SPECIAL REPORT
PROCESS MONITORING

Intravis Inc.

Intravis' new software program, OCR-X, identifies engravings or imprints on a preform, closure or bottle with high confidence.

PROBLEM SPOTTER

Recognition software links parts to their mold cavities

By Mikell Knights

INTRAVIS, A SUPPLIER of inline and offline visual inspection systems, has announced software enhancements that bring new inspection capabilities for bottles, preforms and closures.

The company developed a new software program for use with its inspection technologies that identifies engravings or imprints on a preform, closure or bottle with high confidence, CEO Andreas Mueller said.

"It has been a challenge for a vision system to correctly read a glyph or engraving that identifies the mold cavity. The primary reason for this difficulty stems from the lack of a standardized design for letters, numbers and symbols," Mueller said. Each company has its own style for the characters it engraves in mold cavities. In addition, object surfaces may be uneven or textured causing visual background noise which affects the quality of the character recognition. Excessive mold maintenance, such as treatment with strong abrasives, may be required to achieve smooth surfaces inside the mold, resulting in smooth surfaces of the molded products as well, Mueller said.

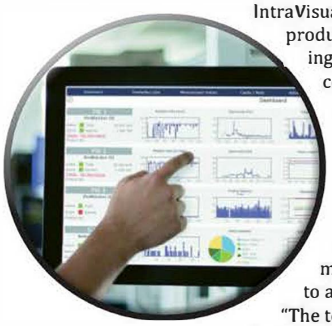
Many visual inspection systems use traditional optical character recognition (OCR) software to inspect a product, yet that software might not offer high enough precision to correctly detect the character under the aforementioned conditions, Mueller said. Traditional OCR software compares the image it is seeing when it looks at the molded product to a database of letters, numbers and characters it has in its memory. Because this method often fails, incorrect OCR readings could corrupt statistics even when products are perfectly molded.

Intravis has introduced a new software program, Optical Character Recognition-Extended, or OCR-X, which takes a different approach to identifying cavity numbers. Instead of searching its database for a number or letter, the software

employs algorithms to identify the parts of a symbol from thousands of shapes. OCR-X builds the character by finding and matching edges and shapes piece by piece.

"The software uses scientific machine-learning techniques to look at the character one edge or one surface at a time, examining a certain part of the character and not the entire glyph," Mueller said. "When the software recognizes a shape, it stores it, and then views another section of the shape that it matches to a similar shape in its database."

The "logic" of the OCR-X operates on artificial intelligence. "At the lowest level, it just sees edges," he said. "The higher levels of the logic structure examine the character for clues as to what is being built. When the software has assigned a shape to all the edges it is trying to match, the series of shapes and edges selected are processed and that completed shape is identified. Mueller said the process is similar to a child learning letters and numbers for the first time. "You show a child the letter 'A,' but it is not compared to anything in his or her brain because the child does not know what an 'A' is. They have to learn it," Mueller said. Since the OCR-X is learning every character one edge at a time, it is not fooled by deviations in design. OCR-X achieves recognition accuracy of close to 100 percent. The high level of accuracy opens markets for its application, Mueller said. The software is offered with Intravis' IntraVisualizer real-time production monitoring system, which converts production information derived from visual inspection into more usable data.



Molders can use OCR-X to match a scrap part to a specific cavity. "The technology suddenly becomes big for blow molders because problem parts can now be traced back to a specific mold and statistically documented," Mueller said. The new character recognition technology can be used with the company's preform, closure and bottle inspection systems.

Intravis also enhanced software in its SamplePreWatcher system, which allows the unit to distinguish contamination on a PET preform from dust sticking to its surface.

The dust-recognition software upgrade recognizes the contour of the preform based on the use of a new set of algorithms. The upgrade is designed to detect objects as small as 0.002 inch. "The program is designed to measure the object by size and contrast. Being able to distinguish dust from contamination can save product from being scrapped unnecessarily," Mueller said.

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Intravis' IntraVisualizer real-time production monitoring system is designed to convert production information derived from vision-based inspection into more usable data.