Vodka, Electronic Assemblies, and Toilet Repair – Make Human Decisions Consistent with AI

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Pleora Technologies

Ed Goffin

Marketing Manager at Pleora Technologies, working with lead customers as they deploy AI to help solve manufacturing challenges

Why AI for Visual Inspection

- **The Cost of Quality:** The Smallest Part Matters…*or one man and a toilet*
- **AI Decision-Support:** Make Humans Consistent and Reliable
- **Mixing Vodka & AI:** In-Process and QC Decision-Support
- **Data Black Holes:** Electronics Inspection and Manual Process Data
- **Manufacturing Advantages:** Making AI Easy

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The Smallest Part Matters

Humans Versus Machines

We excel at visual inspection

We can distinguish subtle flaws, variations or differences, adjust when faced with unpredictability, are easily trained, and learn by example

Technology replicating what we do well

Machine vision and AI aim to replicate our capabilities but with speed, consistency, repeatability, and now more instinctive learning

Still a role for human inspection

Short-run, customized and high-value products where it's uneconomical to consider full-scale automation

AI Decision-Support Improves Human Processes

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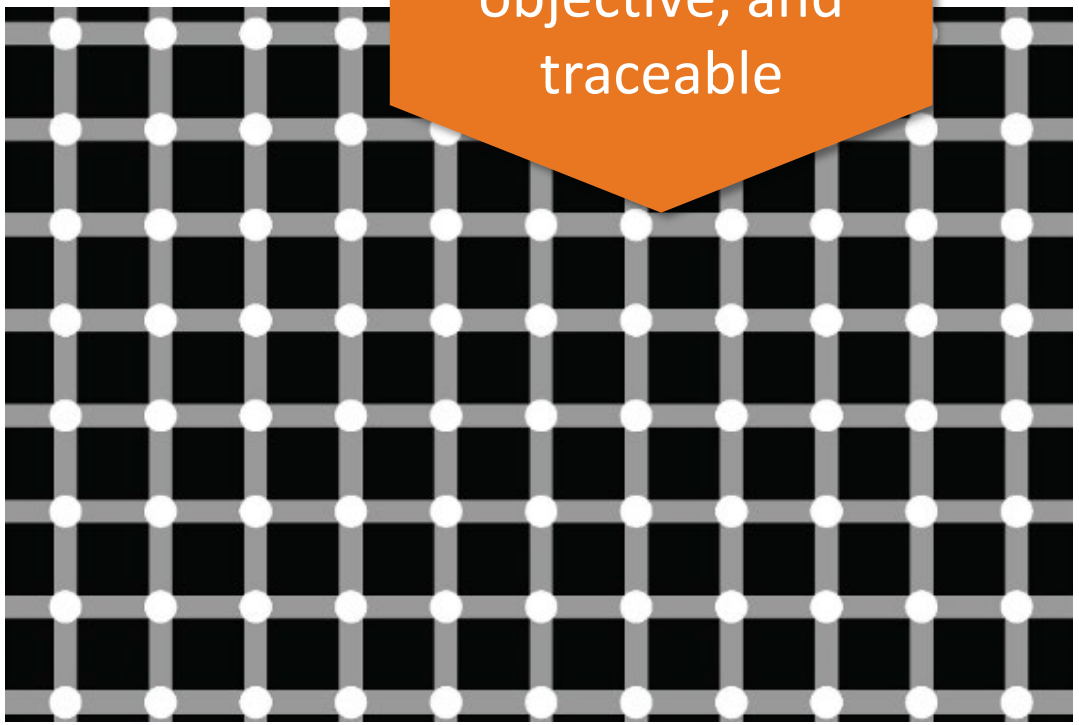
Decision-Support for Manual Tasks

Humans are well-suited for inspection tasks…but when we get tired or distracted AI is a powerful tool to help alert us on issues and guide decision-making

Automated processes are repeatable, objective, and traceable



Manual inspection tasks exhibit error rates **20-30%**

Error rate for human manual assembly instructions **62%**

*Drury, C. G., & Fox, J. G. (1975). The imperfect inspector. In C. G. Drury & J. G. Fox (Eds.), *Human reliability in quality control* (pp. 11-16). London, UK: Taylor & Francis.

