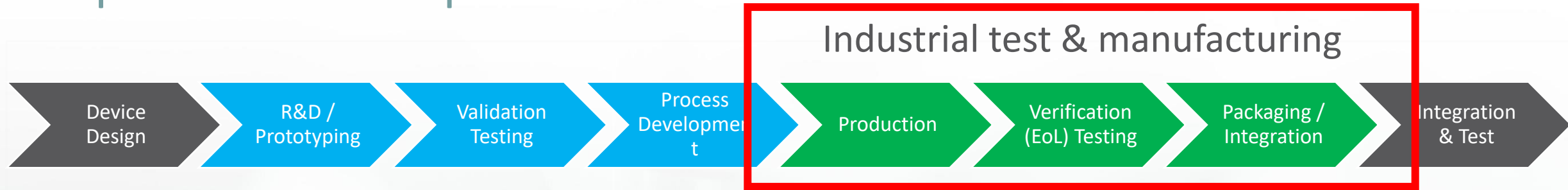
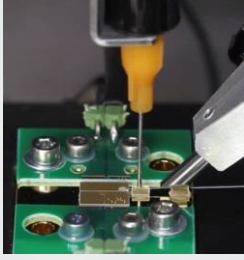

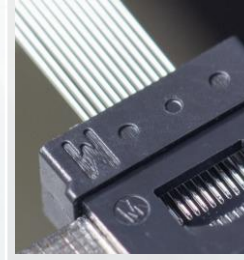
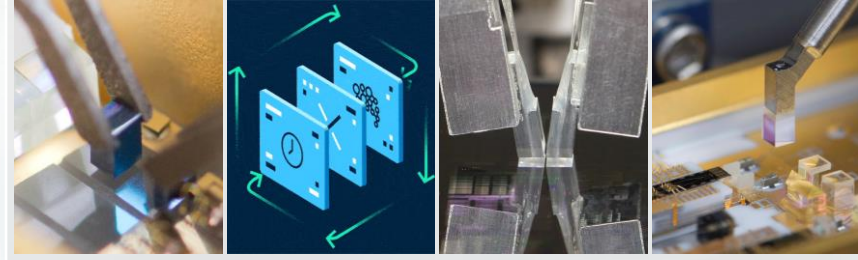


