

4D Vision for Robotic Automation



Apera AI's mission is to simplify automation. Our expertise in AI enables customers to deploy vision-guided robots that are smarter, faster and more reliable. And you can do it with little vision experience.

This is how we see the future of manufacturing.



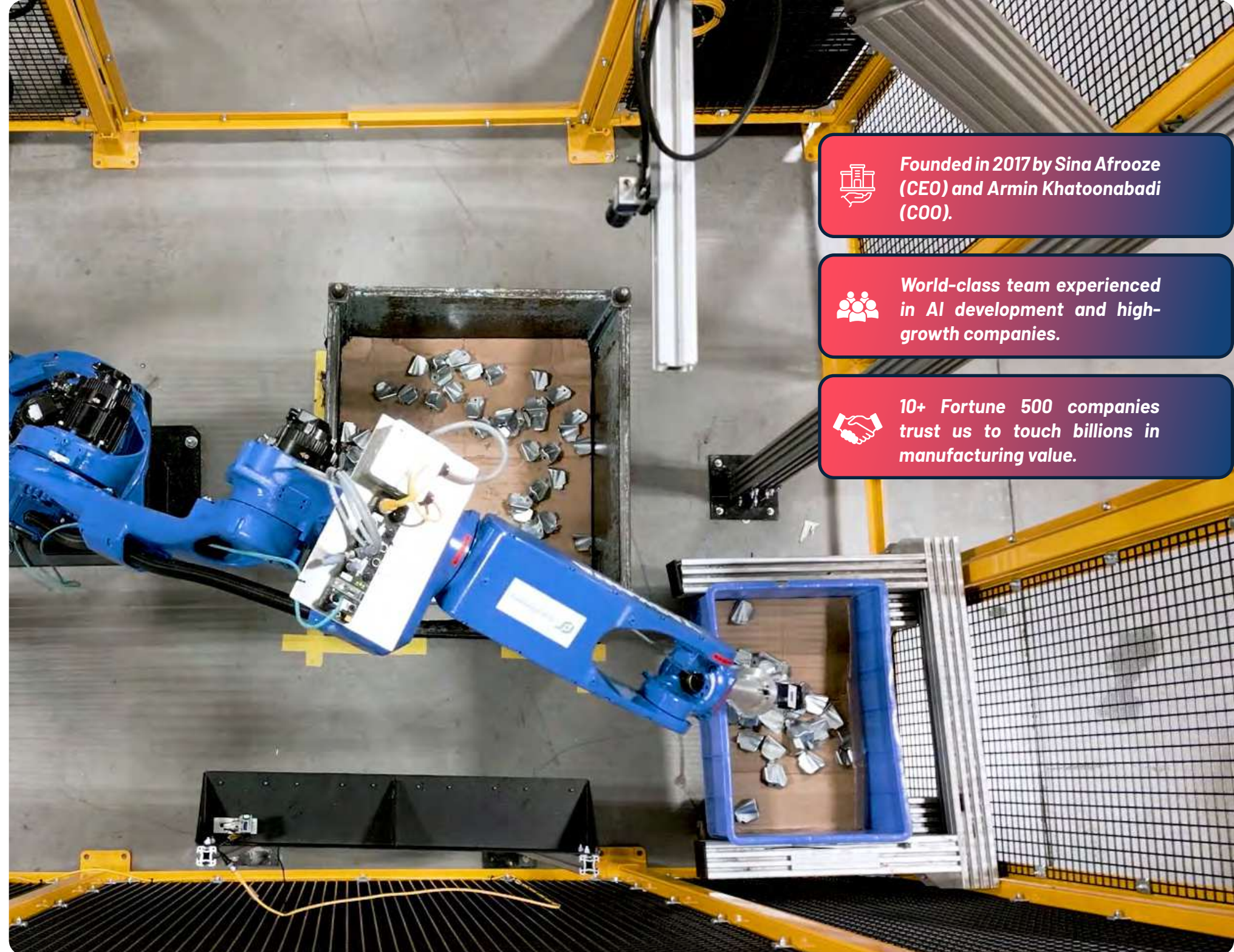
Say hi to Apera AI.

We develop AI-powered vision to make automation simpler.