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Consistent & Reliable Decisions

- Highlight product differences and deviations for incoming, in-process, and final inspection steps
- “AI is scary and expensive”
  - Pre-packaged Inspection apps trained on a manufacturer’s unique data
  - Get started with one image – AI model transparently trained based on user actions, with no programming skills required
- Tracking and Reporting apps provide valuable insight into manual inspection steps

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eBUS AI Studio - Chromium
eBUS AI Studio
Back to Plugin Project
Capture
Execute
Reset
Execute
VODKOW
CREAM LIQUOR
DAIRY DISTILLERY
VODKOW
CREAM LIQUOR

Why Add Decision-Support to Manual Tasks?

Reduce Incoming Appraisal Costs

Helps operators evaluate incoming components, materials, and parts to ensure end-to-end quality

Catch Costly Quality Escapes

Reduce human errors to avoid rework, scrap, secondary screenings, and failure analysis that translate into additional costs and quality risks

Protect Against External Failure Costs

Manual inspection data speeds resolution for repairs, warranty, and returns before they damage brand and customer perception

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Mixing AI and Vodka

Dairy Distillery and AI for Brand Management

$10M Cost of the average recall

58% Food companies affected by recall

21% Consumers will not buy that brand again

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Protecting Consumer Brand with AI

Growing business operating in highly competitive market

- Brand appearance plays a significant role influencing consumers

In-process and final inspection challenges

- Expanding product line, customized and regional products, short production runs make full automation uneconomical
- Increasing production costs due to rework and downtime
- Risk that poorly labelled products reach store shelves
- Subjective, stressful and time-consuming decision-making for employees and seasonal staff

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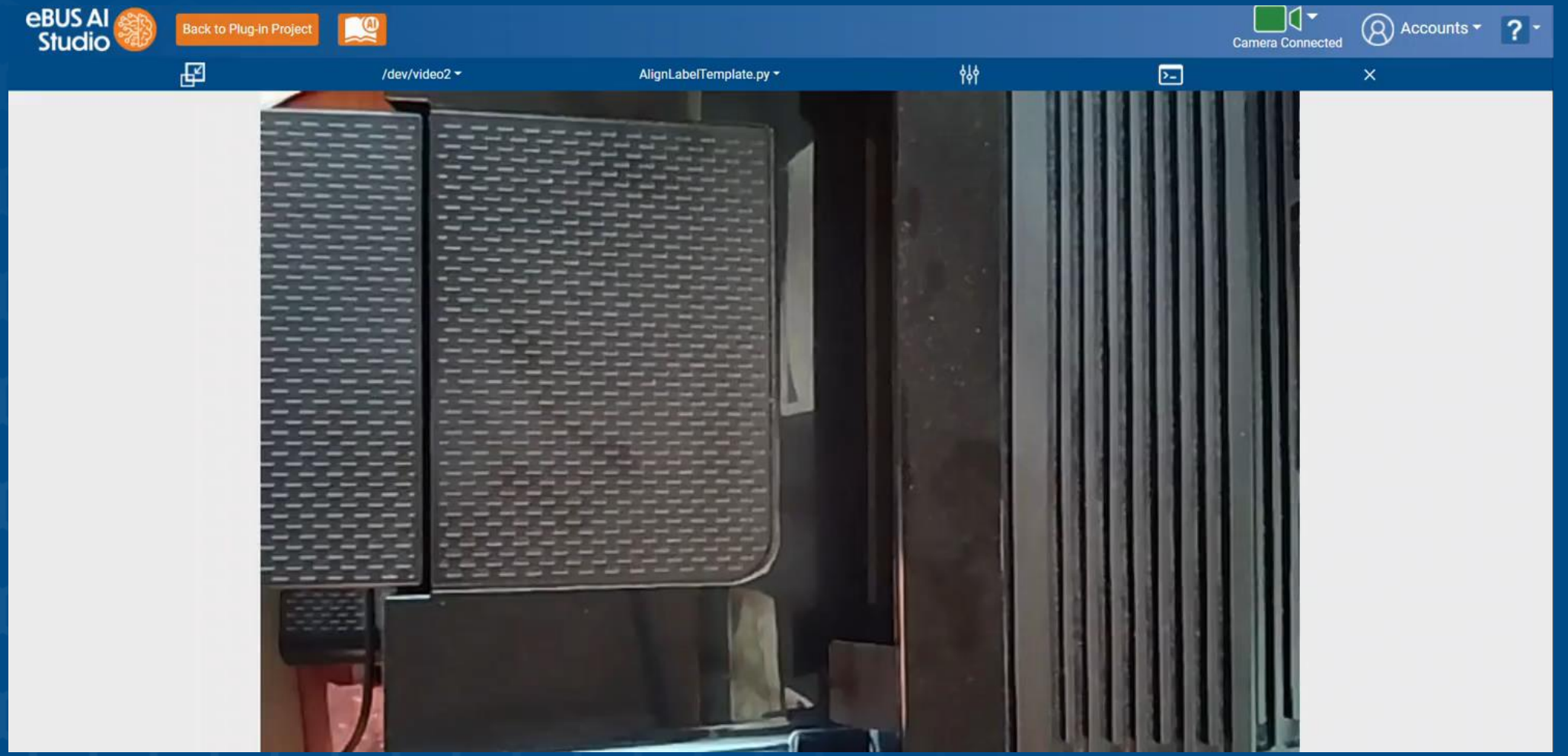
In-Process Operator Assistance

