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EMB010

Amazon Lookout for Vision

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The AWS ML stack

Broadest and most complete set of Machine Learning capabilities

AI SERVICES

VISION	SPEECH		TEXT			SEARCH	CHATBOTS	PERSONALIZATION	FORECASTING	FRAUD	DEVELOPMENT	CONTACT CENTERS
Amazon Lookout for Vision	Amazon Rekognition	Amazon Polly	Amazon Transcribe *+Medical*	Amazon Comprehend *+Medical*	Amazon Translate	Amazon Textract	Amazon Kendra	Amazon Lex	Amazon Personalize	Amazon Forecast	Amazon Fraud Detector	Amazon CodeGuru	Contact Lens *For Amazon Connect*

ML SERVICES

Amazon SageMaker

Ground Truth

AWS Marketplace for ML

SageMaker Studio IDE

Built-in algorithms	Notebooks	Experiments	Processing	Model training & tuning	Debugger	Autopilot	Model hosting	Model Monitor

Neo

Augmented AI

ML FRAMEWORKS & INFRASTRUCTURE

TensorFlow

PyTorch

mxnet

GLUON

Keras

DeepGraphLibrary

Deep Java Library

Deep Learning AMIs & Containers

GPUs & CPUs

Elastic Inference

Inferentia

FPGA

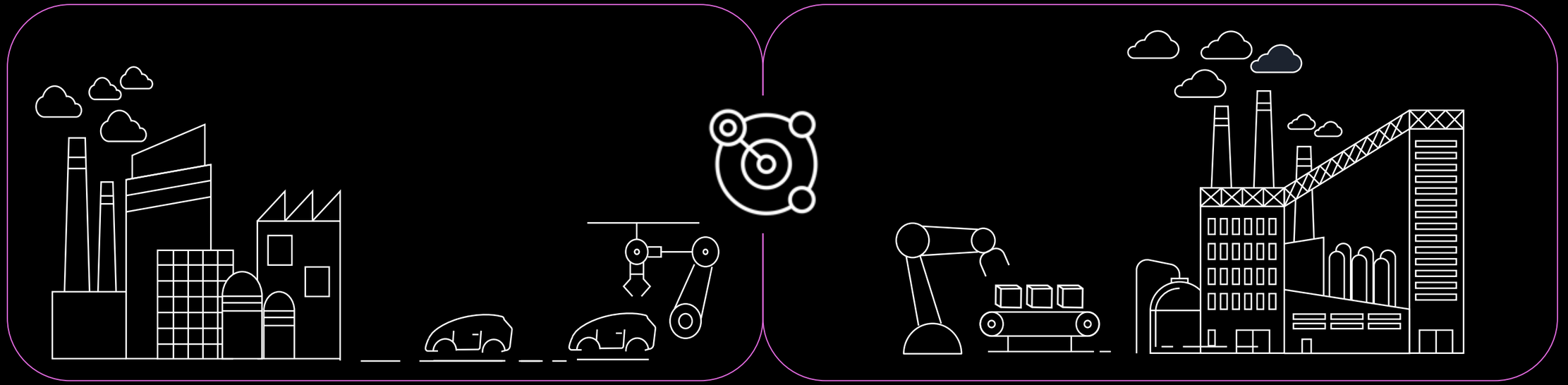
Amazon Lookout for Vision

What?

Why?

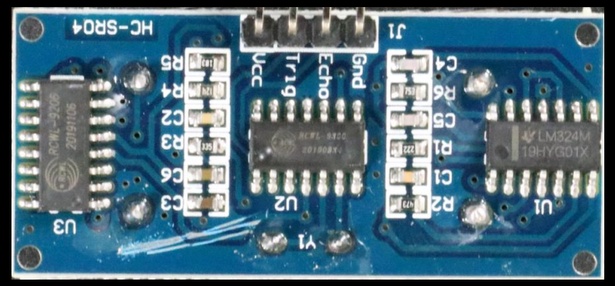
Spot product defects using computer vision to automate quality inspection

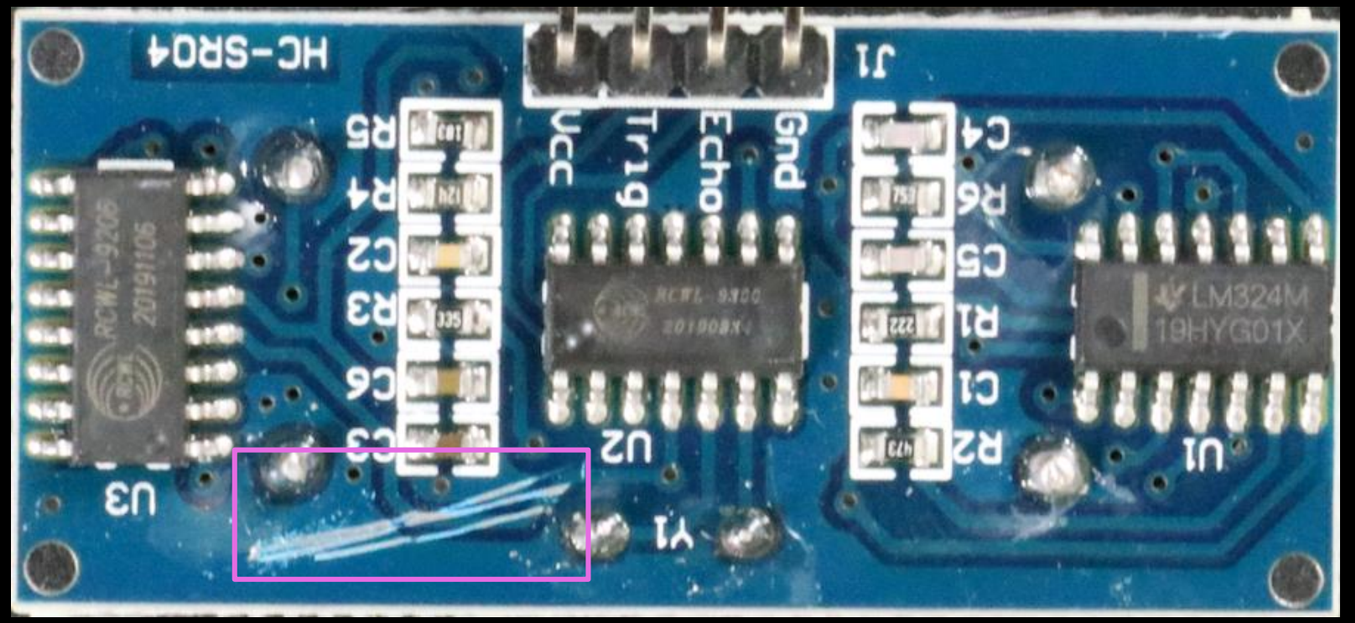
How?



