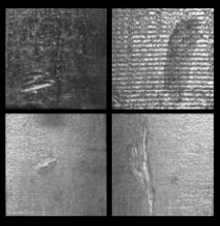
CorteX

Deep Learning System For Surface Defects Inspection

UNITX

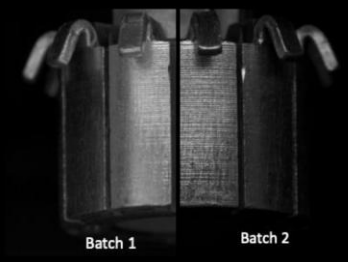
Surface Inspection: Challenges of Conventional Technology

Cannot Handle Variable Defects



Rule-based Algorithm Cannot Handle High Variance Defects

Cannot Handle Variable Surfaces



Fragile When Environment / Product Batch Changes

Cannot Handle Variable Products

Very Time Consuming to Tune Algorithm for Every Product Model

UNITX

Introducing CorteX

UNITX

CorteX: Deep Learning Training & Inference System

Superhuman Accuracy

Achieves superhuman accuracy w/ **700X** better false acceptance on high variance defects

Improved First Pass Yield

Categorizes defects with adjustable tolerances enabling rapid root cause analysis

Rapid Learning

Learns w/ **5** samples per defect

UNITX

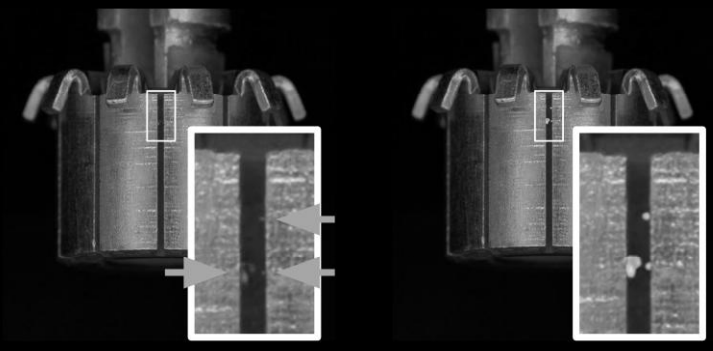
Pixel-Level Precision

for catching critical defects

Up to **700X** better false acceptance

vs. operators

Recognizes defects at pixel-level



Raw Image

AI Recognition

UNITX

Precise Recognition & Classification

for improved first pass yield

- Classifies **30** defect types with single model
- Outputs insight for rapid root cause diagnosis
- Provides adjustable tolerances to instantly fine-tune quality profiles

Raw Image

AI Recognition

Yellow: gap dent
Blue: surface dent

UNITX

Sample-Efficient Learning

for rapid deployment

Learns w/ **5** samples per defect

Recognizes defects of random shapes, sizes, & positions

Surface Dent

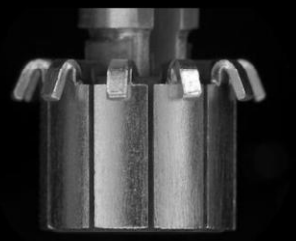
Gap Dent

Deformation

Machine Mark

UNITX

Case Study: Commutator



Defects Inspected for:

scratches, dents, burrs, missing materials and other 50+ defects

	Human Inspection	UnitX Inspection
		
Defect Types	50+	50+ 15 deep learning models
Speed	5 seconds/each	4 seconds/each
Inspection	Manual inspection	100% 360° inspection
FA Rate	1%	100 PPM

UNITX

CorteX is Battle-Hardened

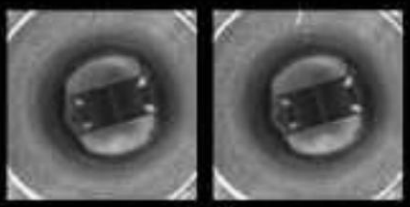
- 8 months in production
- 100% inline inspection
- 50+ defect types
- 20,000 parts inspected per day
- 100X better false acceptance rate

