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V-VIZ HAVE THE VISION

SPEED IS OF THE ESSENCE FOR HEINZ THANKS TO V-VIZ MACHINE VISION INSPECTION SYSTEM

HJ Heinz is one of the best-known food brands in the world and its site in Kitt Green, Wigan, is the largest food-processing complex in Europe. The 55-acre site produces canned soups, baked beans, pasta and puddings for the UK and European market. With an annual production volume of 1.34 billion cans of food, the equivalent of over 440,000 tonnes, the complex has 17 filling lines, a dedicated can-making factory, its own distribution centre, world-class laboratories and a pilot plant.

The multipack packing area within the plant consists of four labelling machines which are capable of applying labels to filled and sealed cans at a rate of 650 cans per minute per machine. As a world leader in food production, HJ Heinz is always looking for new ways to improve manufacturing processes and recently decided to install a state-of-the-art label machine vision inspection system supplied by V-viz Ltd, a Siemens Solution Partner.

The project

The requirement of the project was to provide a label inspection system capable of detecting and rejecting faults, such as missing, incorrect, mis-aligned, loose, folded back or trailing labels, at speeds of up to 650 cans per minute. With up to 40 cans in the Krones labeller system at any one time travelling speeds in excess of 100 meters a minute, the system needed to be able to acquire an image, process the inspection, respond accurately and track any failures all the way to the reject point.

The solution

The system supplied by V-viz Ltd utilising Siemens Simatic Machine Vision consisted of four main elements: a high speed control system, an array of optical sensors, a machine vision system and a high-speed pneumatic rejector.

How does the system work?

The operator interfaces with the system via a panel mount PC, which is mounted in a control console. The PC hosts the vision inspection and also has an OPC connection (via MPI), which allows data to be shared between the control system and PC. Inspection statistics, timer variables and encoder and pulse counts are held in the control system but can be viewed, reset or adjusted via a User Interface on the PC written and coded by V-viz Ltd.

The reject system can be manually operated from a button on the User Interface.

In order to facilitate complete product flexibility (product type, variant and language) the inspection system must learn the label that is to be processed at the beginning of a new batch. The operator does this by (a) selecting 'Train' on the user interface; the system switches to training mode and indicates that it is waiting for a can, (b) the operator then allows the labeller to process a can, when the can reaches the vision system it acquires an image of the labelled can and learns/remembers the patterns that fall within user defined regions of interest on the image, (c) once it has automatically learned the new label features the system displays an image of the labelled can and prompts the user to

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ACCEPT or DECLINE the train as good. If the user ACCEPTS the train the system switches back to run mode. (d) the operator can then allow cans to be fed into the labeller for processing.

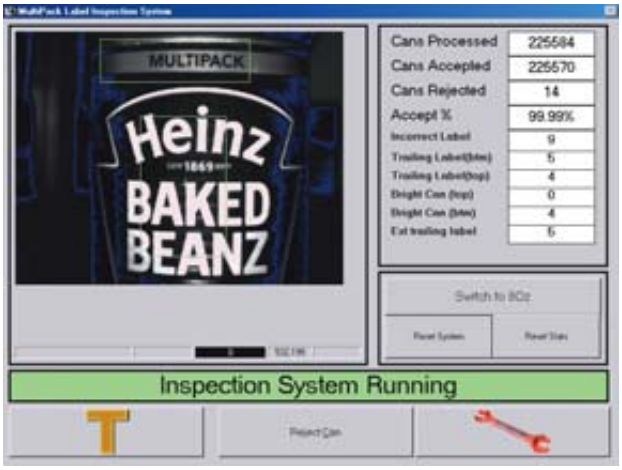
When a can enters the labelling machine an inductive proximity sensor detects that a can is present. This signal is passed to the control system. The control system 'tracks' the travel of the can within the labeller by looking at a pulse train generated from the rotation of the labelling machine. As the can passes through an array of sensors the control system monitors the state of four sensors. The sensors are positioned such that, should the label be incorrectly applied, loose, have turn backs along its seam or should there be no label applied, then the sensors will indicate this to the controller.

If the sensors indicate that the can is faulty then controller flags this within the FIFO.

Finally, the can is then presented to the vision system. The vision system is triggered to acquire an image when the can breaks the beam of an optical sensor positioned adjacent to the camera. The image is transferred to the PC for processing via the A to D converter on board the PCi frame grabber. The vision algorithms search the image to determine that two unique features are (a) present, (b) in the correct location and (c) correctly orientated on the label. If they are not then the can fails the inspection. The vision system indicates to the controller that the can has passed or failed by switching digital signals.

The can continues through the labelling machine and the controller continues to track it. The can is transferred from the labeller carousel on to a linear exit conveyor. At this point the controller passes the can from the first FIFO to a second. The can is now tracked not via the carousel pulse train but via an incremental encoder that is fitted to the shaft of the exit conveyor. The can passes through another sensor inspection. This consists of two optical sensors and reflectors. These are set to be slightly greater then the width of the can apart. When the second sensor is broken the first should be made. If it is then the can is good. If not then the can width is too great which would indicate that the label is not applied properly and the can fails the inspection.

The can then continues to the reject station, which consists of an inductive proximity switch and a pneumatic rejecter. Once the can exits the reject station it is no longer tracked.



What sets the Siemens product apart from the competition?

The control system is made up of an S7-300 PLC and a FM352 high-speed Boolean processor function module. The function module operates very quickly and has an effective scan time of more than 500usecs. This was essential for the Heinz project for a number of reasons, including the travel speed of the cans, the frequency of the pulse train from the carousel rotation and encoder and the fact that the inspection array sensors may switch state for extremely small amounts of time.

At full operating speed, a can is presented for inspection every 75 milliseconds and during this time the vision system must be capable of acquiring an image of the can, transferring the image to the PC and digitalising it, processing the image and determining its status and finally, indicate the result to the controller. This is achieved by deploying a Siemens Visionscape system which features on board dedicated I/O for fast acquisition triggering and general purpose I/O. All Siemens VisionScape systems (PC based and Smart cameras) utilise the same design. This was particularly beneficial to Heinz as the team did not have to learn multiple versions of software when individual PC-based and Smart Camera Systems are deployed within the facility.

For any further product information or application details please contact: +44 (0)870 242 2515 www.v-viz.com

About V-viz Ltd

V-viz was established in 2004 as an independent machine vision solution provider and has been successfully supplying and deploying inline machine vision inspection solutions to leading global manufacturing companies ever since. Recognising the value added expertise and experience in machine vision V-viz brings the Company was audited and certified as a Siemens AG "Specialist Machine Vision Solution Partner" in 2008. We are the appointed and exclusive Technology Partner for both Festo GB and Datasensor UK for all machine vision applications.

Providing inline high speed machine vision applications requires a specialist with experience built up over many years and with core competencies in camera technologies, complex illumination techniques, inspection tools and platforms, software, communications, controls and integration.

V-viz prides itself as a proven competent and reliable supplier of integrated machine vision inspection systems and has a rapidly expanding global customer base across Automotive, Food & Beverage, Consumer Goods, Medical Device, Pharmaceutical and Primary Metals.

Making a significant and successful investment in automated inspection requires selecting a vendor whose proven expertise and understanding of applying the technology into a manufacturing environment ensures the success and long term reliability of the solution. By contracting V-viz customers ensure that their investment is adopted successfully, effectively and to the highest possible standards of on-going support.