a global threshold are discussed in Section 10.3.1. In
uss allowing the threshold to vary, which is called *local*

sholding

hreshold is by visual inspection of the image histogram.
re 10.12 clearly has two distinct modes; as a result, it is
old T that separates them. Another method of choosing
picking different thresholds until one is found that pro-
judged by the observer. This is particularly effective in
ment, such as one that allows the user to change the
et (graphical control) such as a slider and see the result

eshold automatically, Gonzalez and Woods [2002] de-
rative procedure:

timate for T. (A suggested initial estimate is the mid-
minimum and maximum intensity values in the image.)
e using T. This will produce two groups of pixels: G_1,
xels with intensity values $\geq T$, and G_2, consisting of pix-
T.
age intensity values μ_1 and μ_2 for the pixels in regions

reshold value:

$$T = \frac{1}{2}(\mu_1 + \mu_2)$$

ough 4 until the difference in T in successive iterations

600 800 1000 1200 1400

100 200 300 400 500 600 700 800 900 1000

Methods for choosing a global threshold are discussed in Sec
Section 10.3.2 we discuss allowing the threshold to vary, which
thresholding.

10.3.1 Global Thresholding

One way to choose a threshold is by visual inspection of the im
The histogram in Figure 10.12 clearly has two distinct modes;
easy to choose a threshold T that separates them. Another meth
T is by trial and error, picking different thresholds until one is
duces a good result as judged by the observer. This is particula
an interactive environment, such as one that allows the user
threshold using a *widget* (graphical control) such as a slider an
immediately.

For choosing a threshold automatically, Gonzalez and Wo
scribe the following iterative procedure:

1. Select an initial estimate for T. (A suggested initial estim
point between the minimum and maximum intensity value
2. Segment the image using T. This will produce two group
consisting of all pixels with intensity values $\geq T$, and G_2, co
els with values $< T$.
3. Compute the average intensity values μ_1 and μ_2 for the p
G_1 and G_2.
4. Compute a new threshold value:

$$T = \frac{1}{2}(\mu_1 + \mu_2)$$

5. Repeat steps 2 through 4 until the difference in T in succe

200 400 600 800 10