	Before	After	
False Acceptance	1%	0.01%	100X Better

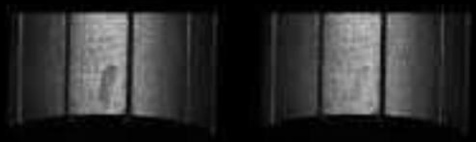
Complex Defect Detection

Precisely identify & distinguish 20+ defect types

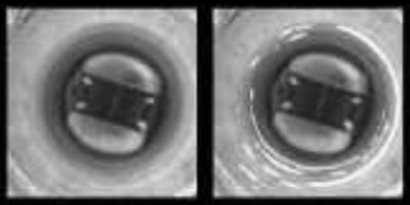
gap dent
surface dent



crack



oxidation



thread

UNITX

https://www.youtube.com/watch?v=RDSv0QsUKQg

CorteX Case Studies

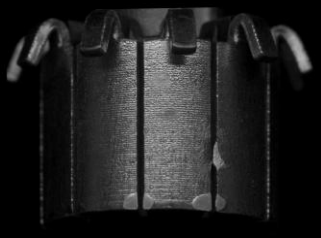
UNITX

Machined Copper: Dents, Machine Marks

Raw Image

AI Recognition

Raw Image



AI Recognition

Raw Image

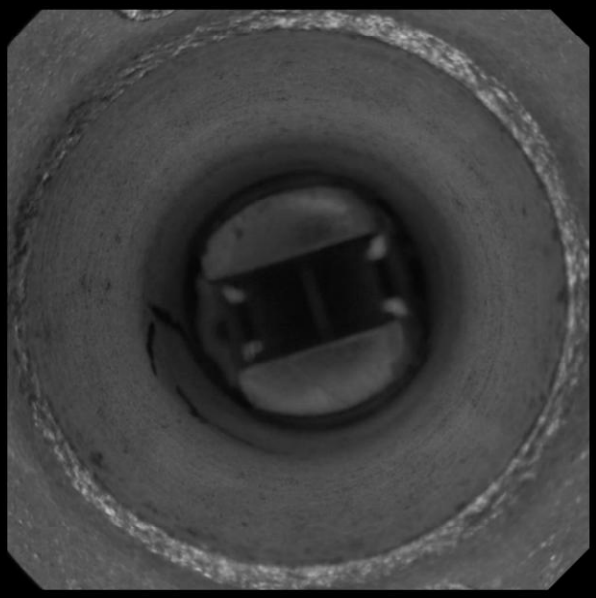
AI Recognition

Raw Image

AI Recognition

UNITX

Molded Plastic: Missing Material



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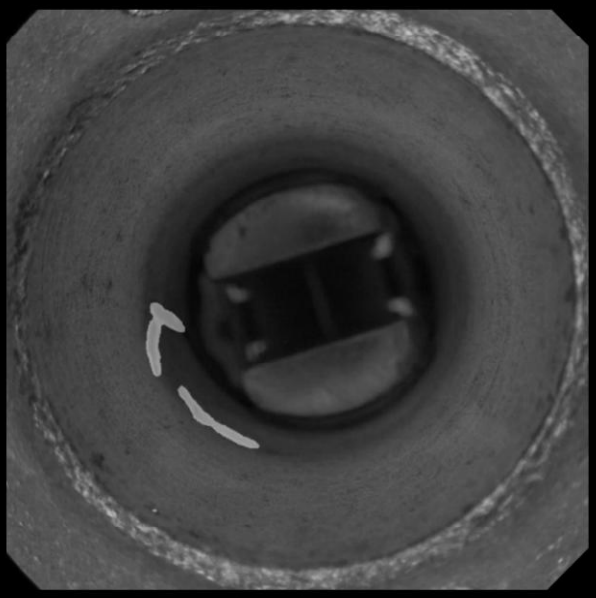
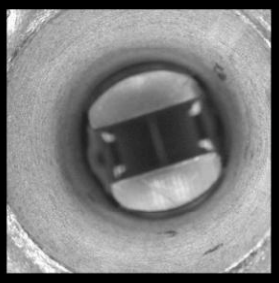


AI Recognition

UNITX

Molded Plastic: Missing Material, Crack, Thead



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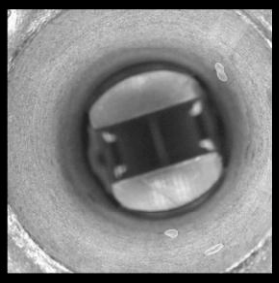

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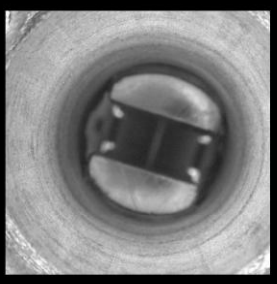

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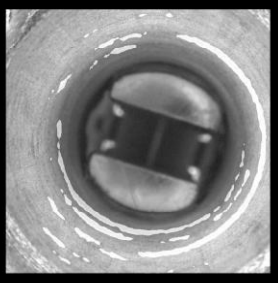

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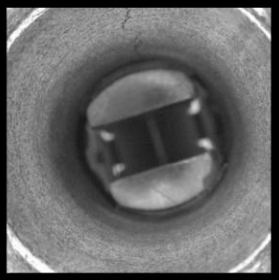

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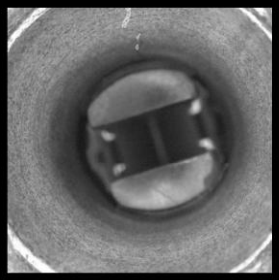