ARTIFICIAL INTELLIGENCE FOR OPTICAL TEST & MANUFACTURING



Scope: AI in Development Flow

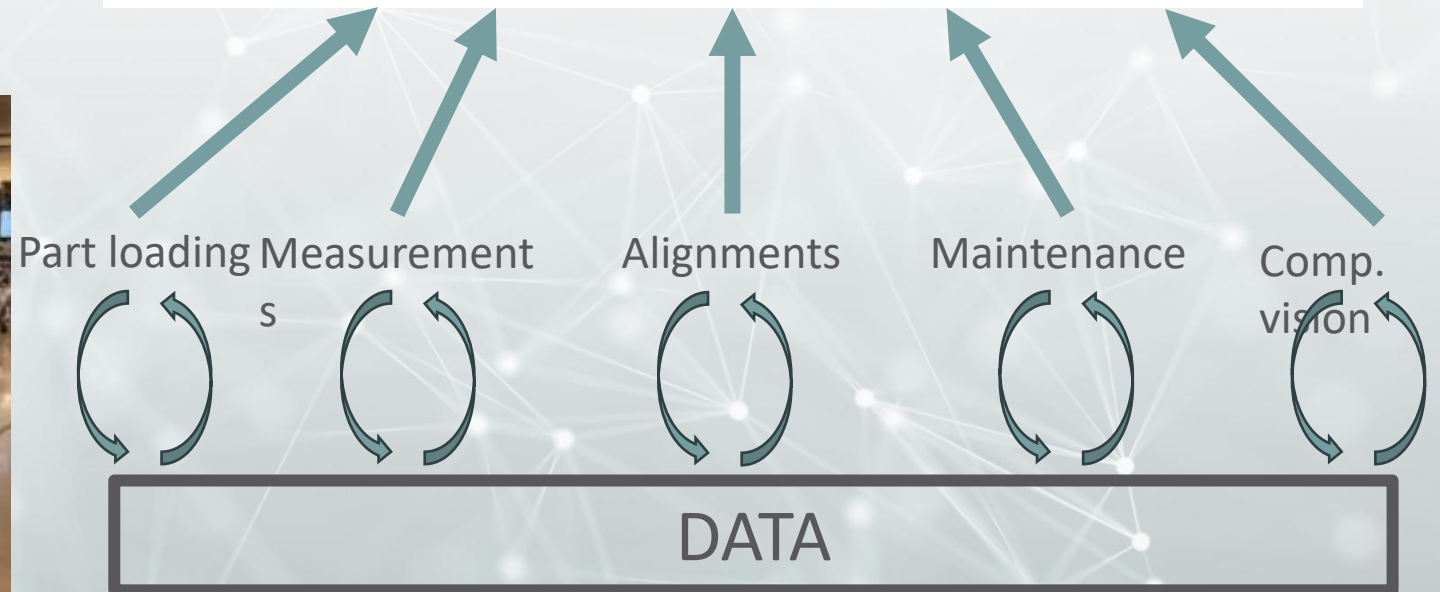
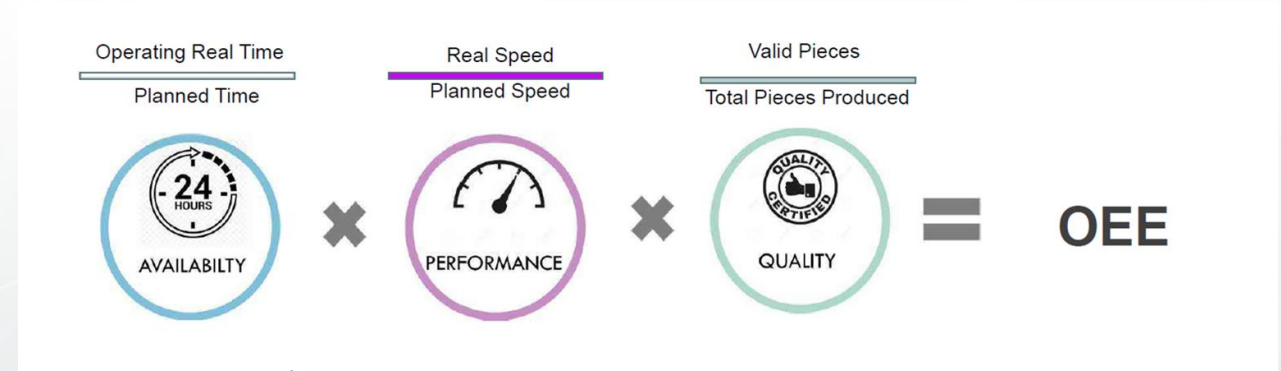


				
Task / Requirements:	align-&-attach (passive/active) or custom assembly at die or wafer level	test-&-qualify at die or wafer level	process automation & optimization & system design for die or wafer level	low-volume & batch production or high-volume in-line manufacturing with preventative maintenance via ML-based Performance Services at die or wafer level
Product lines:	AssemblyLine BondLine FiberLine CustomLine	TestLine	AssemblyLine BondLine FiberLine CustomLine	AssemblyLine BondLine FiberLine TestLine InspectionLine StackLine Weld
System platform:	Entry-level Stand-alone	Stand-alone In-line as stand-alone	Stand-alone In-line as stand-alone	Stand-alone (batch production) In-line (HVM)

INDUSTRIAL PHOTONICS TEST & ASSEMBLY: OEE IS PARAMOUNT

Priorities in Production:

