

# Food & Beverage



How Machine Vision is used to meet today's increased demands for information, quality, and manufacturing flexibility in the food & beverage industry



# Proven Applications in Food & Beverage



Food Processing	Packaged Food	Bottling	Packaging
<ul style="list-style-type: none"><li>• <b>Sorting</b><ul style="list-style-type: none"><li>– Color</li><li>– Shape</li><li>– Code</li></ul></li><li>• <b>Contaminants</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Date/Lot Code verification</b></li><li>• <b>Assembly Verification</b></li><li>• <b>Label Inspection</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Label and Cap presence / skew</b></li><li>• <b>Fill level detection</b></li><li>• <b>Sorting</b></li><li>• <b>Safety Seal Presence</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Robot Pick &amp; Place</b></li><li>• <b>Carton Inspection</b></li><li>• <b>Labeling/ Marking</b></li><li>• <b>Material Handling</b></li></ul>

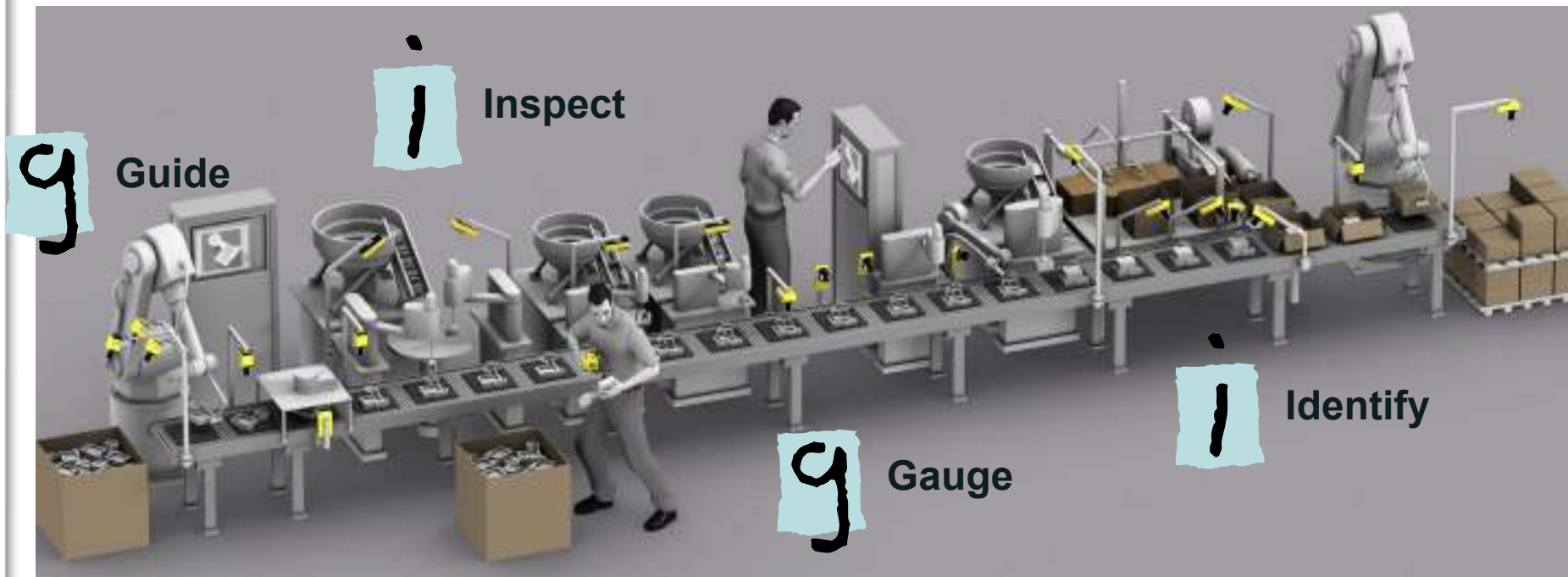
- **Benefits of Machine Vision:**
  - Improved Process Control
  - Allergen and Part Tracing
  - Less Scrap
  - Improved Brand Image

# Vision Applications



What does machine vision do?

g i g i



# Defects on Candy Bears



- Detection of Excess Starch
  - Inspect each bear to ensure no pieces of starch are stuck to the candy
  - When a piece of starch is detected, the bear is rejected from the line



