

Case Study fringeAI Ltd.

GOCATOR® 3D SMART SENSORS FOR HIGH-SPEED AUTOMATED FOOD PROCESSING

www.fringeai.com

fringeAI provides turnkey inspection solutions to factories by solving difficult problems that require AI models and a steady stream of support and optimization over the life of the inspection.



The Application

In this food processing application, two technicians monitor the travel of pork loins on a conveyor belt immediately after the loins have been separated from the shoulder. Their task is to sort loins from the right side and left side of the carcass for downstream processing. This type of manual inspection incurs unnecessary cost (through inefficiencies and worker error), as well as the risk of personal injury.

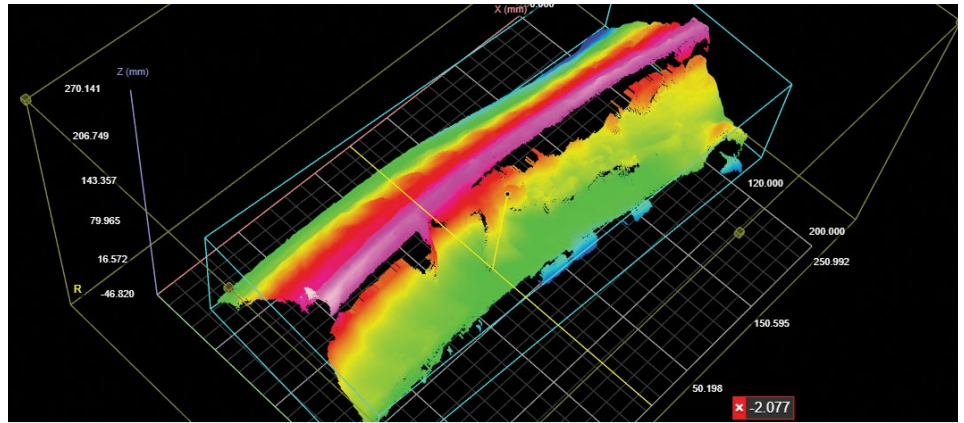
The Challenge

Surface concavity indicates whether the loin is from the left or right side of the carcass. This shape-based feature cannot be viewed with 2D technology. Only 3D machine vision delivers the shape data required to solve this application. Moreover, conventional vision tools struggle with classification because each loin is unique and un-fixtured.

The Solution

fringeAI developed and deployed a production inspection system for identifying the orientation of the pork loin on the conveyor. The system uses 1 x Gocator 2180 to generate a 3D point cloud that is modeled to determine the orientation of the pork loin. fringeAI chose Gocator® for its ease of use in setting imaging parameters, configuring external hardware, and the ability to control the sensor and easily offload 3D point clouds from the camera with the Gocator® SDK. The open source SDK is written in the C programming language so it can be compiled for any target OS and easily ported to Python for advanced AI implementation.

Gocator® was able to generate high-quality data of the surface of the loins, even though these surfaces are often irregular and prone to image artifacts. Using the imaging and filtering settings in Gocator®, fringeAI was able to eliminate all artifacts and obtain a high-quality point cloud. fringeAI then processed the point cloud and applied a deep learning classification algorithm in their edge processor, off the camera. Overall set up of the Gocator® was simple, with the physical interface allowing for easy integration. With the browser based firmware it was easy to configure tools and connect to external hardware such as encoders, PLCs, and external processors.



3D scan result from a Gocator 2180 that is used to determine pork loin orientation

The Gocator® Advantage

- Ease of setup helped obtain large amounts of time savings. Months to weeks/days.
- The openness of the LMI Gocator® SDK is unique and enabling. Other computer vision companies would have charged in excess of \$10,000 for software to control the system, perform simple analysis, and export data. In many cases, data export is strictly prohibited.
- Most of the heavy lifting for classification is performed on a separate edge processor. However, LMI vision tools and rich I/O enabled the real-time and just-in-time coordination between Gocator, fringeAI edge processor, and the PLC to operate the actuator.
- Unlike other laser profile based solutions, Gocator® generates a full 3D point cloud that enables greater measurement accuracy and repeatability.

The Gocator SDK and its openness is a unique and enabling feature for us over dealing with other providers. With competing products in-market, the ability to control, automate and export point clouds from their displacement sensors would incur additional costs upwards of \$10k.

— Chris Aden, Co-founder & CEO, fringeAI

The Result

- Ability to eliminate two manual inspection jobs and reallocate, upskill the workers.
- Variable cost savings estimated at \$50,400 per year, replacing 2 operators @ \$27,000 (unloaded) with \$3,600 annual subscription for model support and maintenance.
- Total Capital Expense in Year 1: <\$45,000 compared to competitor solutions costing ~\$100,000.
- Time savings: rate of current number of parts being processed/day manually vs. automatically. No throughput bottleneck.

Next Steps

fringeAI is considering using this type of AI algorithm on GoMax® with potential to develop further solutions.



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