



SMART VISUAL INSPECTION WITH ARTIFICIAL INTELLIGENCE

Manual Inspection



- human error
- volume limitations
- time intensive
- skilled labor shortage
- limited data tracking

Machine Vision



- limited function
- expensive equipment
- false positives and negatives
- long deployment cycles
- limited data accessibility

IMPACT OF
INEFFICIENT QUALITY
INSPECTION SYSTEMS

10X

cost of scrap

15%

operational
expenses



material & labor costs
lead times
penalties & fines

revenue
customers
brand reputation

Adapt and Pivot in **Dynamic Environments**



Hyperautomation

By 2025, manufacturers **will lower operational costs by 25%** by combining hyperautomation technologies with redesigned operational processes.



Smart Factory

By 2025, three out of five manufacturers' **smart factory initiatives will stall** due to lack of supply chain integration.



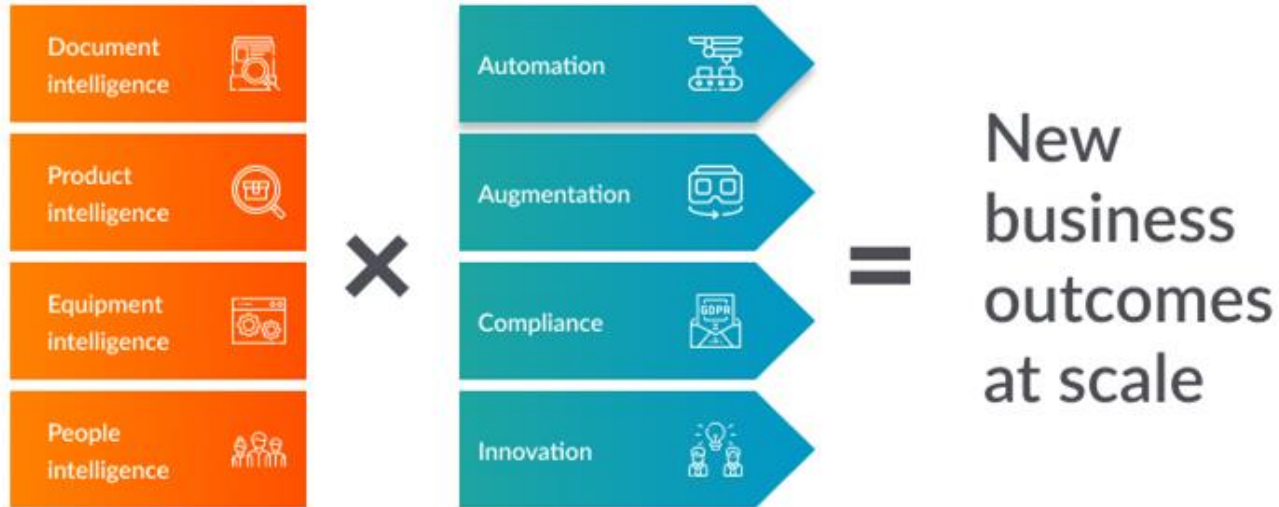
Intelligent Composable Business

By 2023, organizations that have adopted a composable approach **will outpace competition by 80%** in the speed of new-initiative implementations.



Data-Driven AI Vision

Computer vision unlocks new intelligence and drives outcomes at scale



Visual Inspection Use-Cases

		Business Value				Feasibility	
		Cost Reduction ¹	Revenue Growth ²	Customer Satisfaction ³	Innovation ⁴	Technical Feasibility ⁵	Organizational /External Readiness ⁶
1	Visual Damage Estimation	Medium	Medium	Medium	Medium	Medium	Medium
2	Manufacturing Quality Control	High	Medium	Medium	Medium	Medium	Medium
3	Manufacturing Process Optimization	High	Medium	Medium	Medium	Medium	Medium
4	Buyer Intent Analysis	Low	Medium	Medium	Medium	Medium	Medium
5	Sales Forecast	Medium	Medium	Medium	Medium	Medium	High
6	Customer Satisfaction Monitoring	Low	Medium	High	Low	Medium	Medium
7	Machine Predictive Maintenance	Medium	Low	Low	Medium	High	High
8	AMR	Medium	None	Low	High	High	Medium
9	Customer-Facing Chatbots	Medium	Low	Medium	Medium	High	Medium
10	Replenishment Optimization	High	None	Low	Medium	Medium	Medium
11	Parts/System Simulation	High	Medium	Medium	High	Low	Medium
12	Vehicle Inspection	Medium	Low	Medium	High	Medium	Medium
13	Model-Based Generative Design	Medium	Low	Medium	High	Low	Medium
14	Demand Prediction (SCM)	High	Medium	Low	Low	Medium	Medium
15	Virtual Salesperson	Medium	Low	Medium	High	Low	Medium
16	Dynamic Pricing	Low	High	Low	Low	High	Low

¹ Lowering the cost to develop, operate, build, sell or service a vehicle.

