**Critical Thinking 6**

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CSC515: [Foundations of Computer Vision](https://csuglobal.instructure.com/courses/sis_course_id:AdClassSchedID_226249)

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06/22/2025

**Adaptive Thresholding Scheme for Simple Objects**

The provided Python script implements adaptive thresholding using the OpenCV library to segment objects from various types of images - an indoor scene, an outdoor scene, and a close-up object. The script reads each image in grayscale and applies the cv2.adaptiveThreshold function, specifically leveraging the Gaussian adaptive method. This method computes a local threshold for each pixel based on the weighted mean intensity of its surrounding neighborhood, rather than relying on a single global threshold. By doing so, the algorithm dynamically adjusts to local variations in illumination and contrast, making it particularly effective for images with uneven lighting or shadows.

The script allows for easy adjustment of parameters such as the block size (the size of the neighborhood used for calculating the threshold) and the constant subtracted from the local mean, enabling fine-tuning of segmentation results for different images. The processed images often resemble edge-detection outputs because adaptive thresholding highlights regions of high local contrast, which typically correspond to object boundaries and edges.

This approach is widely used in document analysis, medical imaging, and computer vision applications where robust and automatic separation of foreground from background is required under challenging lighting conditions.

**References**

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