Apera AI simplifies automation with our core technology, 4D Vision. We train an AI neural network through a million cycles to achieve 99.99% reliability in recognizing objects and performing tasks.

When your robotic cell enters production, we load this AI program into Apera Vue, our vision software. You're production ready right away. Vue instructs the robot to take the safest, fastest path to the object and then on to the next manufacturing step.

The vision program can now think as fast as the robot can move, with human-like capabilities. Robotic cells will perform at their best, allowing your automation teams to focus on non-vision tasks.



Founded in 2017 by Sina Afrooze (CEO) and Armin Khatoonabadi (COO).



World-class team experienced in AI development and high-growth companies.



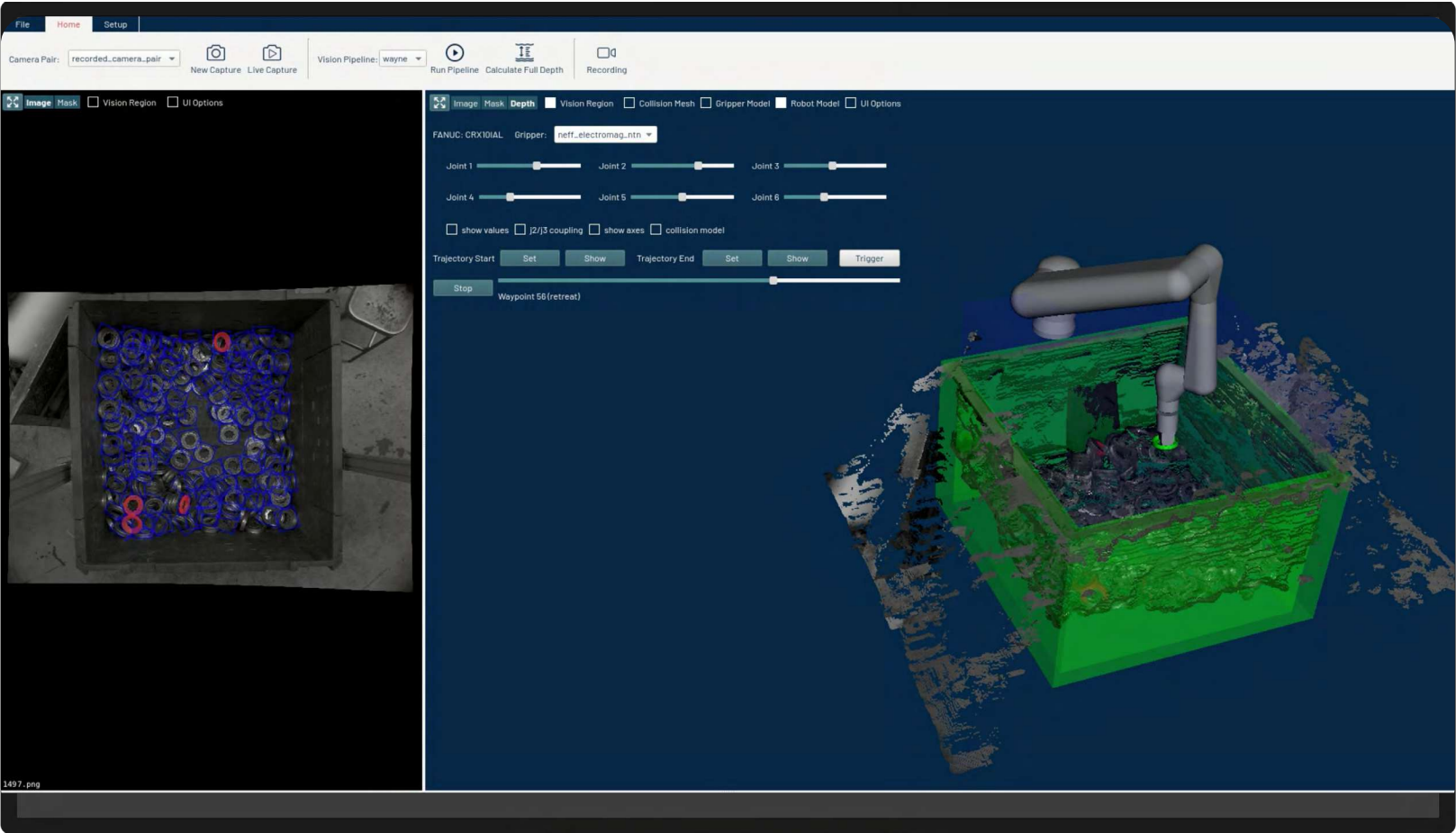
10+ Fortune 500 companies trust us to touch billions in manufacturing value.

