

case studies

Packaging | Sorting and Packaging

A major European biscuit and chocolate maker is one of several clients who work with Bosch to improve the efficiency of their factories. In one plant, this manufacturer outputs 30 million packages a year, and they contain over 80 different types of assorted biscuits. This manufacturer needed a solution that could support the wide variety of products and a high throughput.

The Astor line of robots was the perfect candidate. The Astor features a vision-guided delta robot that can pick and place 140 units per minute. In this biscuit packaging installation, there are eight robot cells on the plant floor that collectively sort 1 120 biscuits per minute. Each cell sorts one or two biscuit varieties for the package. As the blister tray passes each work cell, the robot stacks three or four biscuits in the appropriate section of the blister tray.

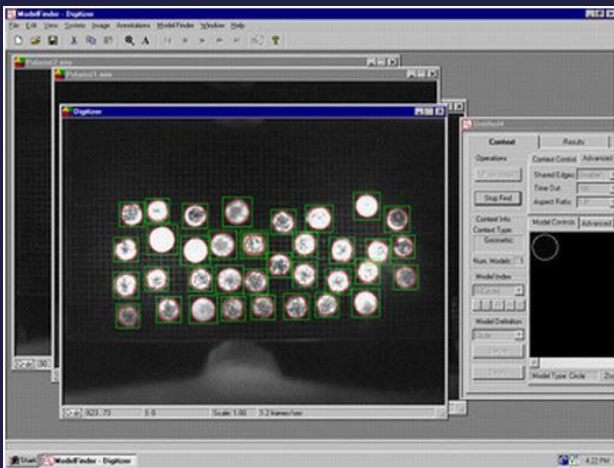


Figure 1: The MIL-based image analysis software uses grayscale values to determine the biscuit's quality. Geometric pattern recognition locates the biscuits for placement in the trays

The robot cell is powered by a CELL in-house designed PC. Before a batch is packaged, an operator specifies the products and tray type that the robot will handle. A Sony XC-HR50 grayscale camera is installed inside an enclosure at the top of the machine, giving a bird's eye view of the conveyor. As the biscuits travel, a Matrox 4Sight M embedded vision system signals the camera and a Matrox Meteor-II/Multi-Channel frame grabber acquires the images. The image acquisition and analysis software is based on the Matrox Imaging Library (MIL). Geometric pattern matching algorithms determine the shape and locate the specific biscuits the robot must pick up. Grayscale analysis determines the quality of the biscuit, and even the quality of the chocolate coating on the biscuit. The analysis results also prevent the robot from placing broken or over-baked biscuits into the package. Finally, the robot must place the top biscuit right-side up in the tray; the image analysis ensures that the upside-down biscuits don't make it to the top position in the stack.