

Algorithm

For every image we have to analyze it.

For each sample image we:

1. Clear the noise with Gaussian filter;
2. Convert image to grayscale;
3. Extract edges with Canny;
4. Split image to images of every bottle;
5. Extract the body of the bottle;
6. Delete small contours from the bottle;
7. With counting median intensity we can understand whether it has a label or not
8. If it has a label, compute average distances from the bottle border to the label of contour from the left side and from the right side.
9. If left distance in average is the same as right distance, than it is centered
10. If all the distances are constant, it means, that label is straight.

Illustration

Here are a few results of image processing:



Figure 1: "Grayscaled image"

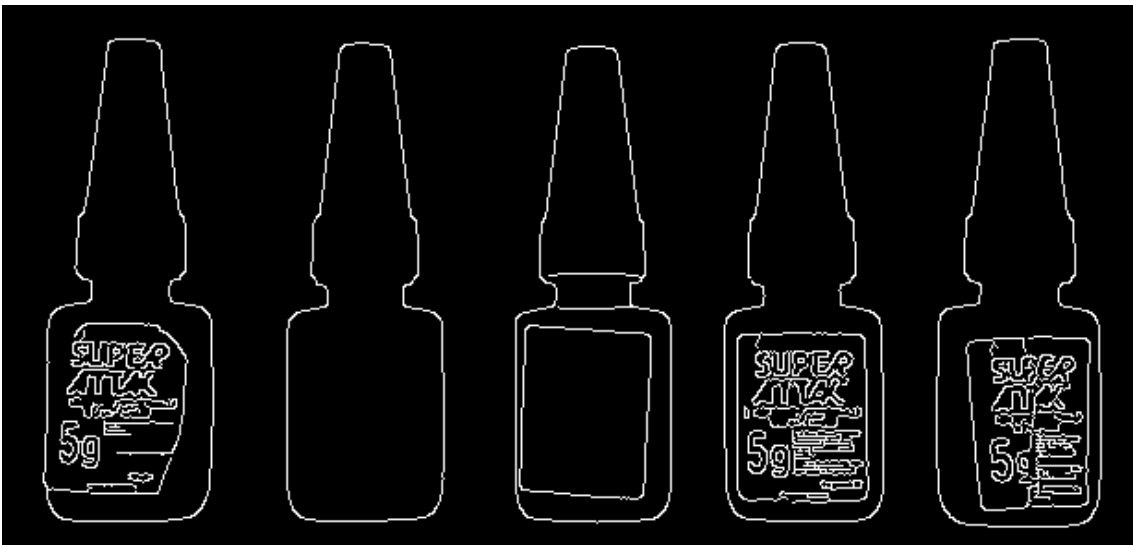


Figure 2: "Edges"



Figure 3: "Filtered edges"



Figure 4: "Extracted bottle"



Figure 5: "Another extracted bottle"

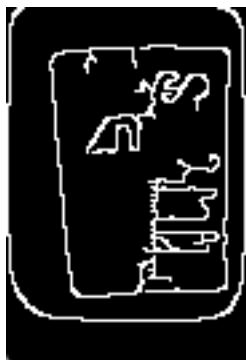


Figure 6: "Extracted body"

Performance measure According to confusion matrix:

	predicted 1	predicted 0	Total
real class 1	True Positive (TP)	False Negative (FN)	P
real class 0	False Positive (FP)	True Negative (TN)	N
Total	P'	N'	$P + N$

The formulas for precision, recall and accuracy:

$$1) \text{ precision} = \frac{TP}{TP + FP}$$

$$2) \text{ recall} = \frac{TP}{P}$$

$$3) \text{ accuracy} = \frac{TP+TN}{P+N}$$

The results of the program:

precision = recall = accuracy = 100