

Image processing application to count objects with overlapping images

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Abstract: This study presents an image processing application designed to accurately count objects that appear in contact or overlapping within digital images. The proposed method addresses a common challenge in automated visual inspection and analysis, where touching objects are often misidentified as a single entity, leading to significant counting errors. The system integrates several key stages: image preprocessing to enhance contrast and reduce noise, segmentation using adaptive thresholding, and a novel contour analysis algorithm. To resolve object boundaries, a watershed-based segmentation technique is employed, guided by distance transform and marker-controlled approaches to prevent over-segmentation. The algorithm was tested on a dataset of partially occluded objects, including agricultural products and industrial components. Experimental results demonstrate a counting accuracy exceeding 94%, significantly outperforming traditional blob detection methods. The findings confirm that the proposed framework effectively separates and enumerates clustered objects, offering a robust solution for real-time applications in quality control, inventory management, and biological research.

Keywords: Image processing, object counting, touching objects, segmentation