Amazon Lookout for Vision

Spot product defects using computer vision to automate quality inspection





IsAnomalous: true | **Confidence**: 99%

Why is this important?

> Many organizations will have true quality-related costs as high as 15–20%.
>
> ABERDEEN

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Five most common metrics:

› Defect rework

Gartner March 2020

Why is this important?

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> ABERDEEN

Five most common metrics:

› Defect rework

› Scrap

Gartner March 2020

Why is this important?

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> ABERDEEN

Five most common metrics:

› Defect rework

› Scrap

› Corrective action processes

Gartner March 2020

Why is this important?

> Many organizations will have true quality-related costs as high as 15–20%.
>
> ABERDEEN

Five most common metrics:

- Defect rework
- Scrap
- Corrective action processes
- Disposal costs

Gartner March 2020

Why is this important?

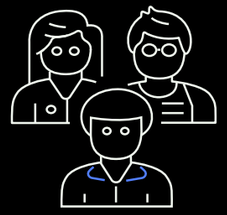
> Many organizations will have true quality-related costs as high as 15–20%.
>
> ABERDEEN

Five most common metrics:

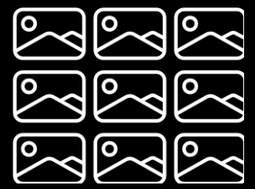
- Defect rework
- Scrap
- Corrective action processes
- Disposal costs
- Rework of supplier rejects

Gartner March 2020

How is this done today?



Manual Inspection



Vision Inspection

Visual inspection for quality assurance – Manual Inspection

MANUAL INSPECTION



Inline inspection



Offline inspection

(sampling)

Visual inspection for quality assurance – Manual Inspection

MANUAL INSPECTION



Inline inspection



Offline inspection (sampling)