Apera Vue Vision Software

Apera Vue provides complete robotic guidance. Object recognition, path planning / pose estimation, collision avoidance, grasp planning, object orientation and placement—it’s all there.

When you use Vue, you have control over the automation strategy of the robotic cell. Choose gripper / end-of-arm tools, select pick points and simulate the whole robotic cell.

Using AI-powered software equals continuous improvement. You’re not locked into the limitations of a conventional 3D camera, We use off-the-shelf 2D cameras. The real power is in Vue, which is continuously improving.



How does 4D Vision compare against 3D vision?

	Apera AI's 4D Vision	3D Vision
Speed	Total vision cycle time of object recognition and path planning to the robot	
	As low as 0.3 seconds	3-8 seconds
Vision Programming	Apera does the work in our AI training engine.	Depends on experienced vision programmer for days or weeks.
Light Conditions	Operates in variable and changing conditions, including nearly dark and outside.	Requires structured light or lighting control.
Robot Compatibility	All major robot brands	
Object Finishes and Complex Shapes	Works with all finishes—shiny, clear, translucent. Works with complex shapes, even when features are not visible.	May work with shiny objects, typically fails with clear and translucent. Point clouds lack detail for complex shapes.

How 4D Vision Works

AI provides a faster and easier path to reliable vision programming.

Step 1:

The AI training process starts with a CAD model.



Step 2:

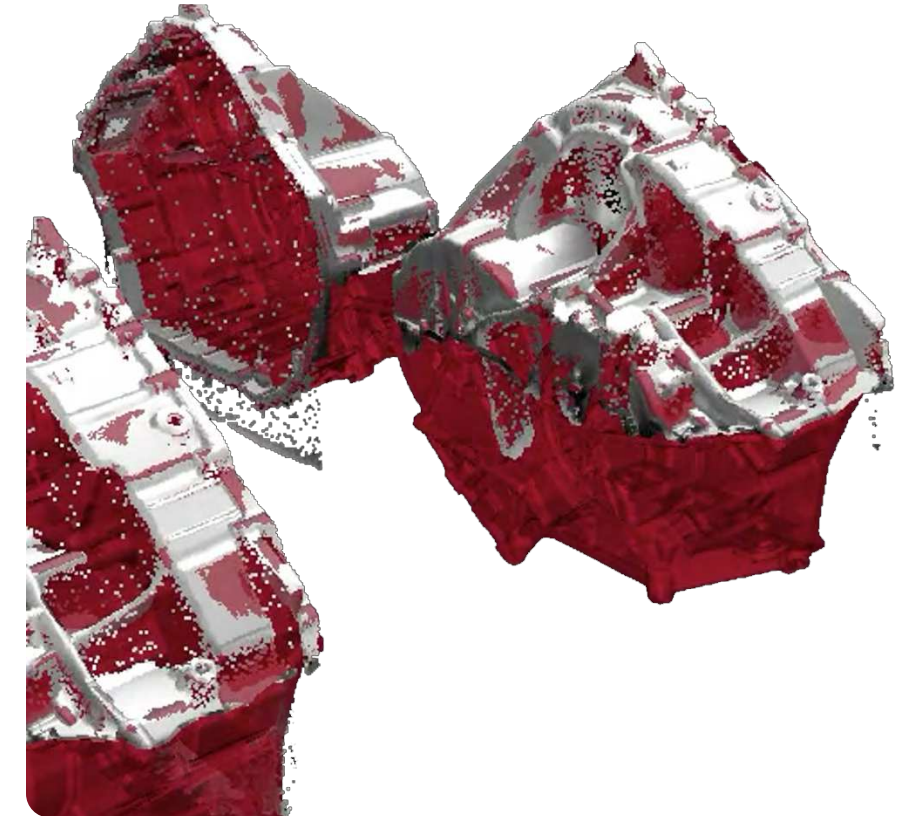
We train your parts into an AI neural network using synthetic data.