² Increasing the ability to sell vehicles and associated services or to raise prices.

³ Includes all factors like timely resolution of customer problems, satisfaction with products and all services.

⁴ The difference in capability or process between the current state and future state.

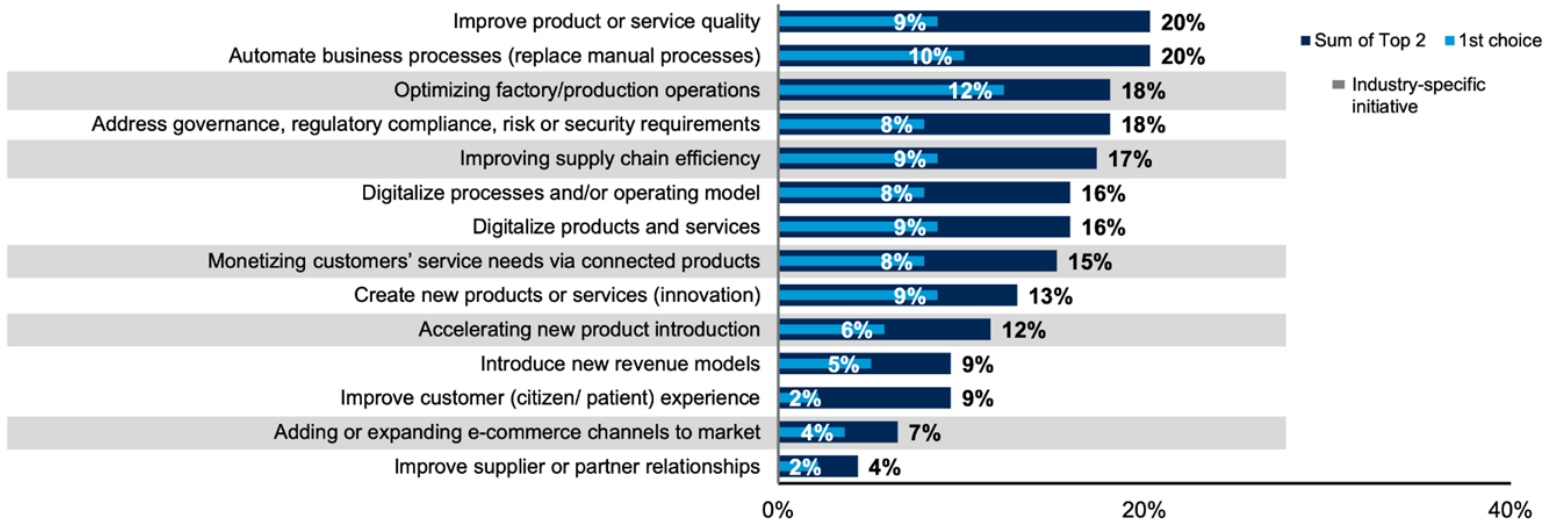
⁵ The availability of tools, human and fiscal resources to execute an implementation.

⁶ The willingness and readiness of an organization to attempt to implement new technology.