# Shrink Wrap Registration



- Problem:
  - Need to detect when to cut shrink wrap
  - Photos can't detect registration mark on different products run on the same line
  - Vision sensors are not fast enough to detect the part
- Solution:
  - Checker detects the barcode which is in the same location on all products



# UPC Label



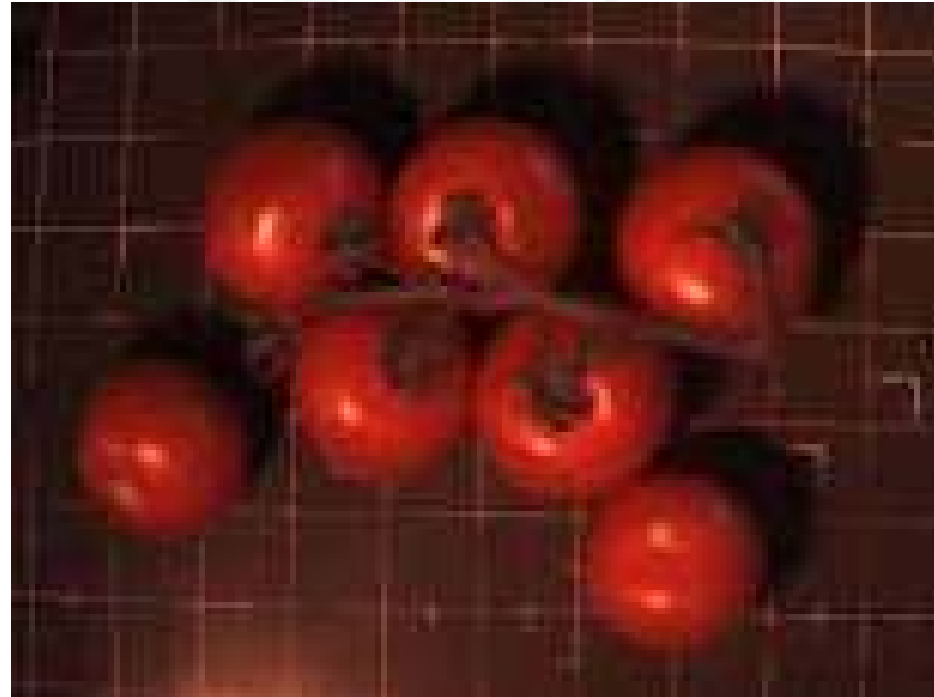
- Shrink-wrapped Water bottles
  - Verify UPC label is on water bottles after shrink wrap is already applied
  - Location of UPC label varies due to rotation of bottles



# Produce Stickers



- Tomato ID Sticker
  - Ensure grocery ID sticker is present on each tomato



# Sobe Drink Application



- Identify & Sort Sobe Drink Model
  - Sorting of bottled product and the quality control of a given production run by liquid color
  - Consistent color is vital to the quality control of the product
  - Backlighting was used to produce an even light/color distribution in the FOV



# Color Sorting for Produce



- Inspect Colors of Peppers
  - Differentiate between shades of yellow and green
  - Grade & Sort based on color
  - Vision Sensor's 24 Bit color capability can see 17.6 million different shades of color



# Contaminant Inspection



- Inspect Juice After Bottling
  - Search for foreign object contamination
  - Search for juice crystals not fully dissolved



# Champagne Inspection



- High Speed on-line final inspection of champagne bottles
  - 8,000 bottles per hour
- Four cameras ensure product quality
  - Fill Level of bottle & “set” of cork (verify distance from bottom of cork to top of the neck of the bottle)
  - Check “turbidity” or amount of sediment present in bottle
  - Inspect for splinters of glass
  - Check for opaque floating objects (such as cork bits)



# Glass Bottle Label Alignment



- Glass Bottle aligned for clear label placement
  - Label placement relative to glass seam critical
  - Detect glass seam and bottle position
  - Provide feedback to motion control system to align bottle to label



# Label Identification



- Label, cap and freshness seal inspection
  - Record pass/fail and defect data for each jar
  - 45,000 jars output per day
  - More than 20 different varieties
  - Aesthetic quality of jar vital for optimal shelf appeal



