Success Story

Fully automated dispense and labeling system for pharmaceutical products runs with MVTec HALCON

MVTec's [Certified Integration Partner](#) Crave Technical developed a vision system for an automatic unit-of-use dispense and labeling system for pharmaceutical products. MVTec HALCON is used in this system for object detection, bar & data code reading as well as hand-eye-calibration for robots that pick the boxes from a conveyor and then position them for the scanning of the code.

The starting point

Automatic unit-of-use dispense and labeling system ScriptPick

[Crave Technical](#), a vision, robotic and automation system integrator, was commissioned to design a vision and robotic automation system to identify, pick, label and verify pharmaceutical bottles and box containers of random shapes and sizes. This system should be integrated into a large automated pharmacy system developed by [R/X Automation Solutions](#) in Longmont, Colorado.

The so-called ScriptPick is a fully automatic unit-of-use dispense and labeling system.

The requirements

- A vision guided robotic system to identify and locate a pharmaceutical container on both an infeed conveyor and a label applicator conveyor.
- The vision system must generate a pick-pose to determine the 3D coordinates of the product to be picked by a gripper and then presented to the vision system to accurately read its UPC code.
- The robot must be able to have an end effector/gripper capable of picking up various sizes, and weights (up to 2 pounds) of boxed or bottled pharmaceutical products. The gripper will then grab the container and the robot will then position the gripper and container so the cameras and vision system can accurately read the products UPC bar code on any side of the container.
- The lighting system must be small and compact to fit in the small area containing the five cameras and all the bar lights required for adequate illumination for scanning UPC codes of various sizes and quality.
- The system must be able to read the products UPC code and then send this data to the software verification system that will prepare the associated 2D Data Code bar code and prescription information for that customers order.

- Robots capable of lifting and rotating pharmaceutical containers in a 360 degrees horizontal plane up to 2 pounds in weight.
- The system must be able to place the scanned pharmaceutical container on the labeling conveyor based on separating box containers from bottle containers.
- The vision system must accurately identify the container and its UPC code on the labeling conveyor and then sequence the proper label with its 2D DATA CODE bar code identifier for label placement.
- The printer must be capable of placing a label on flat and curved surfaces and folding the label so that half of the label is sticking to the surface of the container and the other half of the label is folded over on itself. This unique label application prevents part of the label from having a surface that could stick to any other container or surface that it may contact.
- The speed of label placement will be 5 sec. or less.

The solution

Crave Technical used the following software and hardware to develop a solution, which meets the mentioned requirements:

- MVTec HALCON machine vision software
- 2 Yamaha SCARA robots
- 12 SmartVision bar lights
- 8 Basler cameras
- Edmund Optics and Goyo lenses
- Midwest Optics filters and polarizers
- Zebra printer
- Custom PLC control software
- Custom grippers and fixturing

The system incorporates Yamaha's SCARA robots to pick a pharmaceutical product from a conveyor using HALCON's hand-eye calibration feature. Crave Technical used this powerful vision tool and its expertise in robotics to develop the capability to identify a randomly shaped pharmaceutical container, pick this off the infeed conveyor with a custom designed gripper and then position the container to optimize the scanning of the products UPC code.
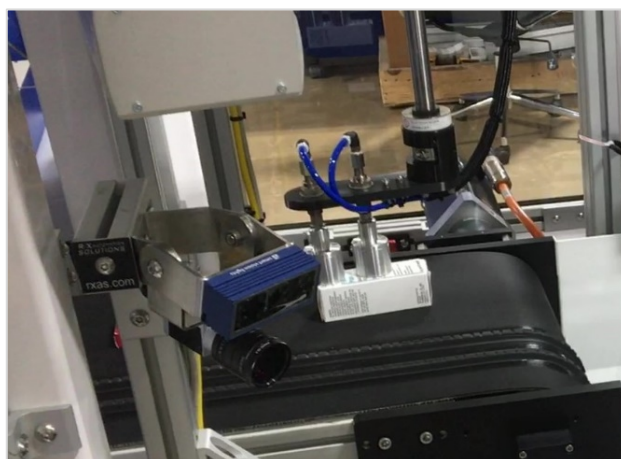
*Robot in action with hand-eye calibration of HALCON*

The SCARA robot and custom gripper positions the product using six cameras so the vision system can read the UPC Code. Once the product has been identified by its UPC code, it is placed on the labeling conveyor.
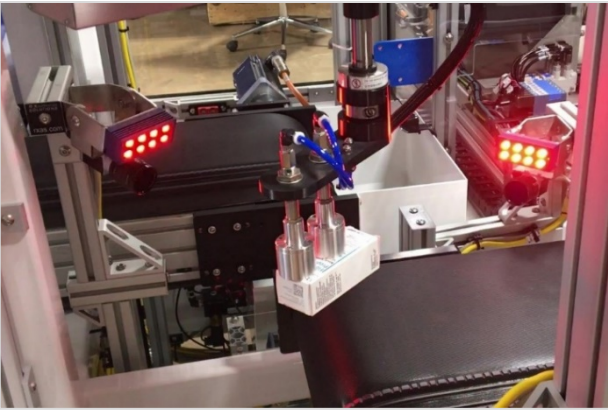
UPC bar code reading with high speed

There, the products information is fed into the print and apply applicator. The vision system knows where on the labeling conveyor the product is including its UPC code and cap, again using HALCON's hand-eye calibration. The Zebra printer then produces a label with the correct 2D data code and customers' prescription information on a label. The second SCARA robot is fitted with a custom label applicator arm and places this label on the product. The product then moves to the end of the conveyor where the products 2D data code is read and the product is then dropped into a process container that ultimately is picked up and delivered to a pharmacy. The pharmacist at the local pharmacy verifies that all the products in a customer's order are correct.
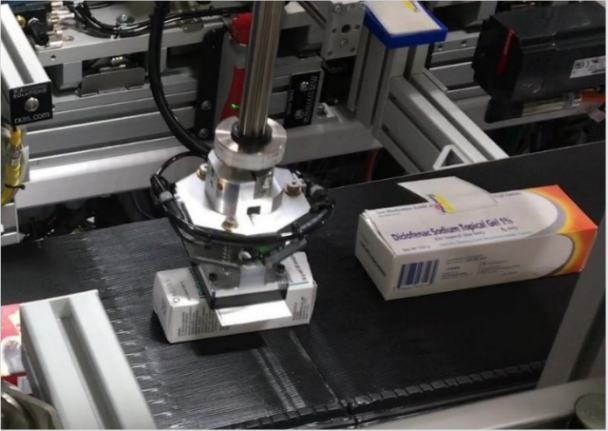
Bar code UPC and data code verification

Why Crave Technical chose MVTec HALCON

- Fast machine vision speed for bar code
- Hand-eye calibration robotic picking capability
- Easy integration through HDevEngine into existing C# code base
- Extensive machine vision library to identify random objects on the belt

The results

The Label, Apply and Verify (LAV) system is a critical part of RX Solution's automated pharmacy system, which centralizes the purchasing and warehousing of pharmaceutical products and reduces the manual labor needed in picking the correct product(s) for each customer's order.

The local pharmacy receives the benefit of less time filling a prescription with fewer pharmacists and reducing their inventory of pharmaceuticals.

The customer receives the benefit of lower cost medicines from a centralized automated warehouse that can stock a variety of standard and generic medicines.

Get more information here www.rxas.com/ScriptPick and www.mvtec.com