- High yield
- High throughput / UPH (units per hour)
- Low unscheduled downtime



SUCCESS STORIES

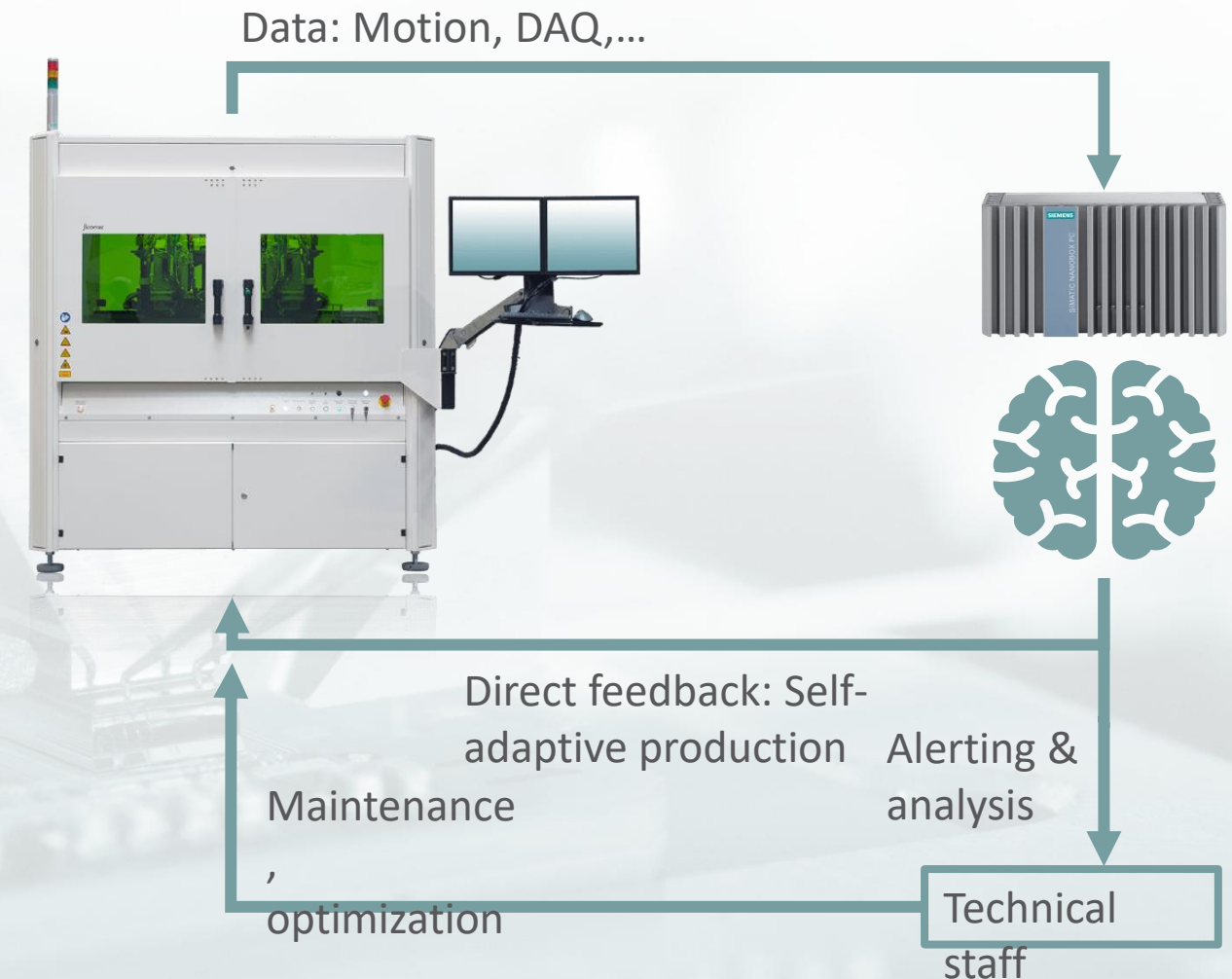
Application	Monthly volume	Use case(s)	Improvement
Datacom assembly	>40 k	Alignment prediction Autofocus prediction	UPH +18% Yield +2%
Datacom assembly	>70 k	Alignment prediction Dispense prediction Predictive maintenance - optical probes	UPH +7% Yield +0.5%
Datacom assembly	>70 k	Adaptive Motion + Motion upgrade	UPH +17%
...more in progress...			