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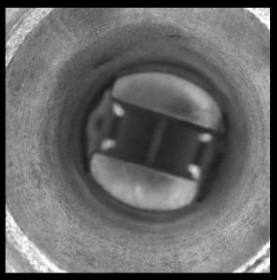

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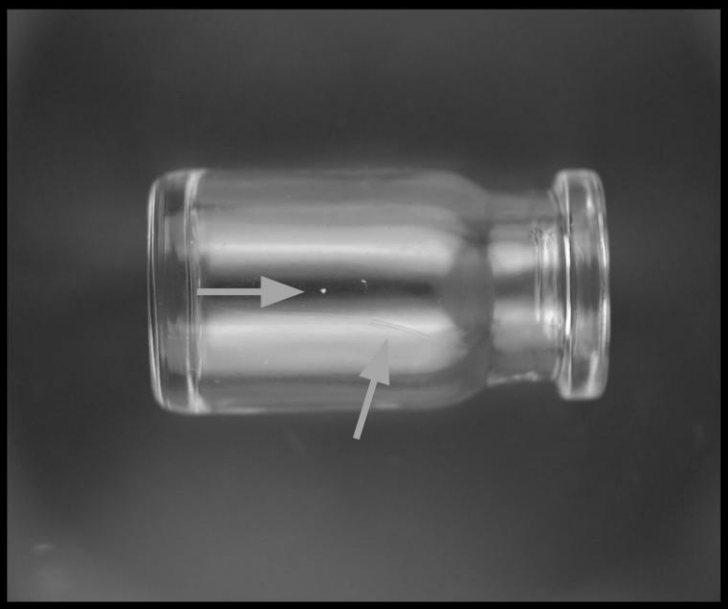
AI Recognition

UNITX

Glass: Speck, Flowline



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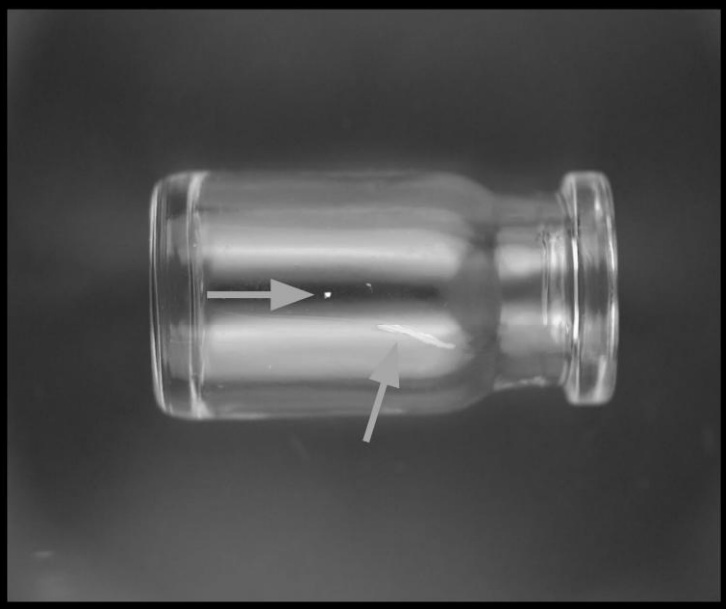

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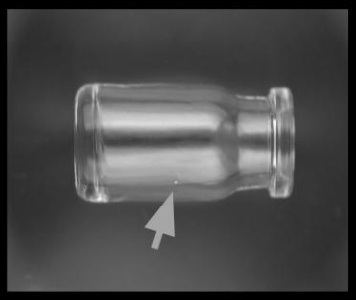
UNITX

Glass: Speck, Flowline



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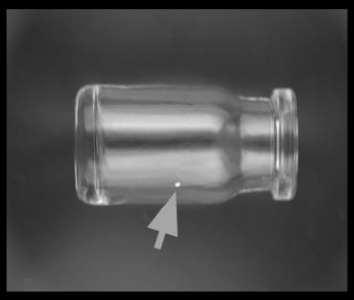

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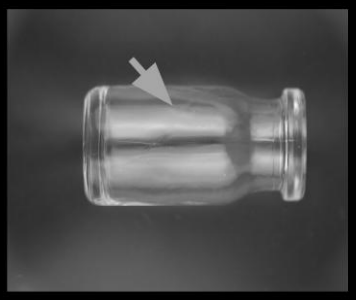

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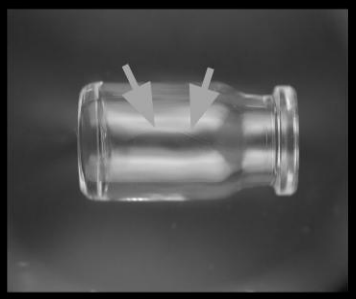

