Eyebot Application

Inspecting Plastic Beverage Bottles for High Cap
(1/8th turn of the cap)

Customer Problem

A leading manufacturer of consumer beverages needed a system to detect high caps, caps that are loosened by as little as 1/8th turn on a plastic bottle. Detecting high caps would ensure proper closure of the bottle and eliminate spillage during or after production runs.

The manufacturer had integrated a Fluid Level Check machine in their inspection line to check the parts for proper fluid levels and detect high caps. They were pleased with the overall performance of the fluid level check portion of the unit; however, its high cap detection was inconsistent and unreliable.

The line speed was running at approximately 20 parts per second (1200 parts per minute) making human detection impossible. They had to find an alternate solution.

They completed intensive in-house evaluations of several machine vision systems and found that most of the machine vision systems they tested were unable to perform reliably at such high line speeds. Moreover, the few that could were too complicated to setup and maintain, making the total cost of ownership prohibitively expensive.

SIGHTech Solution

Eyebot provided the manufacturer with an extremely accurate and affordable solution. The total cost for the Eyebot system (including monitor, camera, and lens) was well under their $10,000 budget.

Proper back lighting was required to achieve success. The operator placed an Advanced Illuminations Thinlite BL1520 directly behind the bottles neck and cap, providing the optimum lighting environment for Eyebot.

The operator connected Eyebot to a standard video camera with an 8mm lens approximately 9" from the area of inspection. Next, he adjusted Eyebot's Field of View window to an area approximately 1" x 2 ½". Then, he turned Eyebot's knob to VIEW and adjusted the video threshold by pressing the UP and DOWN buttons.

Unlike many of the other machine vision systems that they had tested, Eyebot required no trigger or strobe.

Eyebot started learning the process once the operator switched the knob to the LEARN position and pressed the YES button.

The key for Eyebot to learn effectively is to present it only good parts.

Eyebot begins to form an understanding of what is acceptable by seeing various good parts. It is important to train it on several good parts to learn the acceptable variations from part to part. The more tightly controlled the process, the fewer parts one needs to show Eyebot.

Bottles Passed

Bottles Failed

Eyebot displayed a maximum Score of 99 after only 10 seconds of training, indicating that it was no longer detecting new features and that the part had been learned.

The Neuro-RAM Score indicates how many new (unlearned) features Eyebot sees. The Score range is 0-99.

The operator was delighted because in just 10 seconds Eyebot learned the part. Had he chosen a different system, he would have had to spend days in a class and hours programming the system. Instead, Eyebot taught itself what a good part was in just 10 seconds. All he had to do was show acceptable parts to Eyebot.

After training it, he switched Eyebot to RUN, which activates the optically isolated outputs (3 a, 60 v). The manufacturer placed Eyebot on the production line directly after the Tamper-Evident Capping machine, and prior to the Fluid Level Check machine. Eyebot's optically isolated outputs were connected to the Fluid Level Check machine; if Eyebot detected a high cap, Eyebot sent a signal to the fluid check machine. This signal would activate the built-in slat ejector and remove the defective part from the line.

Eyebot was the perfect solution for the manufacturer, providing them with an affordable and reliable solution. Eyebot was capable of handling their line speeds of 20 parts per second and produced 99.99% accuracy. By choosing Eyebot's self-learning technology, their investment in Eyebot paid for itself in three months.

SIGHTech's Eyebot is a revolutionary inspection device. It is a trainable machine vision system that enables manufacturer's to inspect their products and processes for visual defects in order to improve their quality control.

Eyebot relies on SIGHTech's breakthrough Neuro-RAM^{TM} technology. Neuro-RAM is the self-learning, highly memory efficient algorithm that allows Eyebot to learn moving objects just by looking at them, without any programming whatsoever.

Eyebot requires no PC, no frame-grabber, and no software. Eyebot is inexpensive to install and maintain, and can easily be incorporated in quality control inspection processes throughout a wide array of industries.