Data driven optimization can increase OEE by >20%

FICONEDGE: EDGE COMPUTING FOR KPI IMPROVEMENT

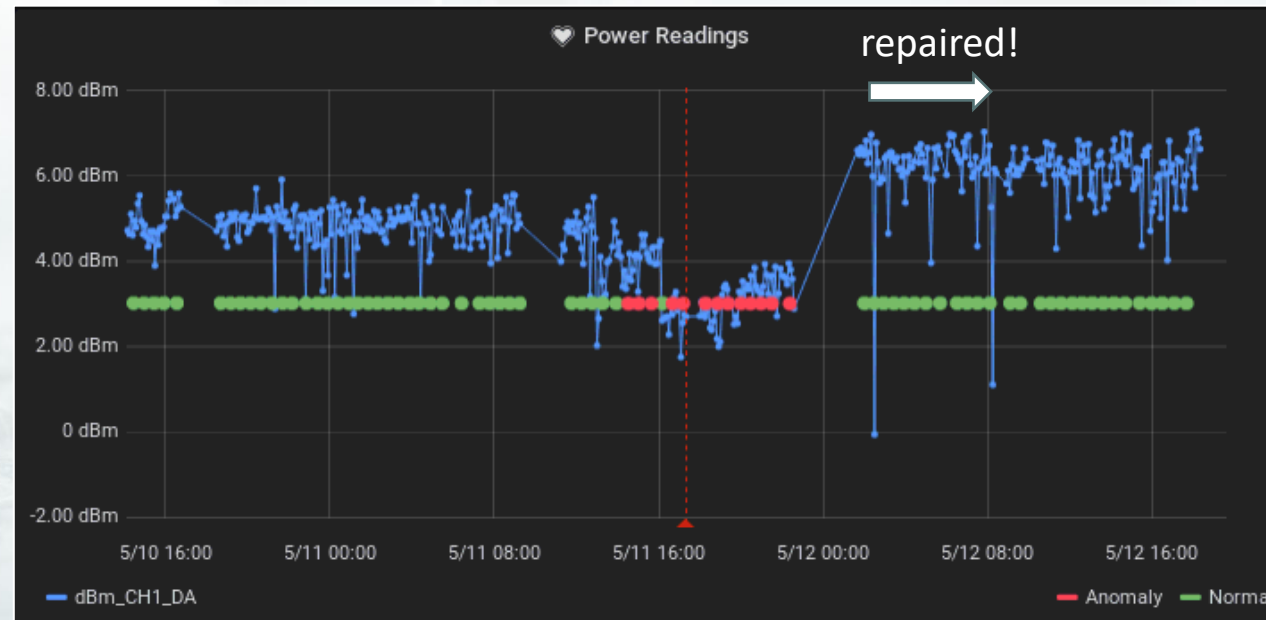
There is an abundance of Data available on the machine. FiconEDGE allows **automatic**, structured storage of **all** of this data:

- Motion system data
- DAQ data
- Process logs
- Machine computer status (CPU, memory)
- Machine status



PREDICTIVE MAINTENANCE: CUSTOMER EXAMPLE

- Contaminated probe leads to failed production due to low measured power
- By monitoring probe status, failed parts could be reduced by 66%
 - 7 figure saving per month!