We use synthetic data—images that look real, but are not—to train the neural network. Wave after wave of calculations happen to train the vision program. Factors such as the part's geometry, finish and appearance under different lighting are all trained into the program. Training continues until greater than 99.99% reliability occurs in the simulation.

Step 3:

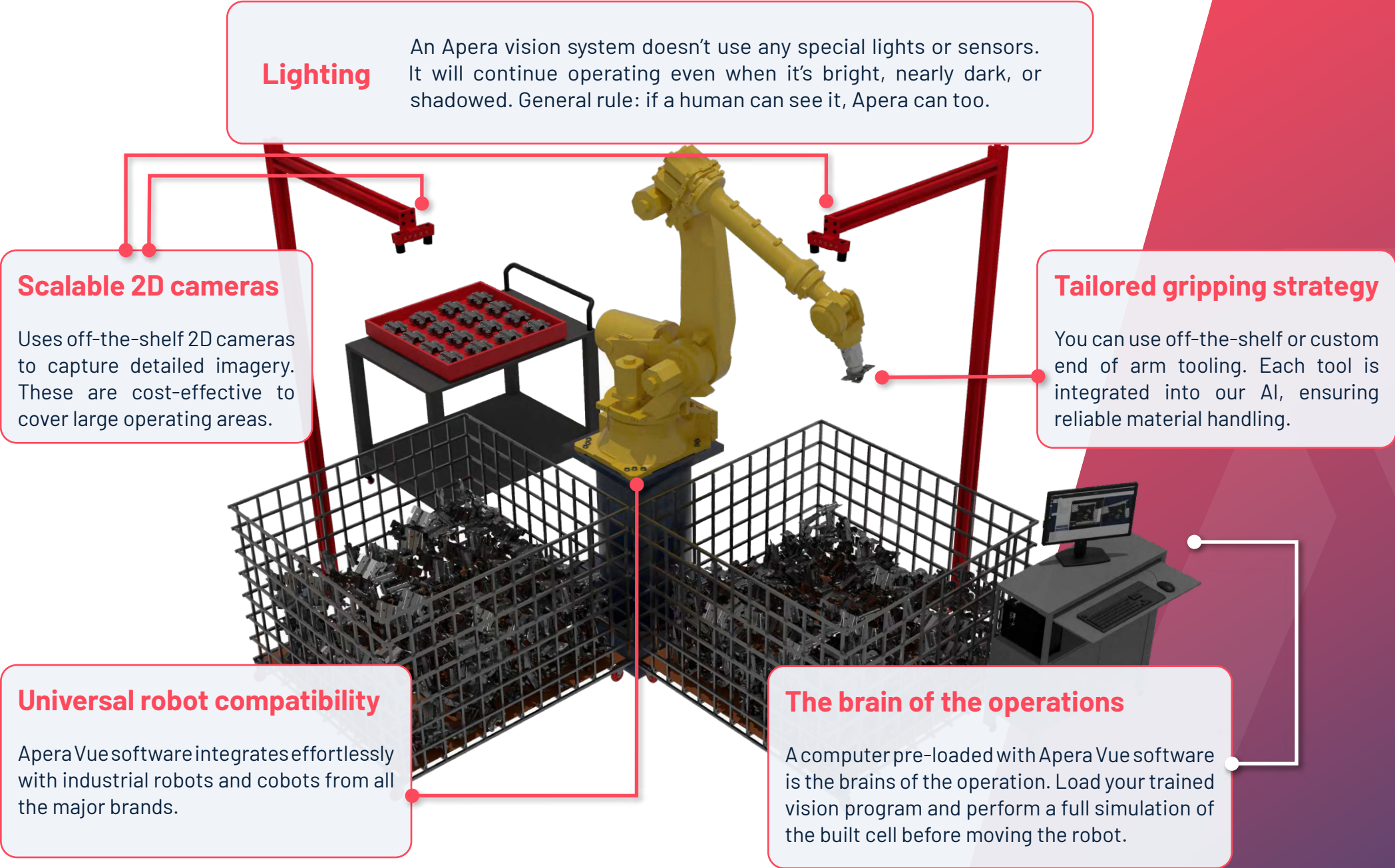
A complete vision program is returned to you for use in Vue.



