Morphological Image Processing

Examples
Example 1

• Estimate the number of balls (the number won’t be exact)

• You will have to shrink the balls so that they don’t touch
Example 1 (continued)

- Plot the density of the balls
  - As a function of x
  - As a function of y
Example 2

• Task:
  – Segment coins from the background
  – Namely, generate a binary (or “logical”) image which is white (1) where there are coins, and black (0) elsewhere
  – Use morphological operators so that:
    • No gaps in the coins
    • No extraneous white pixels in the background
Example 3

• The image “xray.jpg” is an X-ray image of a chicken nugget with some bone fragments inside (Figure 9.18 from the textbook). Create a binary image using the Matlab command “B=I>200” (a little later in the course we will see how to pick thresholds automatically).

• Apply the Matlab function bwlabel to find connected components. How many components are there?

![X-ray Image of Chicken Nugget with Bone Fragments]
Example 3 (continued)

• Get rid of the tiny “noise” blobs by opening the image with a disk structuring element of radius 1. Now how many components are there?

• An automatic inspection will reject the nugget if the total area of all large fragments (larger than 100 pixels) is more than 1000 pixels.

• Using the opened image from step 2, find all blobs with individual areas greater than 100 pixels, and draw a rectangle around each large blob that was found.

• What is the total area of the large blobs?