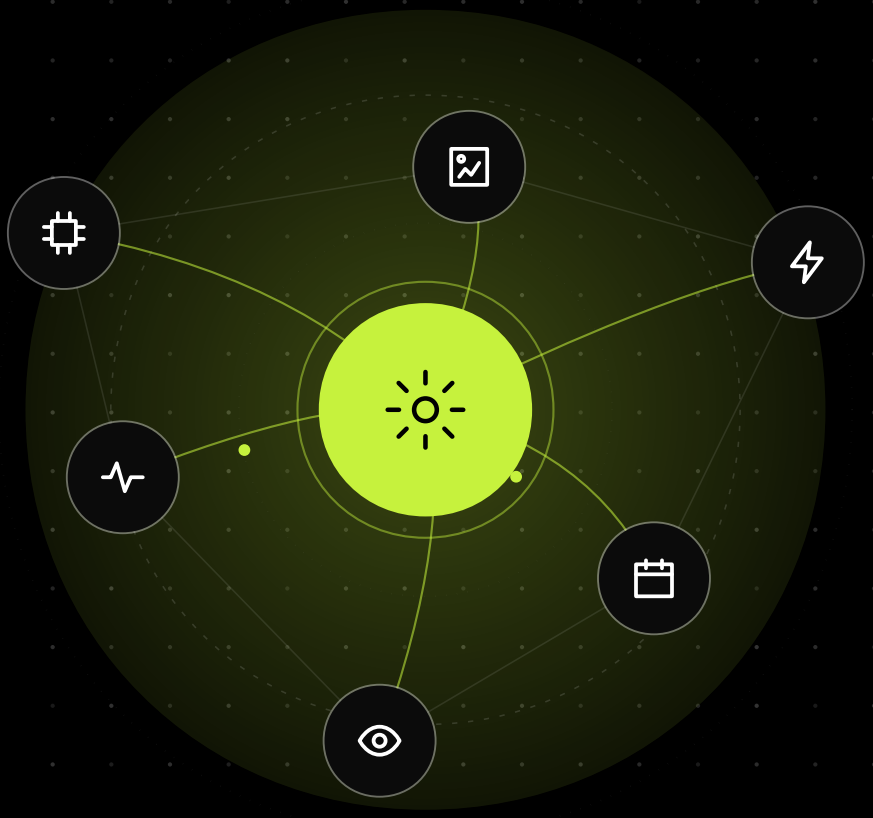


Siemens Amberg

Machine failures predicted up to 36 hours ahead

At its Electronics Works in Amberg, Germany, Siemens uses AI at the edge of the factory floor to warn of a machine failure 12 to 36 hours ahead, and to predict which circuit boards really need an X-ray test.

Manufacturing (electronics) | Quality control and maintenance | Edge AI | Predictive maintenance

12 to 36 h
warning before a spindle failure

Up to 30%
fewer X-ray tests needed

€500K
less capital spent on extra X-ray machines

AT A GLANCE

COMPANY	PLANT	TECHNOLOGY	REPORTED
Siemens, Electronics Works Amberg (EWA)	About 17 million Simatic products a year, over 1,000 variants	Simatic Edge devices, Insights Hub (formerly MindSphere)	Siemens press releases, Nov. 2018; Siemens ETSI talk, Apr. 2019

01

The challenge

At Amberg, 75% of the value chain is handled by machines and robots, and products are made to a quality standard of 99.9990%.

Two problems stood out. First, a circuit-board cutting machine produces fine milling dust that can jam its spindle bearing, causing unscheduled downtime.

Second, production on the circuit-board line was limited by time-consuming X-ray quality tests at the end of the line, and every extra X-ray machine would cost about €500,000.