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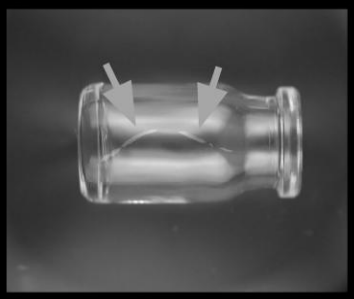

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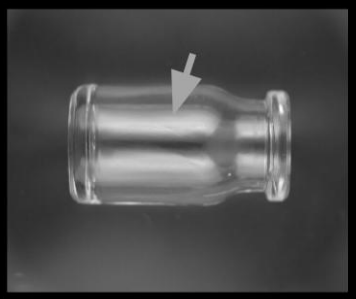

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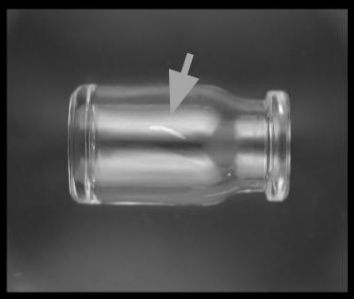
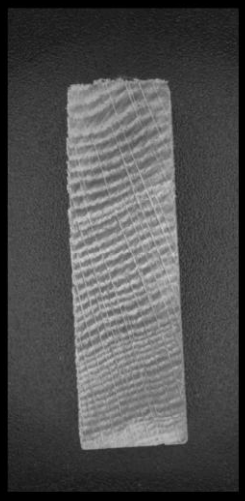


AI Recognition

UNITX

Wood Grain: Coarse, Fine



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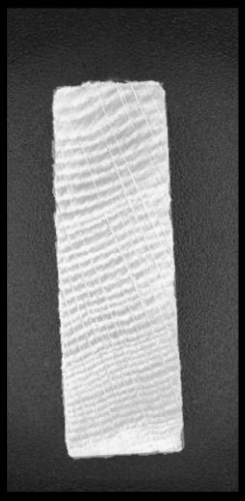

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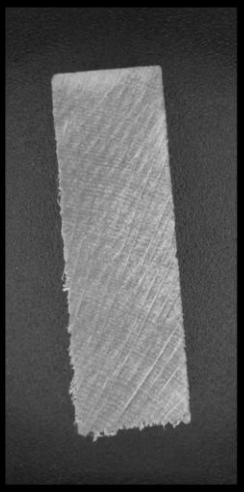

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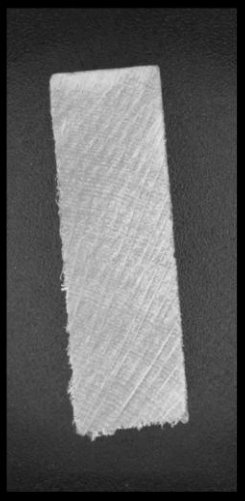
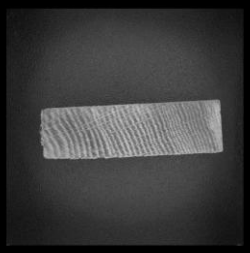


AI Recognition

UNITX

Wood Grain: Coarse, Fine



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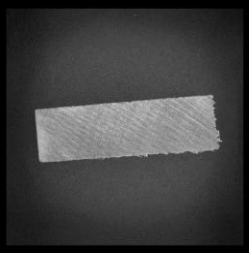

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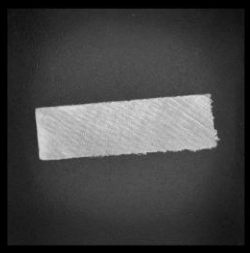

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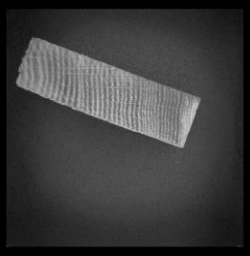

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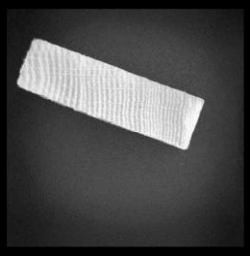

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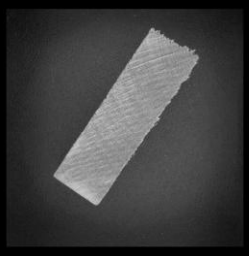

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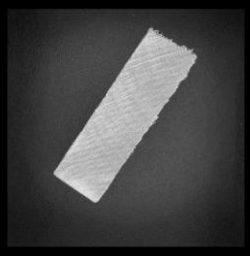

AI Recognition

UNITX

CorteX is Ready for Integration

Simple standard interfaces:

- Input: USB 3, GigE
- Output: TCP/IP, Ethernet/IP, HTTP

Works seamlessly with OptiX

UNITX