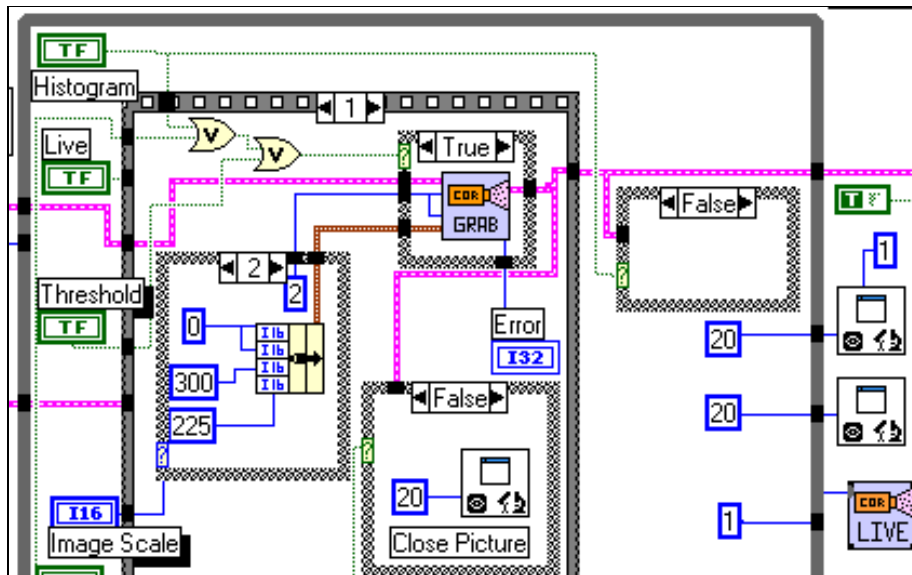


The Problem:

A manufacturer of portable water filtration units wanted to automate their assembly line. The new line was to incorporate robotics for speed and accuracy. One issue was the filter element. They were packed in a box in a random fashion. How could the robotic arm find each element quickly and reliably.

The Solution:

Machine vision is a technique in which a camera is used in place of the human eye. LabVIEW software and an add-on package called Concept V.i provided the intelligence. A small black and white video camera was mounted to an XY gantry system. A video capture card in a PC slot converted the image to binary gray scale data. The Concept V.i software has the ability to analyze this data and to provide for sophisticated processing and pattern recognition. The filter elements were cylindrical and the center of each cylinder was identified and its coordinates were passed to the motion control software (also a LabVIEW program) that controlled the gantry. A grabber on the gantry picked up the filter element and moved it to the assembly line. Another filter was usually within the field of vision of the camera as the program determined the coordinates. If there was, the gantry would return to the new location to pick up a second filter. If there was not an adjacent filter, the software would conduct a search algorithm until it found another part. This would continue until the entire box of filters was empty. At that time, the system would shift to a new box of filters that were adjacent to the now empty one. If necessary, the process can be altered to include determination in software of a filter element's inside and outside diameters and to reject parts that are outside specifications.



Hardware Used:

Coreco Oculus-MX Frame Grabber
Monochrome CCD Camera

Software Used:

National Instruments LabVIEW
Graftek Concept V.i
nuLogic Motion Control Library/LabVIEW