

Performing Basic Vision Tasks

Objectives:

Create a histogram from a live image acquisition.

Apply a threshold to a live image acquisition.

Use histograms and thresholds in IMAQ Vision Builder.

Procedure A: Histogram Grab [5-1] ¹

1. Open the “Grab and Display.vi”.
2. Place a new waveform graph on the VI’s front panel.
3. Add IMAQ Histogram (**Motion and Vision>>Image Processing>>Analysis**) after IMAQ Grab Acquire.
4. In the block diagram, connect the node labeled **Histogram Graph** to the terminal corresponding to the graph you placed on the front panel.
5. Run the VI to display a histogram as you acquire images.

Tip: Cover the lens of the camera with your hand as you acquire and the histogram will display a spike near 0.

6. When you are finished, save the VI as “Histogram Grab.vi” and close the VI.
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Exercise: Histogram and Threshold [5.2]

Modify the “Histogram Grab.vi” so as to add the capability to apply a threshold to the live image acquisition.

Procedure B: Threshold in IMAQ Vision Builder [5.3]

1. Open IMAQ Vision Builder.
2. Click **Acquire Image**.

¹ Numbers in square brackets such as [5-1] refer to exercises in the LabVIEW™ Machine Vision and Image Processing Course Manual by National Instruments.

3. Click “**Acquire Single Image**”. An acquired image opens on the right side of your IMAQ Vision Builder window.
4. After snapping an image that you want to process, click **Return**. Remember that all image-processing functions are accessible through the menu bar at the top of the screen.
5. Select **Threshold** from the **Grayscale** menu. Note: your original image is displayed in the upper left corner of the screen. Use this image as a reference point as you process your images. The main portion of the screen is a display window that lets you view the effects of a threshold on your original image. The bottom part of the screen is an interactive tool that allows you to adjust parameters of the current function, **Threshold**. Two arrows at the bottom of the screen point to a histogram. The arrows indicate a range of pixel values that will be thresholded. The black arrow represents the minimum pixel value and the white arrow represents the maximum pixel value. By comparing the positions of the arrows to the image, you should be able to see how histograms and thresholds are related.
6. Move the black and white arrows at the bottom of the screen, so that various portions of the original image are displayed in a red hue. You may notice that all pixels with values between your **Min** and **Max Threshold** values change to red. All pixels outside this range remain unchanged. When your threshold is complete, click **OK** in the lower right of the window. Notice that all of the pixels are red, indicating a pixel value of 1, while everything else in the image is black, indicating a pixel value of 0. The **Threshold** step is now listed in the script. To make changes to any step in the script, double-click on that step.
7. If you have not done so already, try to adjust the threshold to make several coins appear as red spots on a black background.
8. When finished, save your thresholded image and your script: (a) Go to **File >> Save Image**, and save your image as a JPEG file. (b) Go to **Script >> Save Script** and name this short script `Threshold.scr`.