COMPUTER VISION
#MP2
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Description:

Implementation of basic morphological operations on images with different structuring elements. The goal of the erosion operation is to shrink the image in such a way that the boundary weight of the image is lost. The goal of dilation is to expand the image such that it adds a padding layer surrounding the image. The goal of opening is to smooth the contour of an image by eroding protrusions or isthmuses while that of closing is to smooth the contour of an image by filling in gaps and padding small breaks or joints. Boundary extraction outlines the image.

Algorithm:

Erosion- Loop through all the pixels of the image and check if there are blocks of non zero pixels with the same shape as the structuring element. For these pixels only the center pixel retains its value while the outer layer becomes the background.

Dilution- Loop through all the pixels of the image, for non zero pixel values loop through the structuring elements and add that to the pixel iteration and assign those pixels to the same value as the center or original pixel. This creates a padding on the original image.

Opening- First the image is eroded using the erosion function and then the resulting image is dilated using the dilation function which gives the final opened image.

Closing- First the image is dilated using the dilation function and then the resulting image is eroded using the erosion function which gives the final opened image.

Boundary- The image is first dilated and then eroded, the resulting image is subtracted from the eroded original image. The resulting image is returned.

Result Analysis:

The image resulting from the erosion function is a reduced version of the original as was expected. The image from the dilation function is a thicker version of the original image where all the gaps were filled but the noise also became bigger. The image from the opening function is a smoother version of the original keeping only

the more distinct portions of the image, eliminating thin bridges and protrusions. The image from the closing function fills all the gaps in the image while retaining the approximate original size of the image. The boundary image shows a distinct outline of the original image.