Automation of probe failure detection

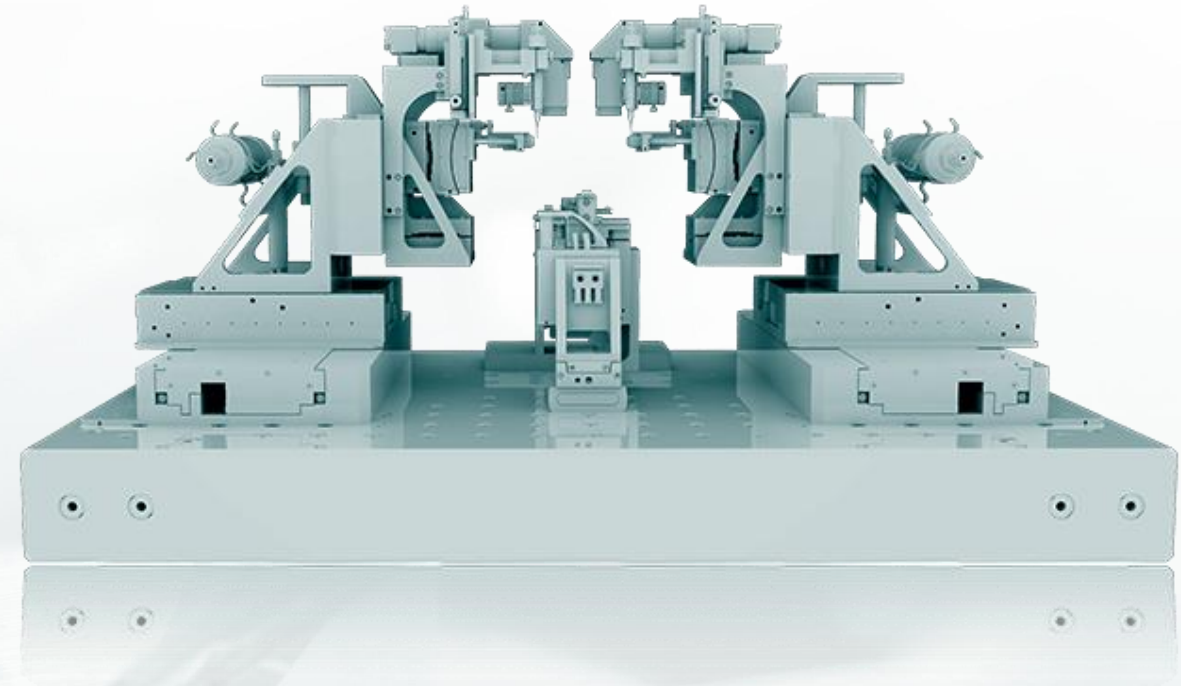
ADAPTIVE MOTION

Optimum motion is a trade off:

- High throughput
 - fast motions
- High yield
 - accurate motions
 - Early alerting to prevent part loss
- Field conditions
 - Performance degradation over time

Ideally we could measure motion accuracy in the field!

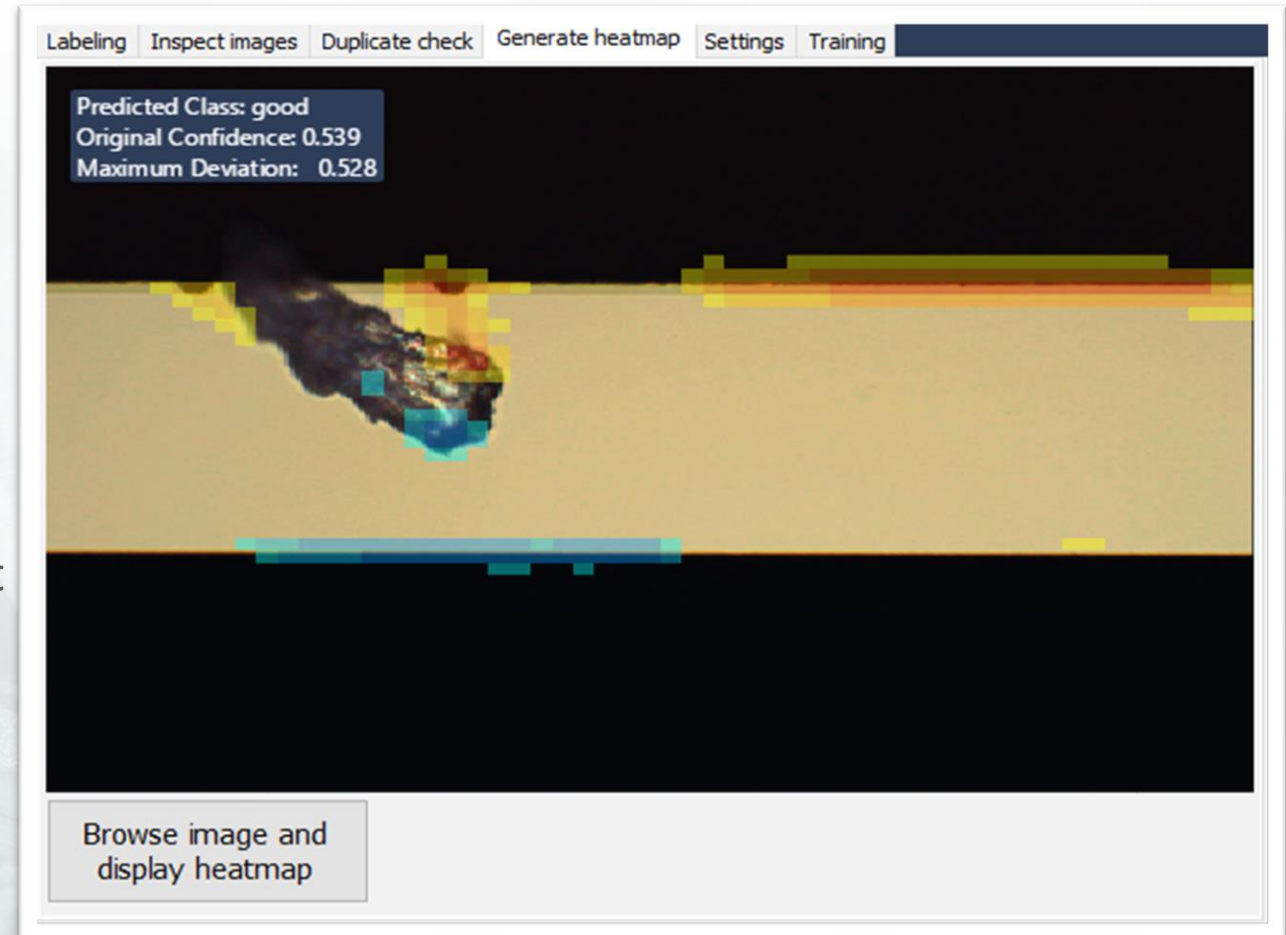
How?