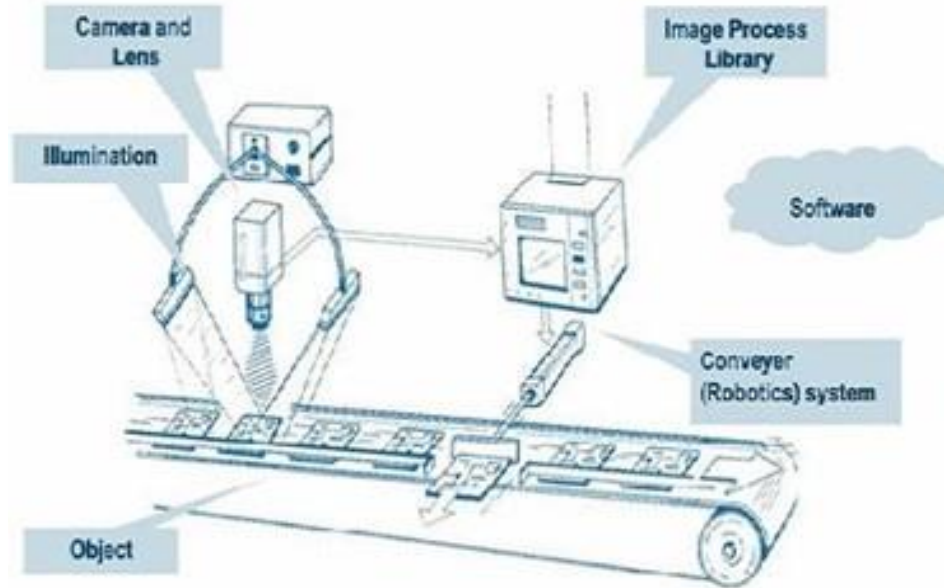


Top strategic business initiatives Manufacturing Industry

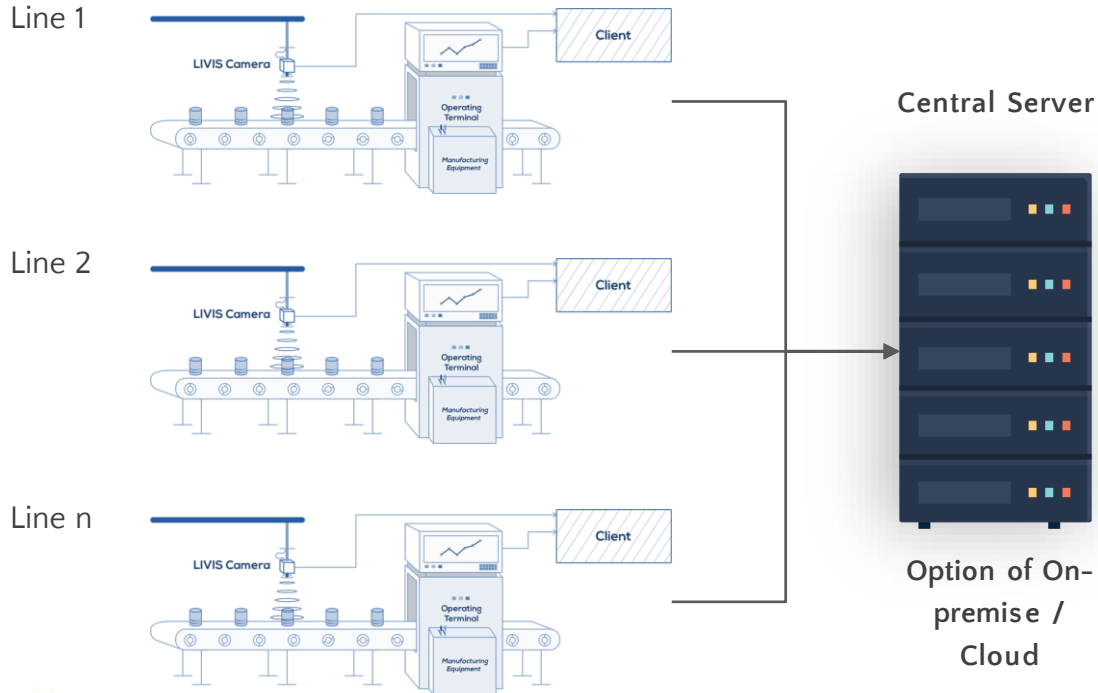
Top strategic business initiatives 1st Choice and Sum of Top 2 Outcomes



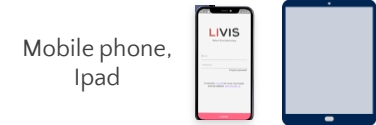
Machine Vision



Fully Integrated - Easier to deploy



Off the shelf camera supported*
(depending on the complexity)





Search 'UseCase'