17M
Simatic products made each year

€500K
cost of each additional X-ray machine

350
production changeovers every day

BEFORE

- × Spindle bearing could jam without warning
- × Unscheduled machine downtime
- × X-ray tests a bottleneck on the line
- × More capacity meant €500K per X-ray machine

AFTER

- ✓ Failures predicted 12 to 36 hours ahead
- ✓ Spindle swapped at the next scheduled service
- ✓ Up to 30% fewer X-ray tests needed
- ✓ Quality rate of 100% maintained

02

The solution

Siemens processes the data right where it is produced, on Edge devices beside the machines, and sends results to the cloud.

For the milling machine, the team isolated two signals linked to downtime: spindle speed and the drive's electric current. A machine learning model scores anomalies in real time, so the spindle can be exchanged at the next scheduled service.

For the X-ray bottleneck, more than 40,000 production parameters are captured in real time. An AI model trained on them predicts whether a board's solder joints are fault-free, and so whether it needs an X-ray at all.

HOW IT WORKS

STEP 01

Capture machine data

Over 40,000 production parameters, plus spindle speed and drive current.

STEP 02

Analyze at the edge

Simatic Edge devices next to the machines process the data on the spot.

STEP 03

Score anomalies live

A machine learning model calculates an anomaly value in real time.

STEP 04

Predict X-ray need

The model says yes or no: does this board need an X-ray test?

STEP 05

Show the results

Results appear in the Performance Insight app in Insights Hub.

STEP 06

Act on schedule

The spindle is replaced at the next planned service, before it fails.

BUILT WITH

Simatic IPC227E Edge device · Machine learning · Insights Hub (formerly MindSphere) · Totally Integrated Automation · Cloud analytics

03

The results

Siemens reports that failures can be predicted 12 to 36 hours before they happen, and that unscheduled downtime from motor bearing damage on its circuit-board milling machines was cut by 100 percent.

12 to 36 h
advance warning of bearing failure

100%
cut in unscheduled downtime from bearing damage

Up to 30%
fewer X-ray tests, with a 100% quality rate

€500K
less capital investment in more X-ray machines

X-RAY TESTS NEEDED, BEFORE VS WITH AI PREDICTION



TIMELINE

1989
Electronics Works Amberg founded

Nov. 27, 2018
Siemens reports AI predictive maintenance at Amberg

Nov. 29, 2018
Edge platform launched with the spindle example

Apr. 4, 2019
X-ray prediction results presented at ETSI

04

What made it work, and what to watch

> “With Edge Computing, data can be immediately processed where it's generated, right at the plant or machine.”
>
> Dr. Jochen Bönig, Head of Strategic Digitalization, Siemens Amberg

1	**Find the few signals that matter**	Out of all the data, two parameters, spindle speed and drive current, explained the downtime.
2	**Process data where it is made**	Edge processing gives instant results and cuts storage and transmission costs.
3	**Fix on your schedule**	A 12 to 36 hour warning turns a breakdown into a planned repair.
4	**Close the loop**	Results feed straight back into production so the line keeps improving.

IS THIS A FIT FOR YOUR BUSINESS?

- ✓ Does an unexpected breakdown stop your work or cost you a rush?
- ✓ Do your machines or systems already record readings or logs?
- ✓ Do you inspect or test every item when only some really need it?
- ✓ Would a day's warning let you plan repairs around busy periods?

05

How Agent Victoria could do this for you

We could connect the data your equipment or systems already produce and alert you before something breaks. You fix problems on your schedule, not in the middle of a rush.

01

Connect your data

Readings your equipment or systems already produce.

02

Learn what normal looks like

Spot the signals that come before a failure.