Primary and cap labels are placed by machine, human operator has to place emblem sticker

- Accurately aligning brand elements for appealing shelf display
- Operator works a long shift, multiple products with different labelling

System identifies brand elements with image overlay guiding operator as they place label

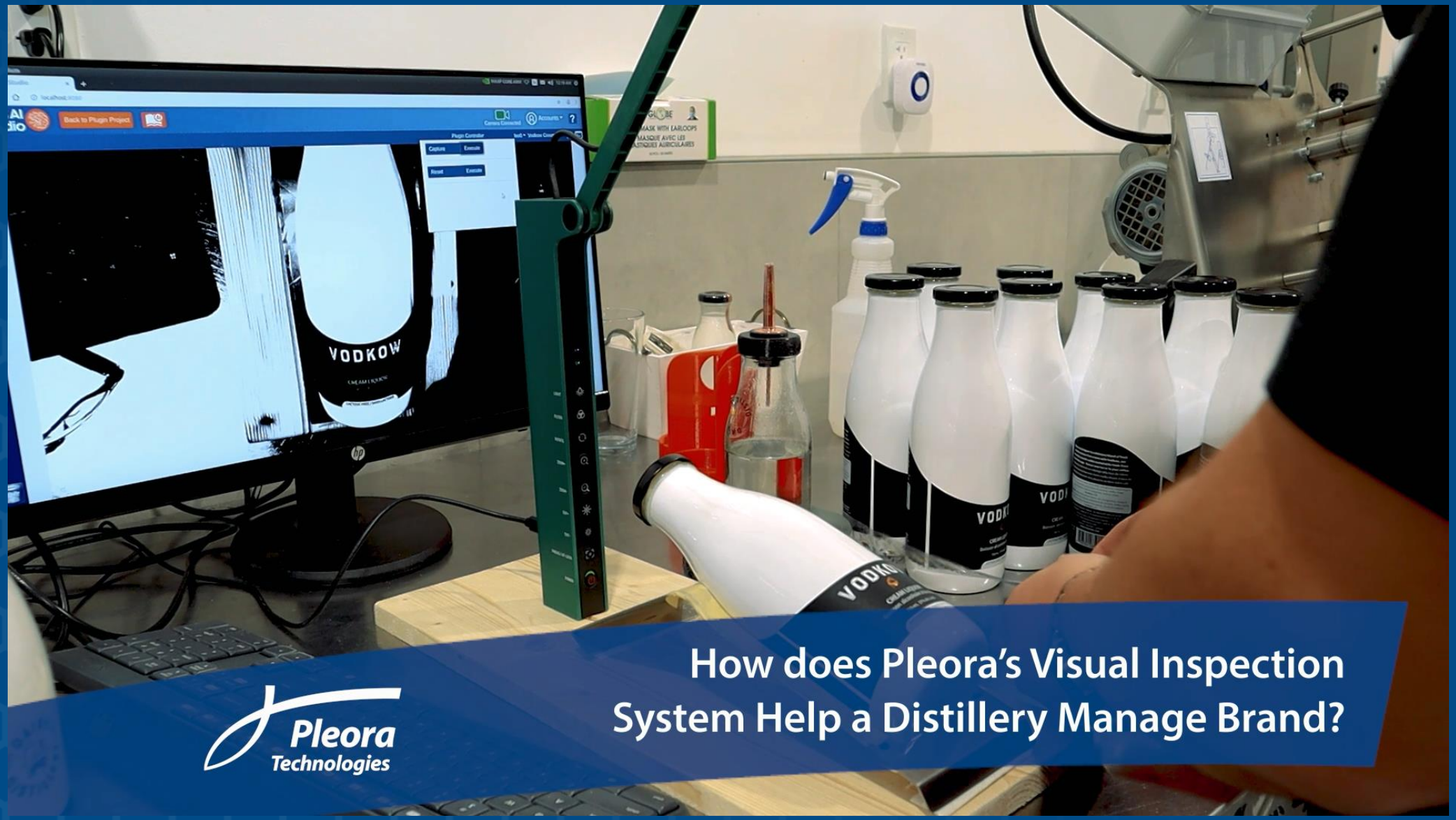
- Ensures brand consistency and accuracy
- Cost-savings – labelling does not have to be manually removed and reapplied if an error is detected during the final phase of production


