustrations

Figure 1: Source image with 5 bottles

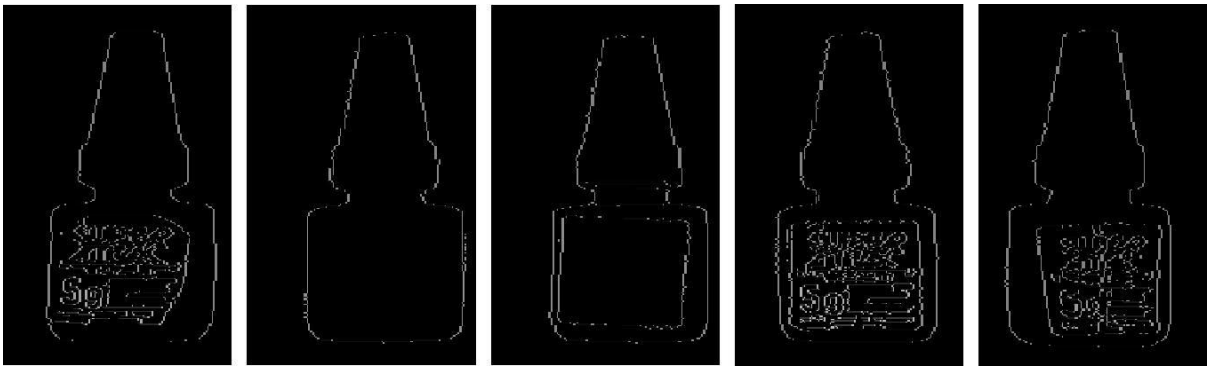

Figure 2: Grayscale images after edge detection

4 Performance measure

Figure 3: Detected contours (red) and corner points (green)

5 Program testing results

On the samples given the program achieved such results:

precision = 100%
recall = 92.5%
accuracy = 96.7%

The recall and accuracy are not 100% because my algorithm based on corners sometimes cannot identify them correct for the corrupted label. That results into invalid centered test result. This error occurs only for 2 bottle in our sample.