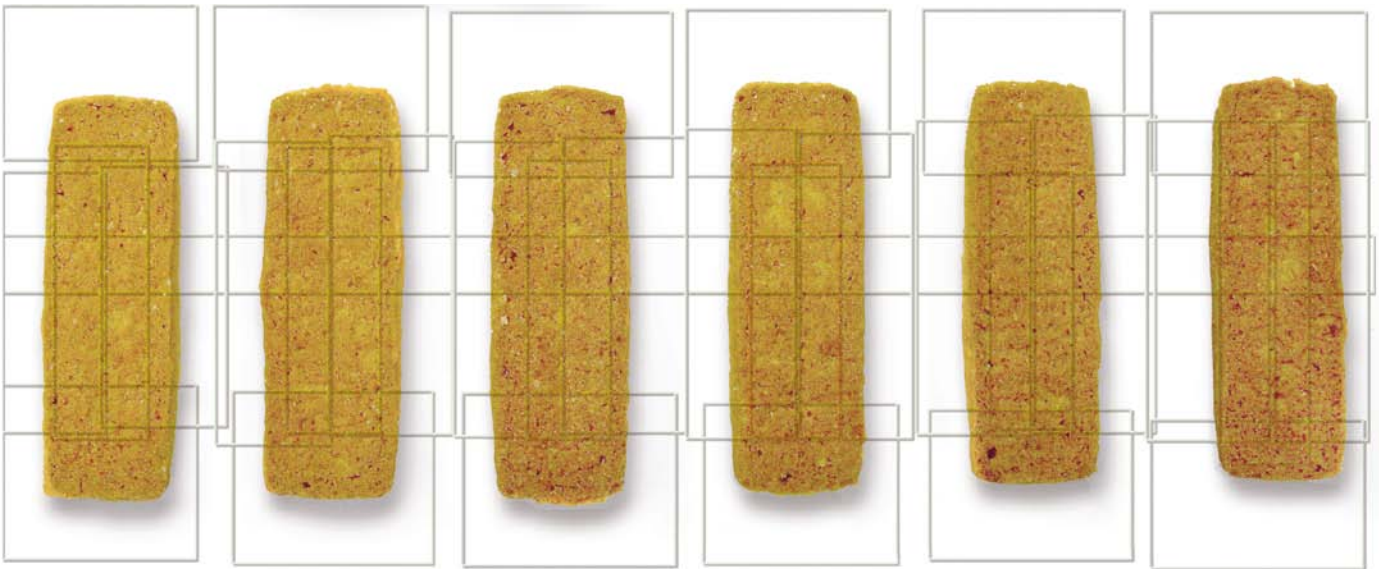


Keeping Biscuits in Good Shape – Basler GigE Cameras Optimize Biscuit Production



Customer

- Customer: One of Europe's leading biscuit manufacturers
- Location: United Kingdom
- Industry: Food and Beverage
- Year of Realization: 2010
- Requirements: Automatic size control and subsequent weight control of biscuits during the production process

Application

Critical consumers make high demands on food quality. Those who buy a package of biscuits expect a constant size, weight, and quality for every single biscuit.

The main objective for a biscuit manufacturer is to achieve economic production, i.e., to be as efficient with resources and packaging as possible. A producer wants to react quickly and reliably to disturbances in the production process based on data and past experience. Therefore, process data must be acquired and stored continuously and must be efficiently accessible on demand.

One of Europe's leading biscuit manufacturers approached our customer, Machine Vision Technology Ltd. in Leam-

ington Spa, UK, to automate the size and weight control of their biscuits during the production process. On the production line, 30 rows of baked biscuits pass by on a continuously moving conveyor and must be inspected. Every minute, 120 biscuits in each of the 30 rows must be checked, yielding a total of 3600 biscuits per minute.

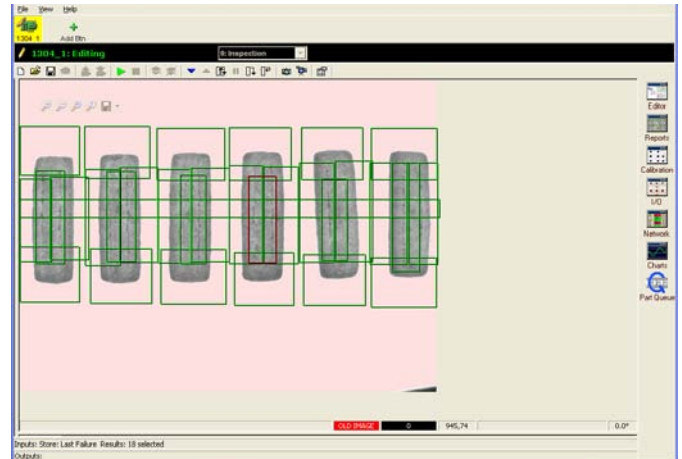
Each pair of biscuits is combined with a filling to result in a "sandwich" in the end. The ultimate aim is to ensure that all "sandwiches" are the same height and weight. A biscuit consists of two "sides" with a fondant filling (such as chocolate) in between. The maker needs to measure the thickness of each side of the biscuit to know how much filling is required to make the "sandwich" result in the correct overall height. Filling is expensive in comparison to biscuit costs, so the idea is to minimize how much filling is required to consistently create "sandwiches" of the correct height and weight, thus eliminating over filling.

The biscuit size is easily controlled by the raw ingredient weight and the pressures used to create the original sheet of dough.

As required for the food industry, the system is made of stainless steel and the equipment must operate at food industry standards.



Biscuit Inspection System



User Interface of Software Application

Solution and Benefits

Machine Vision Technology Ltd. chose an approach that uses three Basler scout scA1390-17gm GigE cameras to capture images of the biscuits from above. These images are used to measure the length and width of the biscuits and to make sure that they are the correct size. A fourth GigE camera, a scout scA640-120gm, is used in partial scan mode for higher frame rates. This camera captures images of a laser line profile of the biscuit, and the captured images are used to construct a 3D image that allows accurate height measurements. Using this procedure, accuracies of ± 0.17 mm regarding the length measurement, ± 0.17 mm regarding the width measurement, and ± 0.17 mm regarding the thickness can be achieved.

In regard to the cameras used in the system, two characteristics are decisive for the success of the measurement setup.

The production environment requires highly reliable cameras that capture excellent quality images, and the cameras must be able to work in a hostile environment at temperatures exceeding 45°C . The two Basler camera models selected by the customer, the scA1390 and scA640, can fully meet these criteria.

The custom-designed front end of the system's software incorporates a display showing average size measurements over the last 100 biscuits in each row. To satisfy the customer's traceability demands, these statistics are tagged with the time and date and are stored for four years.

The operator can easily select a set of saved system parameters from a drop down menu to ease product changeover. All this information is available for monitoring by an engineer on a duplicate display screen located 100 meters away. Because it can deliver data via cables of up to 100 meters in length, GigE is the ideal interface for applications such as this.



Basler scout

Technologies Used

- Basler scout area scan cameras: 3 scA1390-17gm and 1 scA640-120gm
- A GigE camera interface
- MVTec Halcon as the image processing software (learn more at <http://www.mvtec.com/halcon>)
- Laser Line Processing, commonly known as "sheet-of-light" height measurement

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