Calibrate the cameras and the robot—a 15-minute process—then load the complete vision program resulting from the training process. Work through choices that will help your cell perform: gripper / end-of-arm tools, pick points, safe operating boundaries, vacuum cup conformability and more. Then simulate the full operation of the built cell before moving the robot.

Apera AI System Configuration

Scale and customize your Apera AI vision system



The Apera AI Experience

Risk-free Buying

We agree on performance specifications before you buy and guarantee the vision system's performance. No risks, just results.

Unlimited Vision Training

Leave the training to us. New parts or applications? We include ongoing training with your system's purchase.

Multiple Applications

An Apera vision system is capable of most tasks requiring robotic guidance. We also can do some inspection applications, such as high-speed final assembly inspection, object position and absence / presence.

Collision Avoidance

Vue software allows you to define the safe operating area of the robot and the containers from which parts will be picked up. The robot won't hit bin walls or support structures.

Applications



Bin Picking

PERFORMANCE HIGHLIGHTS:

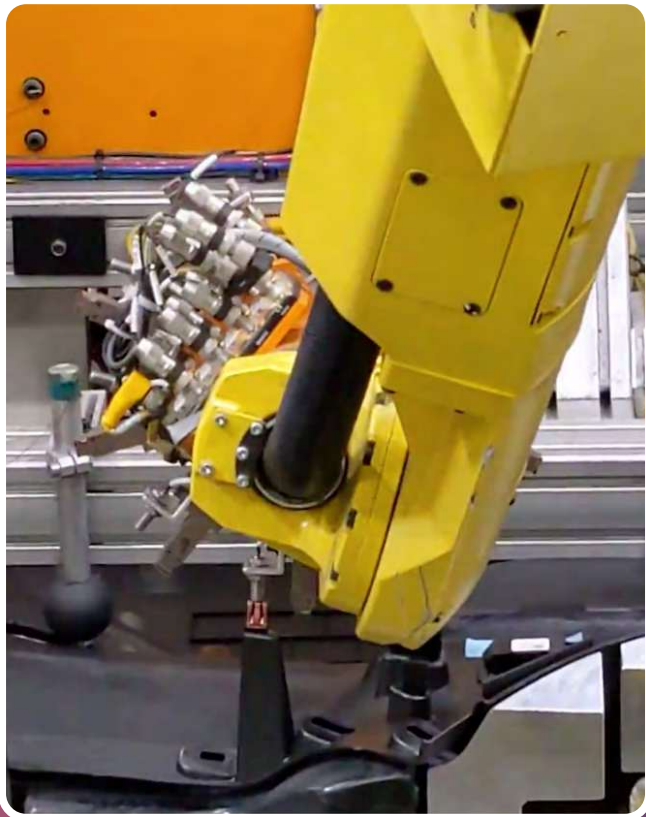
- Total vision cycle time—object identification and complete robotic path planning—in as little as 0.3 seconds.
- Can pick objects that are shiny, clear and translucent, as well as complex shapes.



Robotic Guidance

PERFORMANCE HIGHLIGHTS:

- Move parts without collisions with a bin or dunnage
- Precisely pick / place parts without the need for fixtures or structured environments.



Assembly

PERFORMANCE HIGHLIGHTS:

- Matches the precision of the most precise robots to sub-millimeter levels.
- AI understands the object completely, so the robot can combine parts even when all surfaces might not be visible.