CHALLENGES

› Limited throughput

› Incomplete

› Subjective

› Feedback loop is slower

Visual inspection for quality assurance – Machine Vision

CHALLENGES

- High upfront costs
- Inflexible
- Limits coverage

VISION INSPECTION



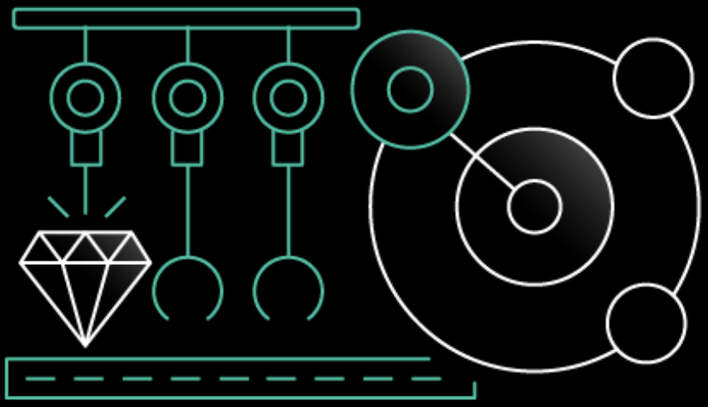
Inline inspection



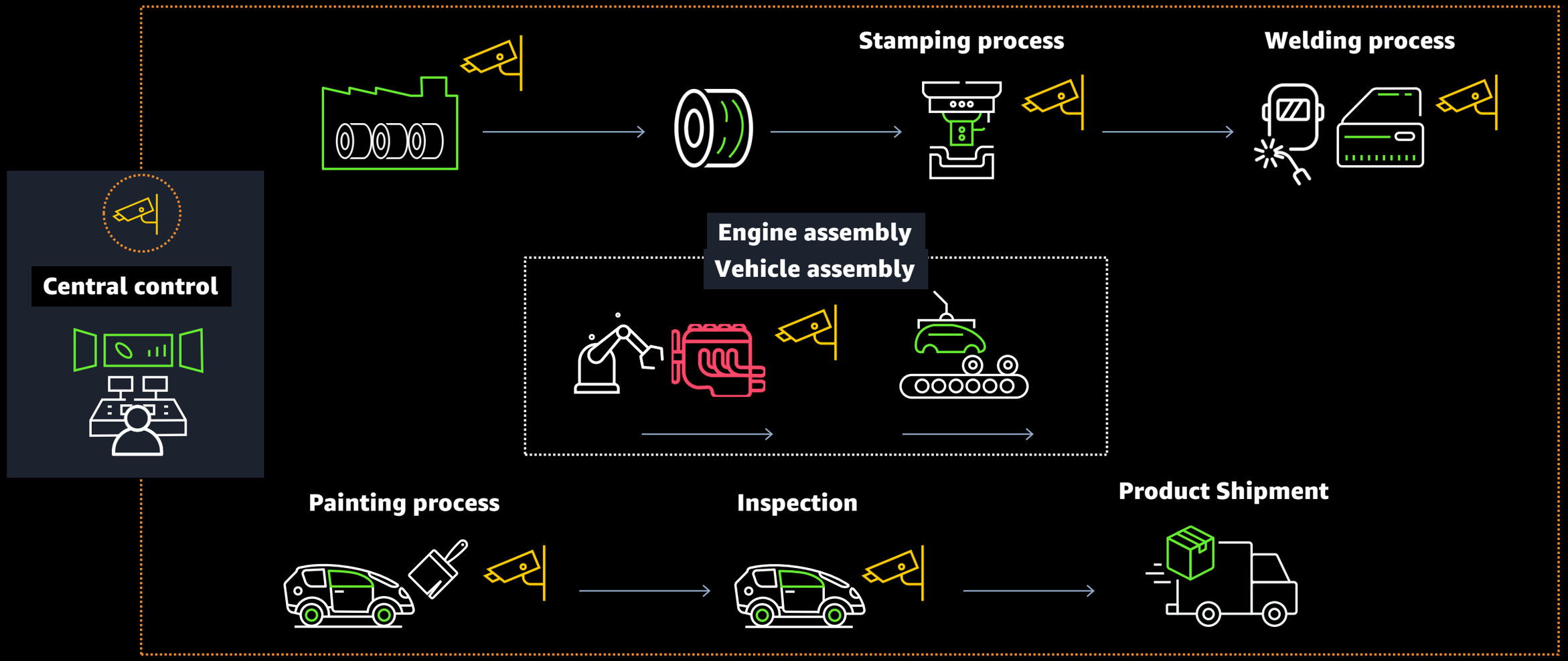
Offline inspection (sampling)

Amazon Lookout for Vision

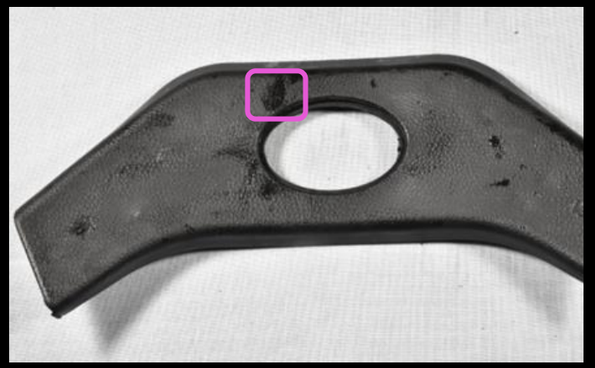
A machine learning service that uses computer vision to automate visual inspection of product defects.

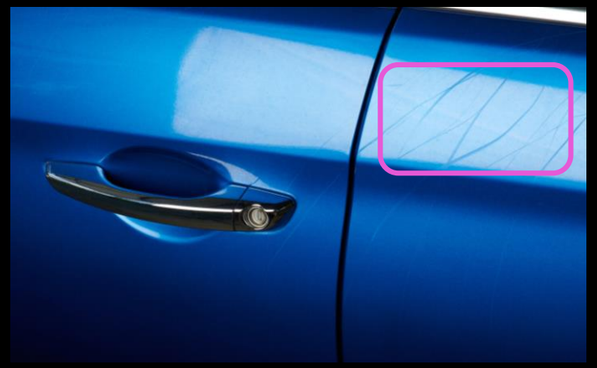


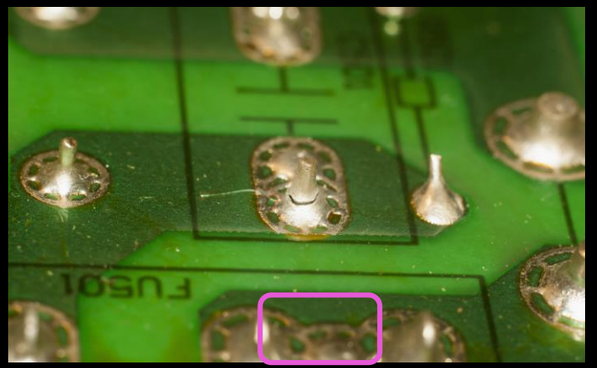
Amazon Lookout for Vision deployed across processes



Use Case: Detect Product Defects

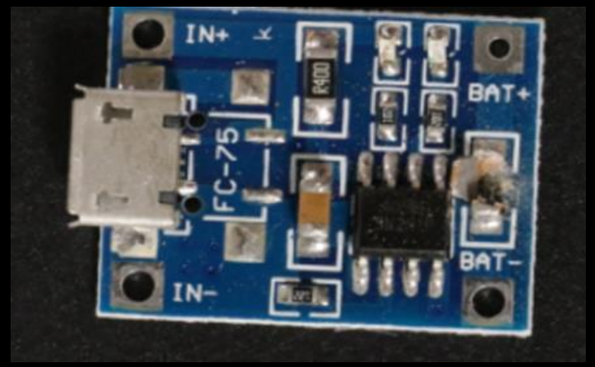






Anomaly	Surface defect	Discoloration	Improper solder (shape)
Example	Horn Plate	Automotive Door	Printed circuit board