eBUS AI Studio
Back to Plug-in Project
Camera Connected
Accounts
/dev/video2
AlignLabelTemplate.py

Outgoing Quality Control (QC) Inspection

- “Spot check” before final packaging and shipping
- Inspection app trained to provide a quick “pass/fail” on labelling
  - Positioned within acceptable tolerances, readable, and correct labels are used on the product
  - Start to gather data at final packaging stage


PASS
DISTILLERY
CREAM
VODKOW CREAM
Liquor/Boisson alcoolique
750 mL 17% alc./vol.
LACTOSE FREE / SANS LACTOSE


How does Pleora's Visual Inspection System Help a Distillery Manage Brand?
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What’s Next for the Distillery

- Gaining confidence in AI and automation
- Add initial inspection capabilities on manufacturing line
  - Adapt QC app for inline inspection
  - Gather data for ERP system

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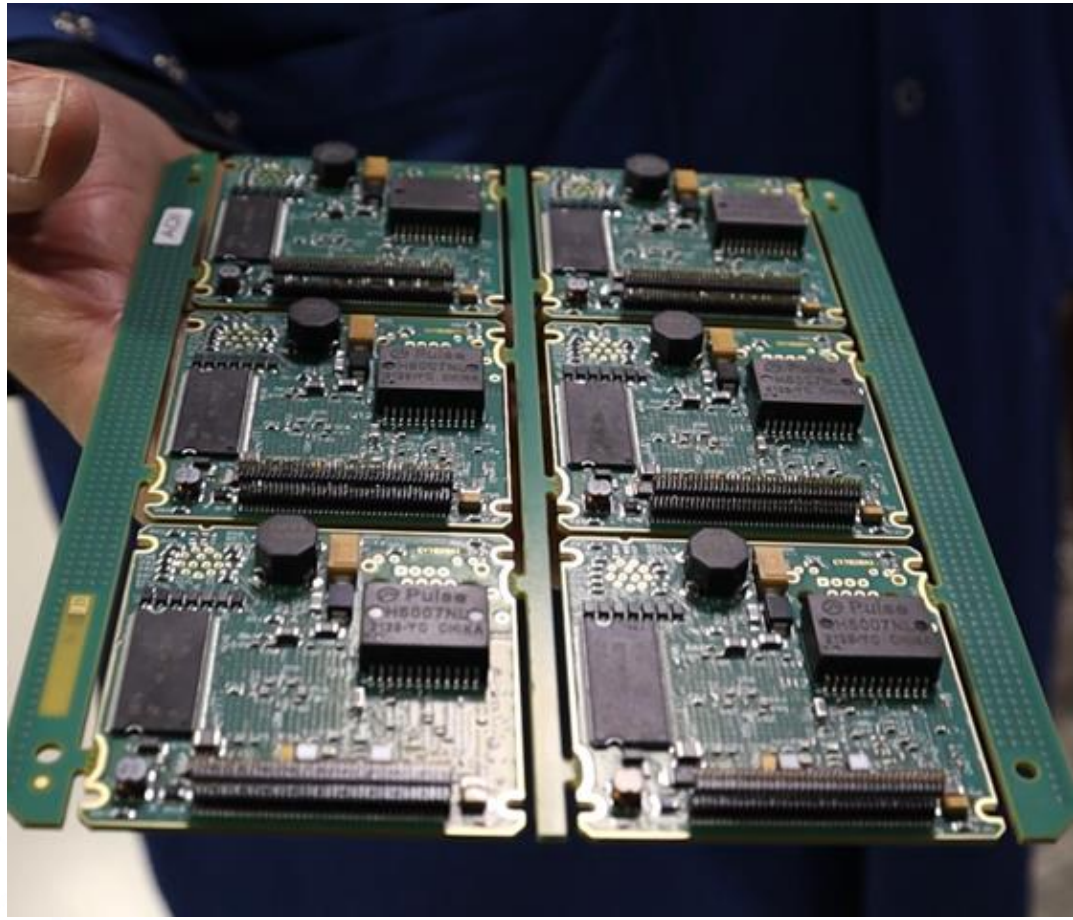
AI Decision-Support & Electronics Manufacturing