03

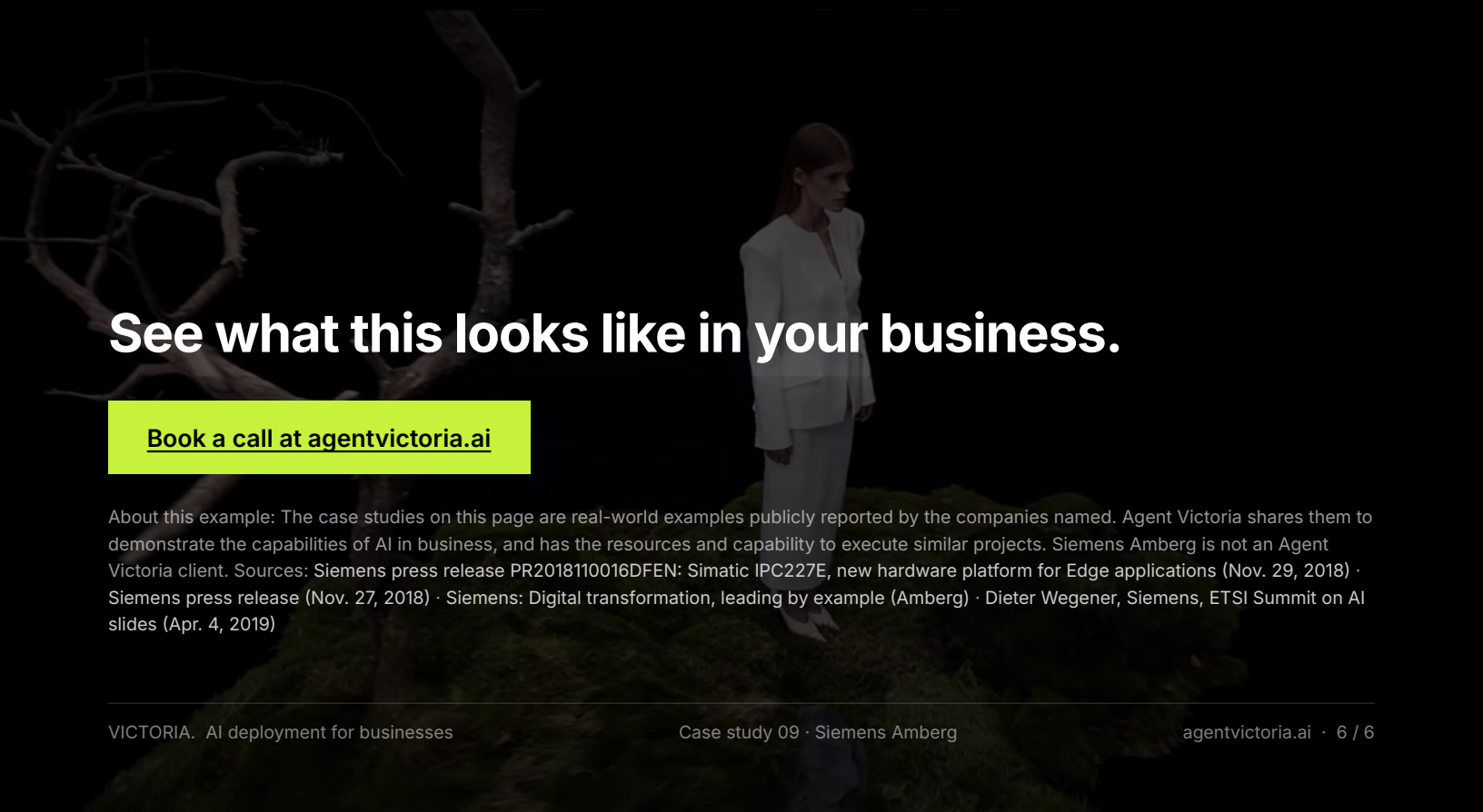
Alert you early

A warning while there is still time to plan.

04

Fix it on your schedule

Repairs during planned downtime, not a rush.



See what this looks like in your business.

Book a call at agentvictoria.ai

About this example: The case studies on this page are real-world examples publicly reported by the companies named. Agent Victoria shares them to demonstrate the capabilities of AI in business, and has the resources and capability to execute similar projects. Siemens Amberg is not an Agent Victoria client. Sources: Siemens press release PR2018110016DFEN: Simatic IPC227E, new hardware platform for Edge applications (Nov. 29, 2018) · Siemens press release (Nov. 27, 2018) · Siemens: Digital transformation, leading by example (Amberg) · Dieter Wegener, Siemens, ETSI Summit on AI slides (Apr. 4, 2019)