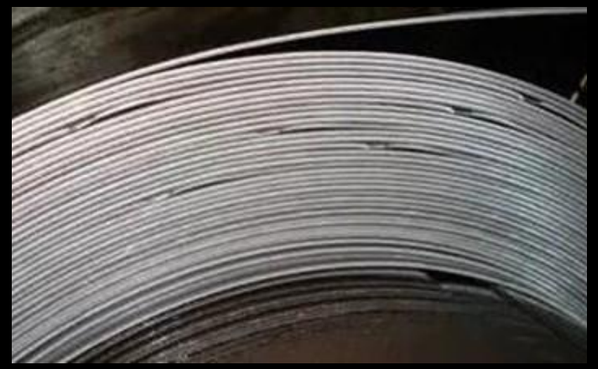
Use Case: Identify missing component





Anomaly	Absence/presence	Placement (position)
Example	Painted circuit board	Operation coil surge absorber unit

Use Case – Uncover process issues



Anomaly	Count, Change, Consistency
Example	Nylon bobbin

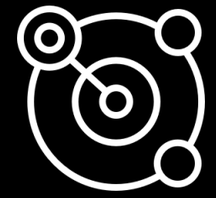
Amazon Lookout for Vision Benefits



Get started quickly

30+ images

~2 hours



Amazon Lookout for Vision Benefits



Get started quickly



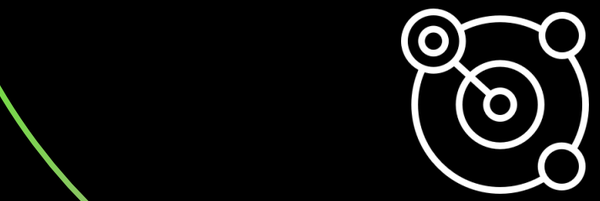
Identify defects in challenging conditions

Lighting variations



Amazon Lookout for Vision

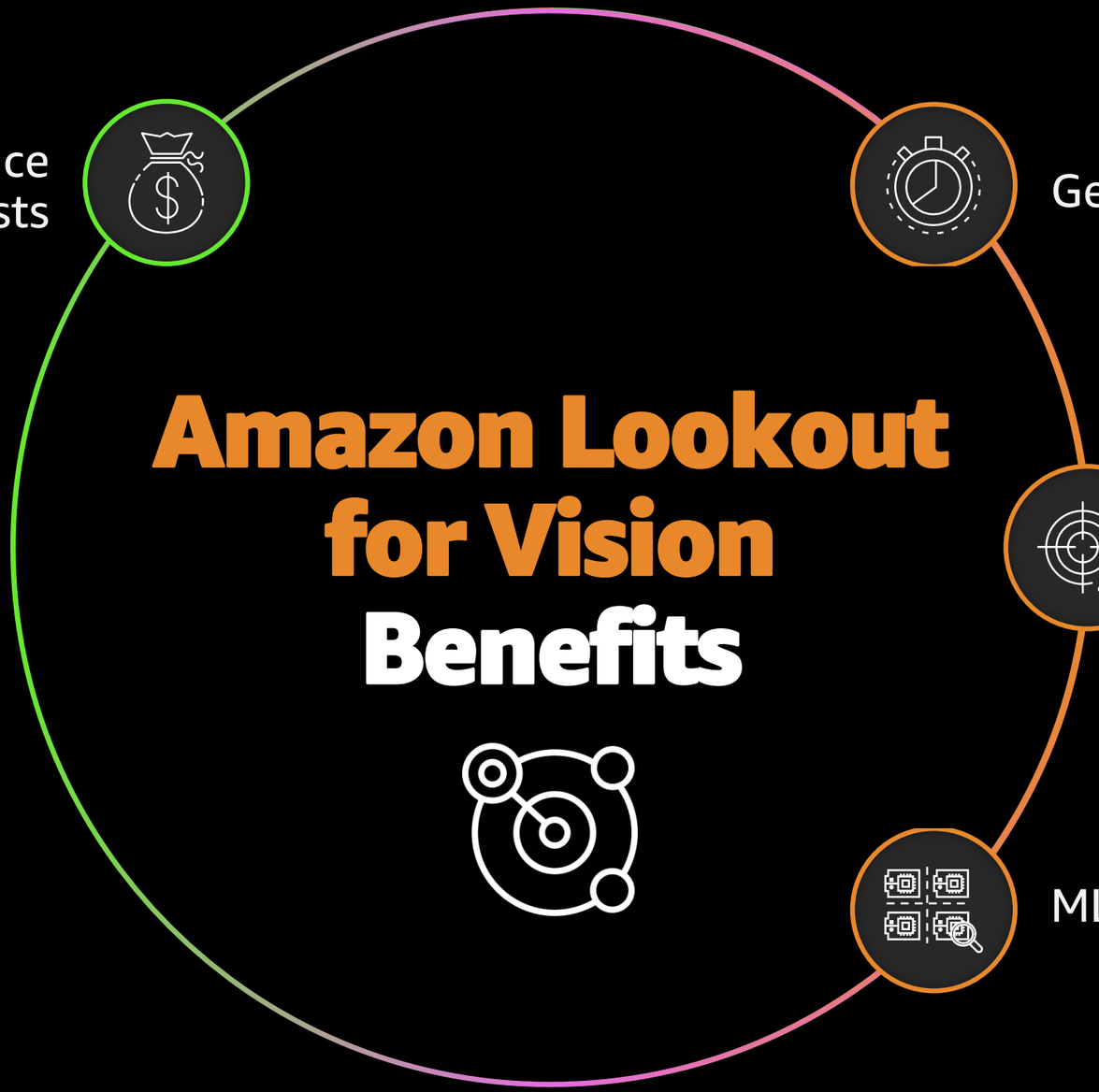
Benefits



- Get started quickly
- Identify defects in challenging conditions
- ML-enabled cameras
  - no prior ML experience