DICA deploys AI for inspection and tracking of high-value products

Decision-Support for High-Value Electronics Inspection

- AI decision-support for custom and low-run products
- Detects defects commonly missed by AOI
  - Component orientation, damaged components, solder issues, through holes, labeling
- Operator training



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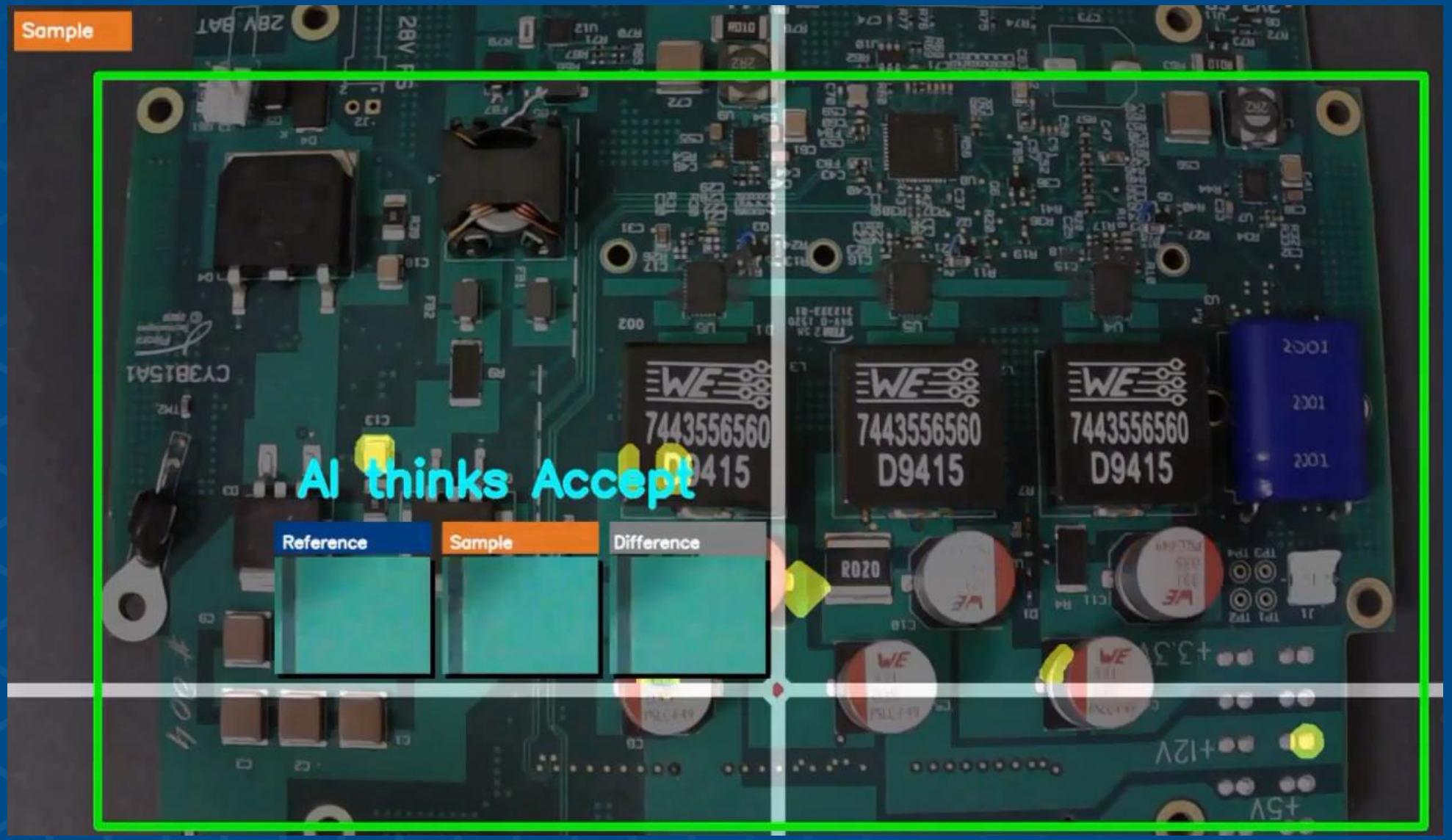
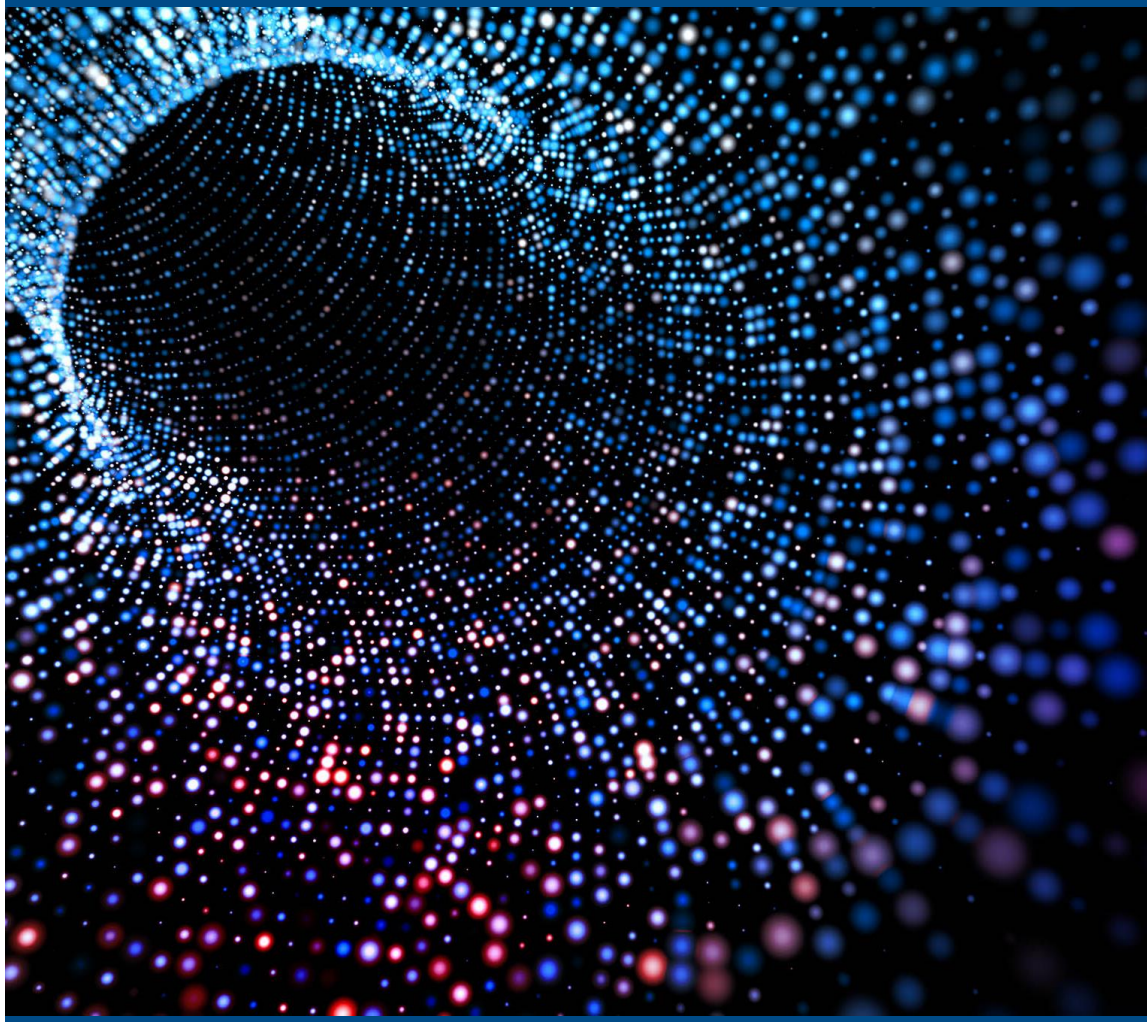

Sample
AI thinks Accept
Reference
Sample
Difference

Manual Processes and Data Black Holes

- Speeds resolution of in-field quality issues — Images of every manually inspected product and bar code
- Improves failure analysis processes when an error does happen



Making AI Easier for Manufacturers

- AI is complex, with lots of different terminology, but it promises to be an increasingly important tools for manufacturers
- Put new technologies in the hands of operators – “*the democratization of AI*”
- Solve cost, downtime, waste and employee turnover issues and eat into profitability


DAIRY
DISTILLERY
Reducing Production Costs,
Downtime and Risks

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Thank You!