Vision inspection – State of the Art

State of the Art

- Good part / bad part: Classification model
- Large, pre-trained neural networks available
 - Multiple millions of images for training!
- Transfer learning: Only top layers trained to adapt to customer use case
 - 100s of images needed
- Model training takes AI expertise to do right



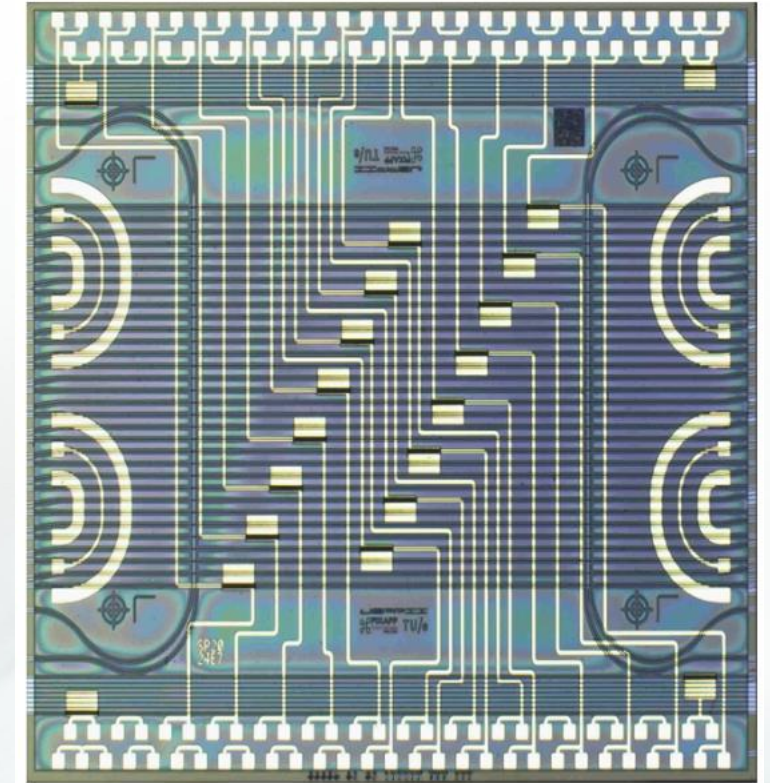
Are there better ways?

Narrow down the scope

- We don't need to identify faces or trees!
 - Only technical parts!
- General image models need to deal with low resolution, shaking & arbitrary tilts
 - Machines don't do that!



Source: Wikipedia



Courtesy of PixApp/ficonTEC

Specialization works!

What do these have in common?

Thank you!