

Sightech Vision Systems, Inc.

PC-Eyebot

Good Applications for PC-Eyebot

The power of our massive neural learning process allows users to consider and solve applications that were previously too difficult using traditional vision techniques. This document discusses examples of the kinds of applications are best solved with our advanced intelligent vision technology.

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Sightech Vision Systems, Inc.
6580 Via del Oro
San Jose, CA 95126
Tel: 408.282.3770 Fax: 408.413-2600
Email: sales@Sightech.com
Web: www.Sightech.com

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Bottling: Carton Inspection - make sure product is placed correctly inside carton.

Description:

- Cartons containing items in a generally repeatable arrangement.

Task:

- Detect missing or misplaced items

Benefits of using PC-Eyebot:

- Use no sensor or trigger input
- Store data for nearly unlimited number of product types
- Allow use of low-cost lighting
- Interface via relay with alarm and line so an operator can correct the problems.
- Process changes or additional examples of defects may be cumulatively trained at any later time.
- Barcode scanner option allows hand-off operation for changing product types (SKU's).

Competing solutions:

- Weight-check systems:
 - Pro's: Accurate, simple
 - Con's: Expensive, disruptive – major rework of conveyor system often needed, cannot detect many defects such as misplaced bottles because the total weight is the same.
- Sensor:
 - Pro's: Cheap, small
 - Con's: Cannot detect many defect situations, carton often makes effective sensor placement difficult, does not easily accommodate different SKU's.
- Tradition machine vision:
 - Pro's: Multiple sources, established technology
 - Con's: Not as powerful for this application, requires sensor or PLC generated trigger input, needs skilled programmer to setup tools to detect all of the many defect possibilities, strict lighting requirements, a lot of work to accommodate many product SKU's.

Bottling: Cap Inspection – check tamper seal, missing cap, cocked cap, or loose cap.

Description:

- Bottle fill lines – beverages, medical liquids, etc.

Task:

- Detect for broken tamper seal, loose caps, cocked caps, and missing caps. Also detect for slightly loose caps that have tamper seal still intact.

Benefits of using PC-Eyebot:

- On slow lines, 150 bottles-per-minute or less, sensor or PLC trigger input is NOT necessary
- New bottle types may be easily trained in at any later time. Nearly an unlimited quantity of SKU's may be saved. Because PC-Eyebot programs itself, additional product setup can be accomplished with available personnel.
- Allows a great deal of bottle movement during inspection – vertical movement as well as horizontal movement. Line vibration and normal bottle height variations do not affect the effectiveness of PC-Eyebot's cap inspection.
- Relay output allows simple integration with line ejection system.
- For fast lines, PC-Eyebot can inspect at speeds as high as 1500 bottles-per-minute.
- Process changes or additional examples of defects or good product may be cumulatively trained at any later time.
- A LAN-based reporting option (QC-Reporter) offers production statistics reporting on a central PC

Competing solutions:

- Torque test:
 - Pro's:
 - Straightforward
 - Con's:
 - Expensive
 - Usually part of capping equipment
 - Difficult to add later
 - May miss certain form defects such as tamper seal flaws
- Sensor:
 - Pro's:
 - Cheap, small
 - Con's:
 - Cannot detect many defect situations such as tamper seal defects
 - Cannot tolerate much vertical movement of bottles
 - Different product types (SKU's) make it difficult to position sensor correctly for all variations
- Traditional machine vision:
 - Pro's:\
 - Multiple sources
 - Established technology
 - Con's:
 - Not as powerful for this application
 - Requires sensor or PLC generated trigger input
 - Needs skilled programmer to setup tools to detect all of the many defect possibilities
 - Requires much setup/programming work to accommodate many product SKU's.

Large Panels: Stamped holes and notches, form, and graphics inspection.

Description:

- Large panel items such as kitchen stove controls panels. These products are relatively large area, but have localized detailed graphics, holes, and notches.

Task:

- Detect registration of graphics, holes, and notches. Check for form defects of graphics, holes, and notches. Check for dents, scratches, and bumps in the panel surface. Check for paint splatter as well as graphics defects.

Benefits of using PC-Eyebot:

- Can use up to 4 mega-pixel digital cameras for ultra-high resolution.
- Many (up to 100) Areas may be defined in different locations on the image – each with its own parameter settings. Each Area is allocated its own data memory, etc. The all can be saved at once under the same product type.
- Each Area may inspect for shape, color, and/or location as desired. Each Area can be assigned its own inspection task. They are conceptually “little cameras” that are looking at an defined sub-image.
- Defined Areas may overlap so multiple inspection criteria may apply to the same areas on the target panel.
- The decision of all defined Areas may be consolidated into one final PASS/FAIL decision.

Competing solutions:

- Custom machine vision system:
 - Pro's:
 - Designed specifically to task.
 - Con's:
 - Very expensive.
 - Designer (programmer) must be used again for future changes.
 - Difficult to find other designer that knows the system for future changes.
 - If not needed for this task any longer, difficult to re-deploy inspection station to another use and location.
- Traditional machine vision:
 - Pro's:
 - Multiple sources.
 - Con's:
 - Relatively expensive.
 - Not generally good for this application.
 - Requires very large setup effort - repeated for each detailed inspection.
 - Many do not offer ultra-high resolution cameras.

Produce: Detection of undesired foreign materials in parsley, cherries, tomatoes, etc. This material is called MOP (Material Other than Produce).

Description:

- Due to the large volumes processed, produce is harvested with equipment. Foreign materials such as cans, snakes, birds, water bottles, rags, corn cobs, etc. get harvested along with the desired produce.

Task:

- Detect presence of these material-other-than-produce (MOP) while produce is moving by at a relatively fast speed (up to 600 ft per minute). Also provide a consistently timed output, with X and Y location information so the correct air ejector may be activated.

Benefits of using PC-Eyebot:

- Speed: Can interface with 60 fps digital cameras.
- A PC-Eyebot option provides defect XY location information in the image for precision ejector activation. PC-Eyebot can provide up to 40 digital outputs for ejector interfacing.
- Advanced color detection: An advanced new mode, Coloration, is used to provide unequalled detection of MOP. Coloration is much more than Spectrum detection – it actually learns what we call the “shape of color”. Our patented technology offers a new dimension of detection for produce inspection.
- New MOP may be trained in at any later time – the learning is cumulative.
- If multiple PC-Eyebots are used, the LAN connection can be used to copy data trained on one PC-Eyebot onto the others.
- Optionally, PC-Eyebot can collect images of MOP detections into a designated folder. Also and optionally, another PC may be connected via LAN to continually offload the PC-Eyebots of these captured images.
- If a large number of PC-Eyebots are required in a small space, they can be provided in a 2-U form factor and be rack mounted.

Competing solutions:

- Custom machine vision system:
 - Pro's:
 - Designed specifically to task.
 - Con's:
 - Very expensive, and designer must be around and on call into the future.
 - Since they do not employ the patented Coloration method, MOP detection is not nearly as effective.
 - Difficult to add new MOP encountered in the future to the repertoire of detection ability.
- Traditional machine vision:
 - Pro's:
 - Known brands
 - Solution providers
 - Con's:
 - History of being very expensive compared to PC-Eyebot, sometimes several times as expensive.
 - Since detection is using older simpler spectral techniques, the performance will not be nearly as good as PC-Eyebot. The “shape of color” that PC-Eyebot uses performs much better.
 - Difficult to accommodate the wide variety of MOP and to train on new MOP in the future.