+ Create



● Deployed ● Not Deployed

1-88 of 221

Specific AI model to surface & process

Defect library

Add Usecase

Usecase Name
engine block

Choose Process

CNC

InjectionMoulding

Forging

Painting

Stamping

Assembly

Automotive

Engine

Enter Features

Enter Defects

scratch

dent

burr

CANCEL

SUBMIT

Washer2



AUTOMOTIVE

Labelled
72%

Version
1

Facility
0

39.77 %

Accuracy

Train

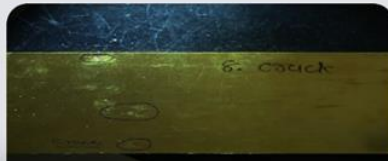
Break Pad



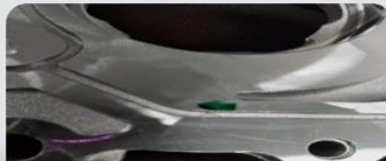
Copper Sheet



Brass Sheet



Machining Chips

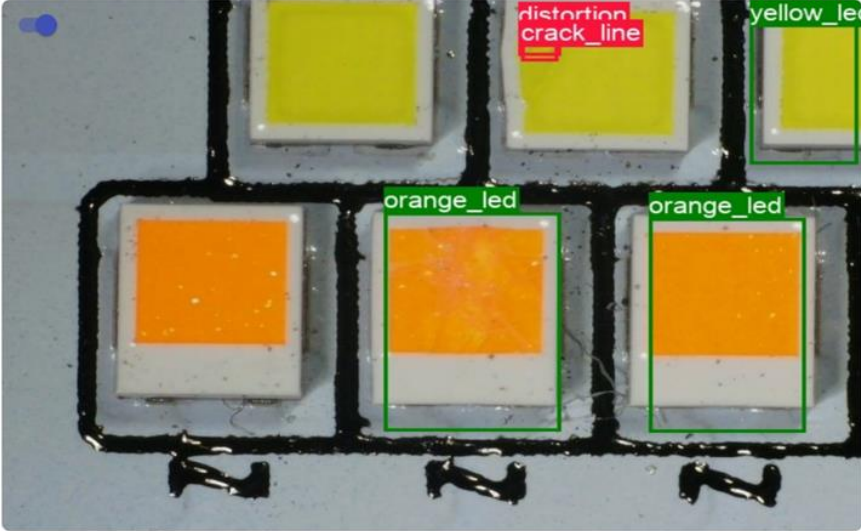


LIVIS

RAJESH

- Users & Roles
- Config
- Inspection Library
- Inspection Reports**
- (EN) English
- Software Updates

Inspection Results



Usecase Name
Led

Inspected at: 2022-08-08 15:23:07

Status: **Rejected**

Reasons:

Features:

- Orange Led ✓
- Yellow Led ✓

Defects:

- Crack Line ✓
- Distortion ✓
- Excess Red ✗
- Excess Material ✗

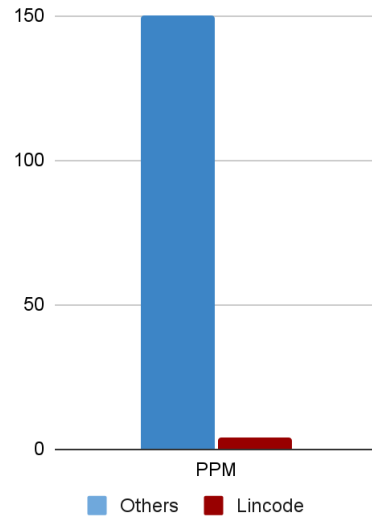
EXPORT FLAG CLOSE

Reports with detailed timestamp, location of defect and type of defect

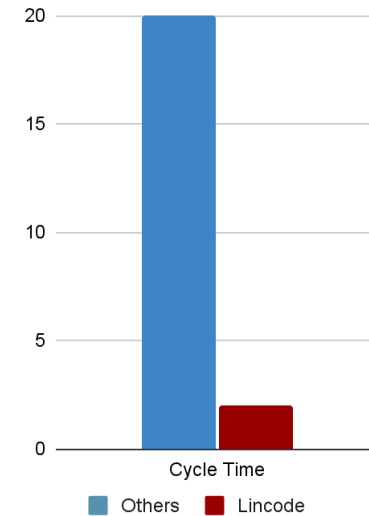
ID	Operator	Timestamp	Location	Defect	Status	Operation
108	operator@livis.com	2022-08-05 11:29:00	led	Excess Red	✗	Info
109	operator@livis.com	2022-08-05 11:29:44	conrod001	Excess Red	✗	Info
110	operator@livis.com	2022-08-05 11:29:10	conrod001	None	✓	Info

Impact with AI

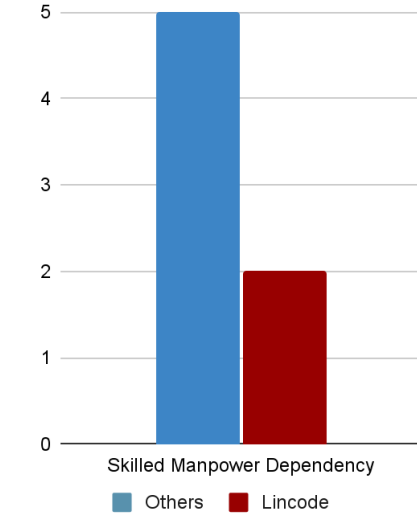
False calls PPM



Cycle Time



Skilled Manpower Dependency



Overall Savings AVG -\$2M/Factory



AI Advantages

- Only 10 to 15 images per defect
 - Hardware neutral – Off the shelf inexpensive camera.
 - API integration with factory systems.
 - Go live in < 1 week.
 - Works on-premise or on the cloud
-
- Augmented Visuals: help improve resolutions
 - Augmented Lighting: improves visibility and no false positive during daylight
 - Augmented models: reduce the total training time to minutes



LINCODE

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