Neurala VIA for Surface Inspection

Overview

A large commercial bakery making mostly bread and other pastries found in groceries stores, makes $14bn a year, and operates 60 bakeries globally.

There are several places where quality inspection should occur on the line.

1. Before the loaves of bread are baked, ensure that the mold is filled appropriately, and the surface is correct (e.g. bubbles vs. no bubbles), so that the bread will both bake properly and to ensure the proof.

2. As baked goods come out of a commercial oven on a conveyor, they need to be inspected for quality. This could include:
   - Color (to determine doneness)
   - Distribution of an ingredient sprinkled on top (chocolate chips, poppy seeds, sesame seeds, etc.)
   - Shape outline of the bakery item

These inspections are mostly subjective, but, with widely distributed brands, consistency is key to maintain brand equity.

Current State

Inspection is typically done by hand, where 1 out of every 100 trays is pulled off the line for inspection. This requires a full-time employee for inspection alone and disrupts the manufacturing flow. With a different person on duty each shift, consistency is challenging, and therefore rarely maintained.

Neurala VIA Implementation

GigE Cameras are placed to view the baking trays before baking and after exiting the oven. The product is inspected at both intervals to ensure both that the correct product is entering the oven, and that the bake was done successfully. The bakery uses Ethernet/IP communication, so in addition to the IPC that is used to run Neurala VIA, they require a gateway to transfer the Modbus TCP communication to Ethernet/IP to talk to the PLCs.

Adapting to Market Changes

There has been an increase in demand for this company's bread products, so they have added an additional shift to keep up with the changing environment, However, with the additional increase in run time, there is less time for general machine maintenance, so consistent inspection is more critical than ever. An increase in quantity sold doesn't mean the quality of the products can decrease; the bakery needs to stay on top of this. In addition to increase in demand, the company has decided to keep fewer people on the floor to meet local hygiene guidelines. In order to manage the increase in demand on workers and the increase uptime of ovens, they need to automate inspection. They are very concerned about the difficulty in quantifying things that their operators check by sight.

The Bottom Line

- Increased inspection (all bread versus samples) leads to improved quality, which is better for the commercial bakery's brand.
- Faster indication that something is wrong: The ability to catch a problem sooner rather than later means that fewer bad loaves will be baked, leading to reduced costly waste.
- Inspections can be completed in line, eliminating the need to pull trays off for QA.
- Doesn't require human intervention: Increased automation leads to productivity improvements, including higher throughput, minimal required intervention, and lower waste costs.