Assignment A6: Mathematical Morphology

CS 4640
Fall 2021

Assigned: 26 October 2021

Due: 11 November 2021

This assignment investigates the application of mathematical morphology operators to the Coke bottle inspection problem. For all questions below, give a clear discussion of your investigation, issues raised, and provide figures to show the results. Submit your report as a PDF file through Canvas which adheres to the report guidelines.

1. How can opening and closing be exploited to improve the quality of image segmentation? Use some reasonable gray level slices to segment the image into semantic components and apply the operators. See if these are useful for cleaning up edge operator results as well (magnitude of gradient).

2. Use thresholding to obtain semantic segments in an image, use opening and closing to improve, and then use the mathematical morphology approach to extract the boundary. Compare this in a quantitative way to boundaries produced by the magnitude of the gradient and the Canny edge detectors.

3. Apply region filling to reasonable aspects of the inspection problem and describe results.

4. Explore ways to use skeletization to help segment the image or analyze features more accurately.