Inspect



Identify

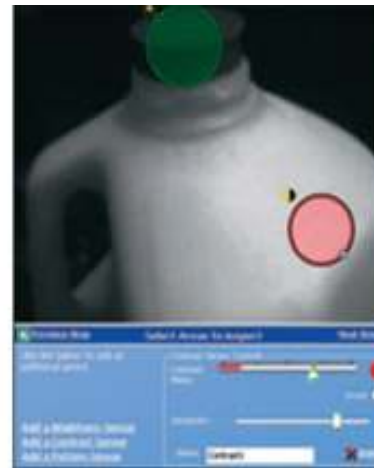
# Date Code & Cap Inspection



- Milk Jug Inspection
  - Verify Date Code is applied
  - Verify Cap is in place



**Good Part**



**Code Missing**



**Cap Missing**

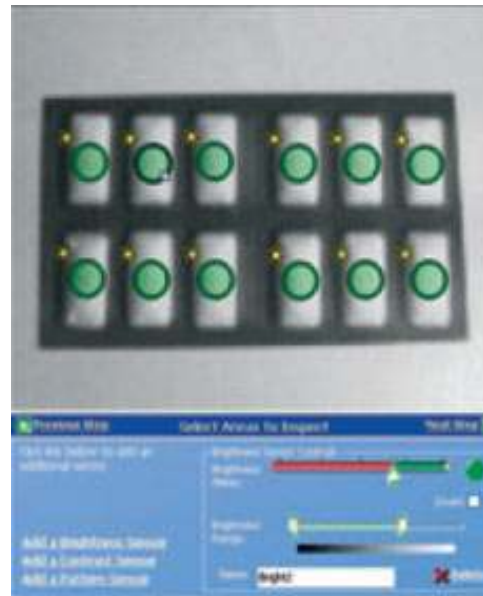


**Inspect**

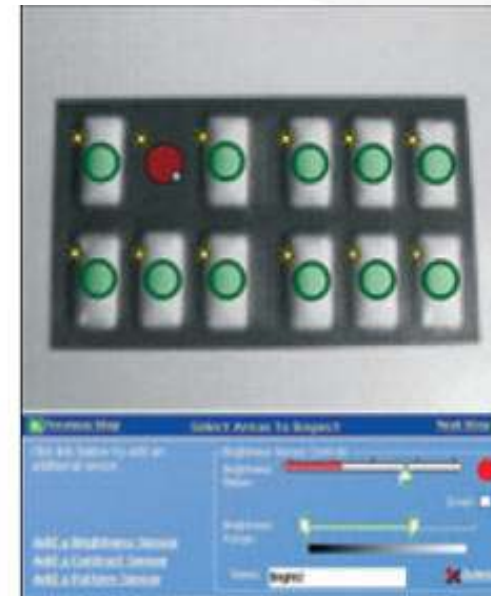
# Blister Pack Completeness



- Blister Packed Chewing Gum
  - Inspect each cavity to ensure all pieces of gum are present



Good Part



Piece Missing

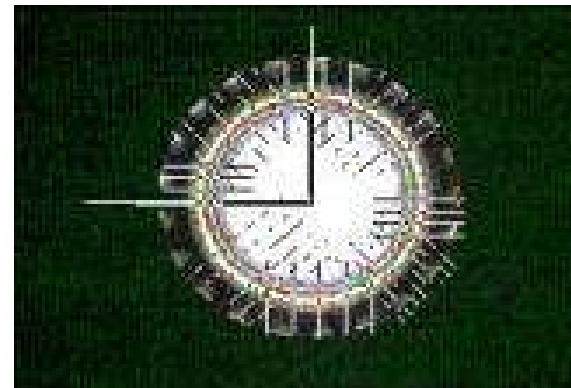


Inspect

# Bottle Crown Cap Inspection



- Check for PVC liner on bottom of crown cap
  - Inspection consists of checking for proper sealing of PVC, lifted liner, and impurities
  - Line speed is 1400 crowns per minute on a belt conveyor
  - Rejects are initiated via a solenoid valve through a PLC



# Pizza Box Inspection



- Carton Inspection
  - Ensure box is present and complete
  - Must tolerate product drift on conveyor belt
  - Each box inspected twice at 175 pizzas per minute
  - Quick change-over time
  - Pass real-time data to third party device



## Benefits of Machine Vision:



- Increase Productivity
- Trace Parts
- Boost Yields
- Enhance Product Quality
- Lower Capital Costs
- Reduce Scrap & Rework
- Increase Customer Satisfaction
- Improve Brand Image