Amazon Lookout for Vision

Benefits



Reduce operational costs

Overview dashboard

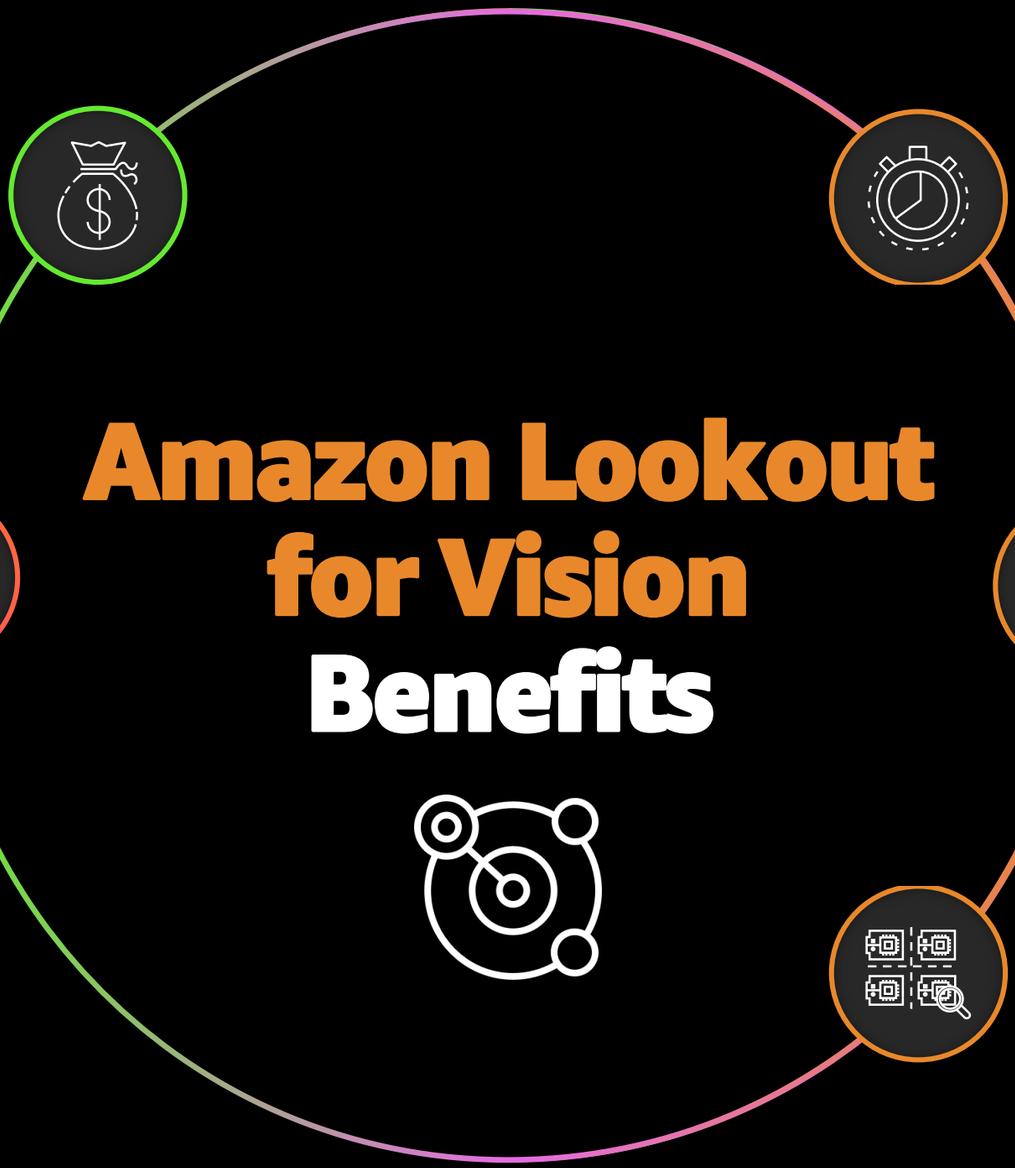
Get started quickly

Identify defects in challenging conditions

ML-enabled cameras

Amazon Lookout for Vision

Benefits



Reduce operational costs

Get started quickly

Improve accuracy continuously

fine tune model

Identify defects in challenging conditions

ML-enabled cameras

Amazon Lookout for Vision Benefits



Reduce operational costs

Get started quickly

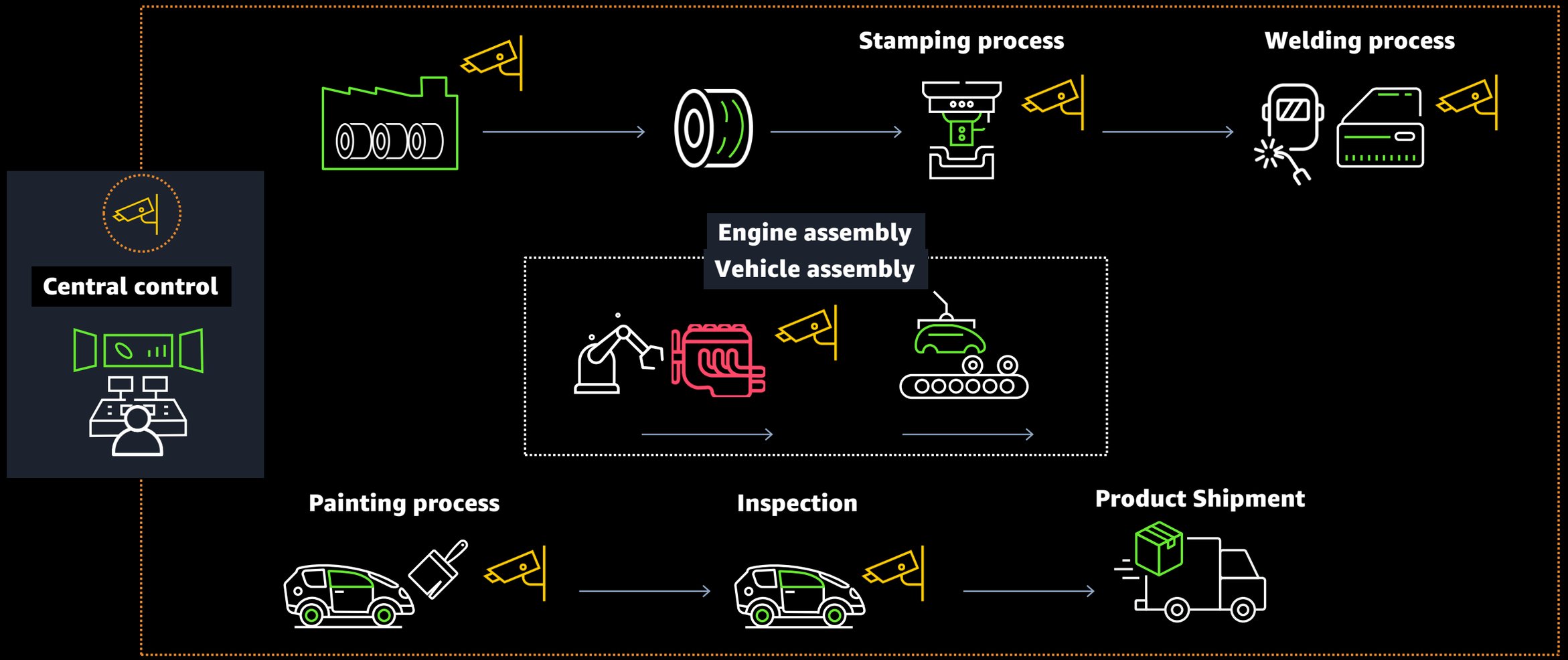
Improve accuracy continuously

Identify defects in challenging conditions

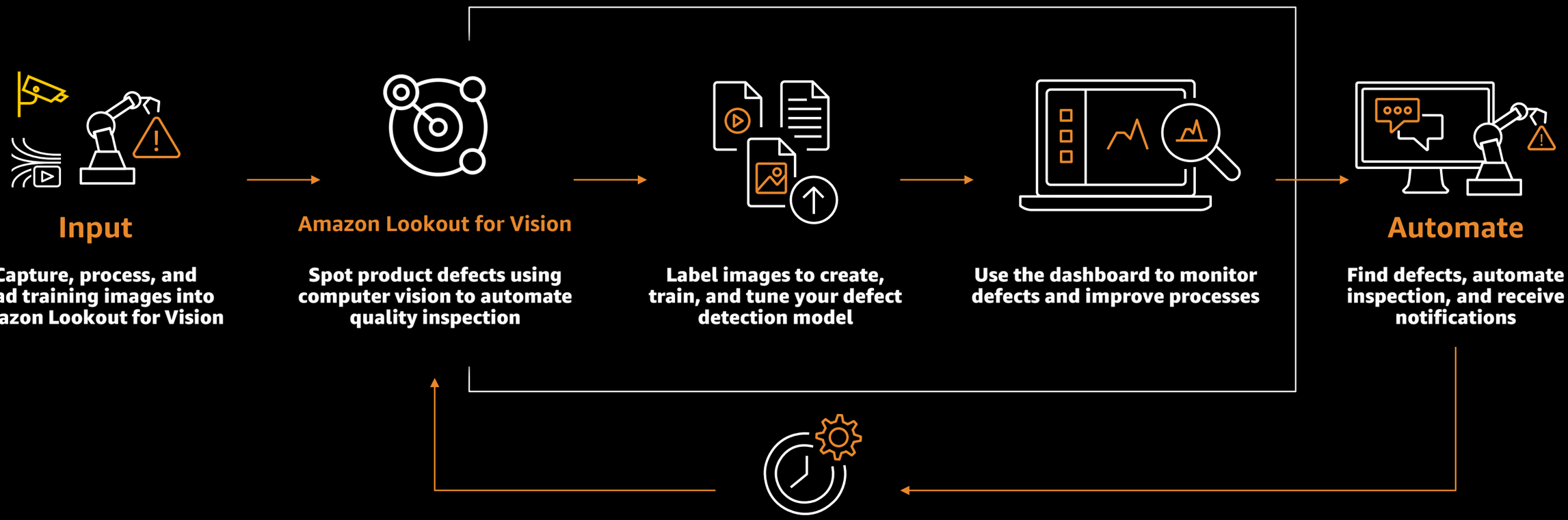
Increase agility
reuse models

ML-enabled cameras

Amazon Lookout for Vision deployed across processes



Customer journey



Input

Capture, process, and load training images into Amazon Lookout for Vision

Amazon Lookout for Vision

Spot product defects using computer vision to automate quality inspection

Label images to create, train, and tune your defect detection model

Use the dashboard to monitor defects and improve processes

Automate

Find defects, automate inspection, and receive notifications

Continuous improvement

Verify model predictions and make continuous improvements with the Amazon Lookout for Vision

Amazon Lookout for Vision

Features



Manufacturing line integration



Dashboard view



Simplified labelling



Quick evaluation



Trial defect detection tasks and feedback

Demo

Shreyas Subramanian

Principal AI/ML Specialist SA



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Customers rely on Amazon Lookout for Vision for quality



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NUKON

Sage Automation, Nukon implements high quality control systems

Together Sage Automation and AWS are using computer vision to implement better quality control systems across different manufacturing plants.