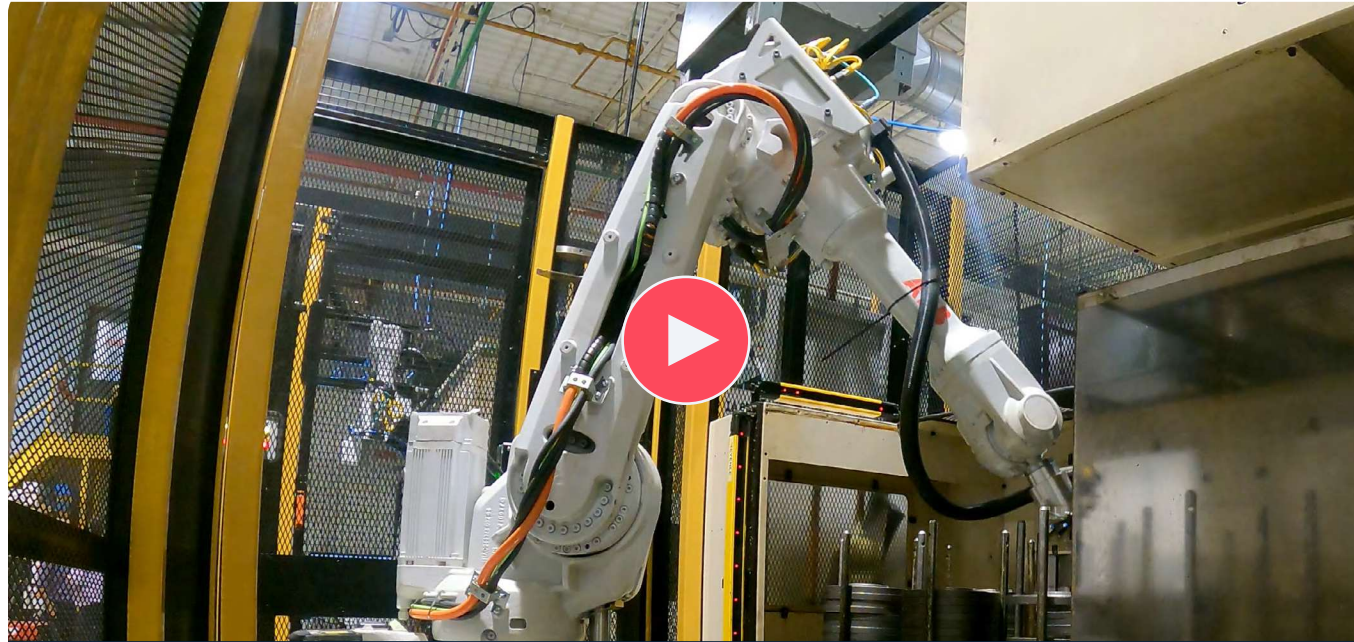
Machine Tending

PERFORMANCE HIGHLIGHTS:

- Feed unmachined parts from a bin and then remove them from CNC or laser marking machines—takes away the need for structured environments.

Who we serve

Apera AI's customers are manufacturers, such as automotive OEMs and their Tier 1 and 2 suppliers. We also serve industries such as agricultural and construction machinery, metal fabrication / stamping, medical devices, and aerospace.



Tier 1 manufacturer

Linamar masters bin picking to feed powertrain machines

Challenge: Boost productivity amidst labor shortages.

Solution: Deployed Apera AI's Vue with ABB Robotics across three robotic cells for continuous operation. The three cells continuously feed transmission parts for machining. Automating this previously manual task significantly improved efficiency.

"With our ABB / Apera combination bin picking cells, the operator is able to focus on maintaining the machines making the components, and making sure that the parts are being manufactured with good quality."

- Badr Dowcet, Process Engineer, Hastech, a Linamar Corporation company



Tier 1 manufacturer

Flex-N-Gate takes sub-assembly to more than 99% accuracy

Challenge: Need for precise placement of automotive clips in interior subassemblies.

Solution: Despite variation in injection-molded parts, Apera's 4D Vision locates automotive clip towers and precisely and gently places clips. The result? The end of breakage and quality issues.

"We saw an almost 9% increase in accuracy to 99% through the [Apera Vue] vision system. From a cost savings perspective, we have been able to reduce repair and manpower, and improve part quality into our customer."

- Don Cumming, General Manager, Flex-N-Gate

The fastest, simplest path to vision-guided robotics

To help us meet your needs, this information would give us a great starting point.

- Description of your application
- Parts to be handled
- Sizes of bins, conveyors and working area
- Performance targets (e.g. picks per minute, accuracy tolerances)
- Brand and model of robot

Let's get Started

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Get in touch

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