> We are excited to have implemented a trial of Amazon Lookout for Vision to detect product defects in real-time within the manufacturing facility of our sister company SAGE Automation, in line with their stringent quality control program. We are excited to now apply this technology to other manufacturers and integrate it into their quality systems.
>
> Rafael Amaral, Chief Technology Officer, Nukon



GE Healthcare delivers high quality medical equipment

GE Healthcare develops, manufactures and distributes diagnostic imaging agents, radiopharmaceuticals, medical diagnostic equipment, including CT and MRI machines, and partners with AWS to bolster their intelligent devices supported by its Edison intelligence platform.

> Today, we use human inspection to verify the quality of our medical equipment. To uphold our brand and deliver best-in-class products trusted by healthcare professionals, we're excited about using Amazon Lookout for Vision to programmatically improve the speed, consistency, and accuracy of detecting product defects across our factories in Japan and potentially in China and the United States in the near future.
>
> Kozaburo Fujimoto,
>
> Operating Officer, General Manager, Manufacturing Division, Plant Manager

Partners



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AWS Partner Community scales digital quality transformation with Amazon Lookout for Vision

Hardware Partners

ADLINK

BASLER

Technology Solution Partners

FOGHORN

TIBCO™

System Integrator and Consulting Partners

accenture

Capgemini

Deloitte.

TensorIoT

LTI

Provectus

Partner

Maikel van Verseveld

Industry X – Digital Manufacturing & Operations

Accenture



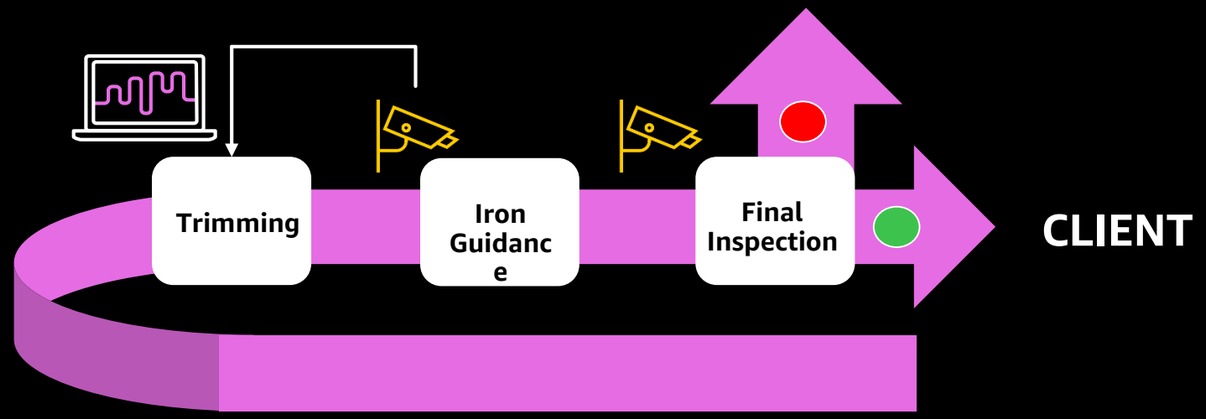
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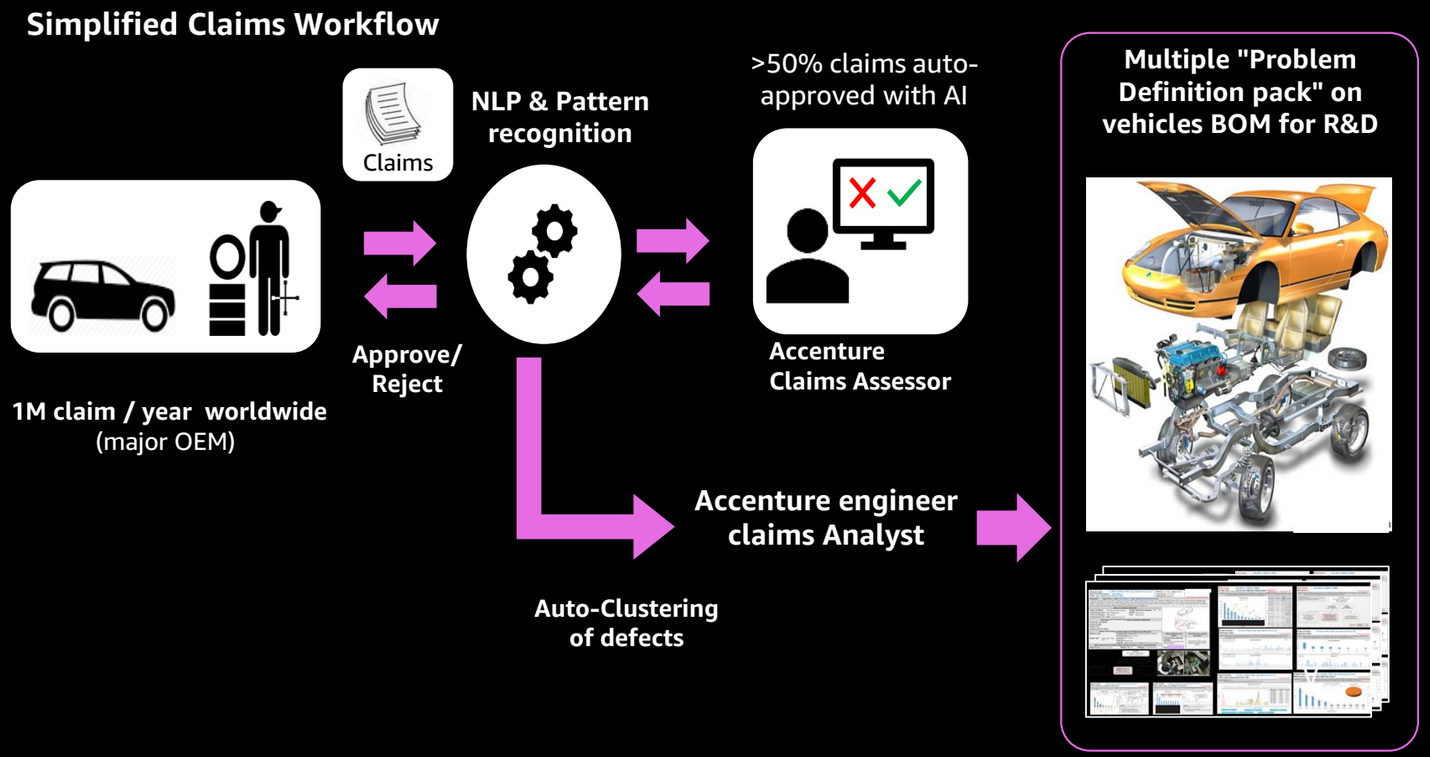
Accenture designed, built, and deployed an AI platform on the shopfloor to automate visual inspection of several products



- ✓ In production since Sept 2018
  - Reduce inspection time by 50% and defects by 40%
  - Reduction of operators needed per line
- ✓ Fully industrialized solution
  - Industrial DevOps Pipeline
  - Deployment to 30 assembly lines
  - AI training and solution evolutions done offshore



Accenture operates warranty analytics at scale for a major European automotive manufacturer



Process	Metrics
Product Quality	Issue Resolution time saved
	Corrective Action Projects
Customer Services	Claims Processed
	Fraudulent Claims
Warranty Financials	Warranty Cost as % to Sales

Pizza time



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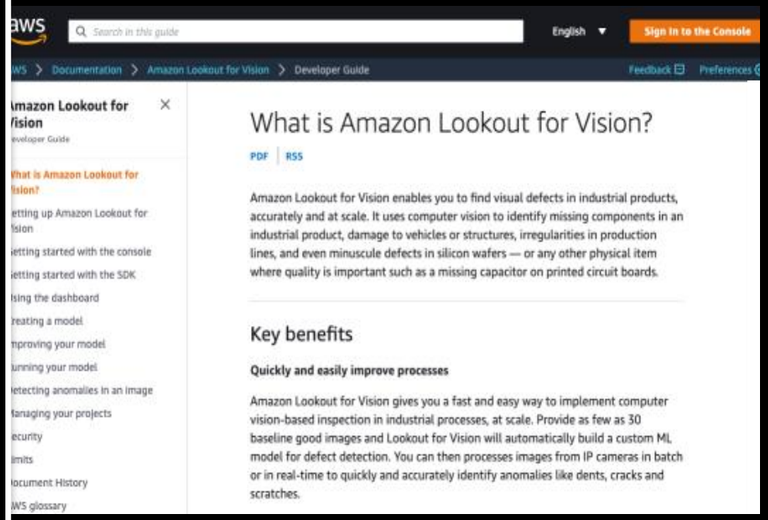
Dafgards innovates while delivering quality

Dafgards is a household name in Sweden, manufacturing all kinds of food. One of their most successful brands is Billys Pan Pizza.

> While our previous systems served well for our original inspection requirement, they were unable to detect defects on new product types that included multiple toppings and foreign objects that were not possible to predict beforehand. **Amazon Lookout for Vision automates and scales inspection of diverse product types such as a cheese pizza with vegetables using the same machine vision system.** We successfully expanded our quality assurance for new product types with minimal impact to operations.
>
> Fredrik Dafgård, Head of Operational Excellence and Industrial IoT

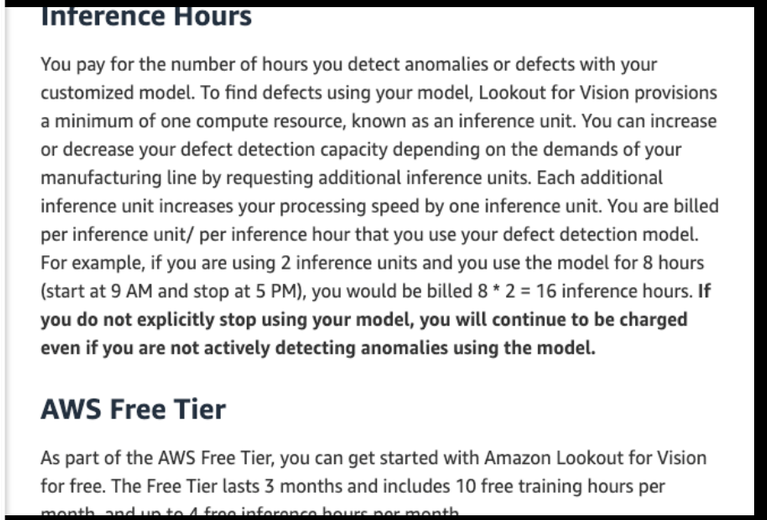
Get started with Amazon Lookout for Vision

DEVELOPER GUIDE



https://docs.aws.amazon.com/lookoutvision

AWS Free Tier



https://aws.amazon.com/lookout-for-vision/pricing

Thank you!

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