MITSUBISHI ELECTRIC
Changes for the Better

e-F@ctory Case study

Predictive Maintenance

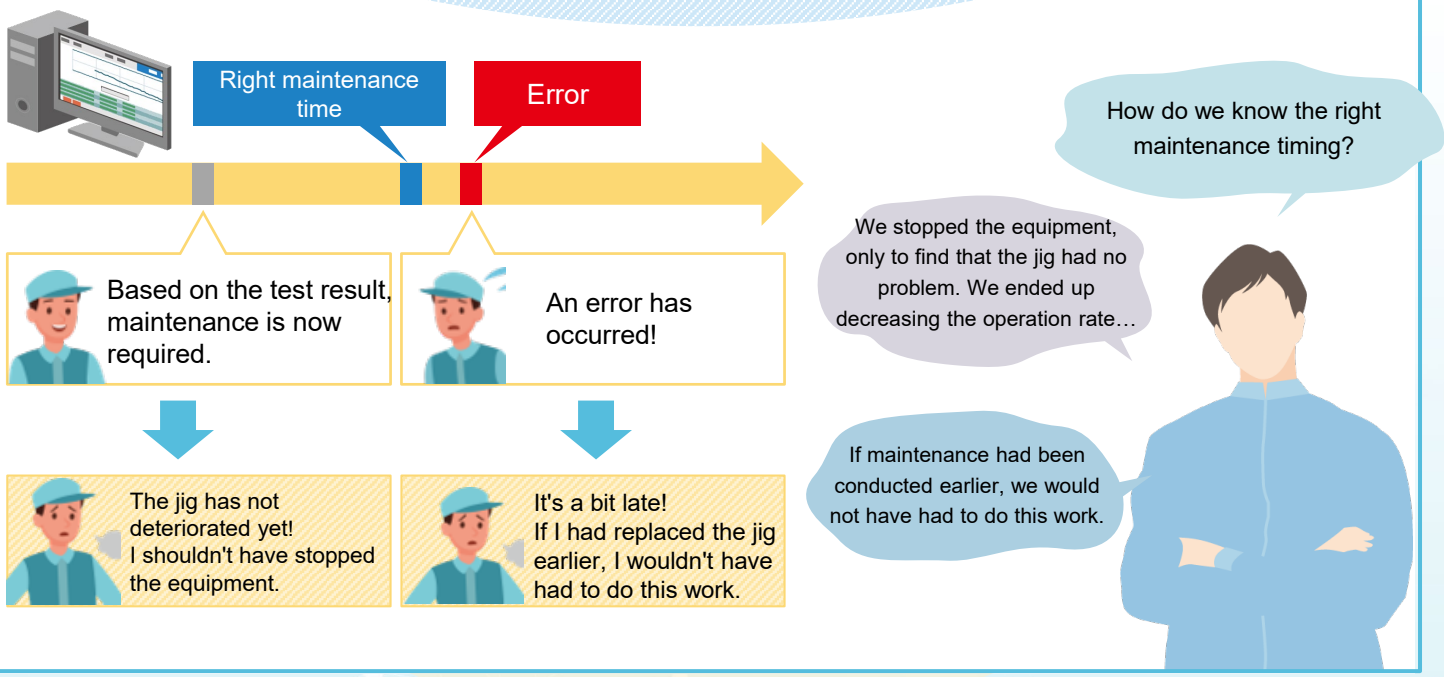
Maintenance hours reduced by 67% by utilizing AI to notify of the maintenance timing!

Company A failed to conduct maintenance work at the optimum timing for test jigs, which resulted in unnecessary equipment shutdown or a delayed response to jig abnormalities. Utilizing AI to detect an abnormality and notify the user of the need for maintenance, company A succeeded in reducing maintenance hours by 67 %.
What is the secret to its success?

See inside for details!

Customer's Concern

Test jigs need to be replaced before they deteriorate because using deteriorated jigs for tests influences the result. Conventionally, operators decided when to conduct maintenance based on the test result. However, this often resulted in wasteful work, such as, "We stopped the equipment for jig replacement, only to find out that the jig had no problem" or "A machine error occurred due to a delayed response to jig abnormalities".



What has improved

With the introduction of the data science tool **MELSOFT MaiLab**, AI can diagnose the deterioration of the jig in real time without having to stop the equipment. It notifies the user of the optimum maintenance time, leading to significant reduction in maintenance work hours.

Maintenance time

Before	After
28.5 hours/month	9.5 hours/month

Approximately 67% reduction

e-Factory

Key Points

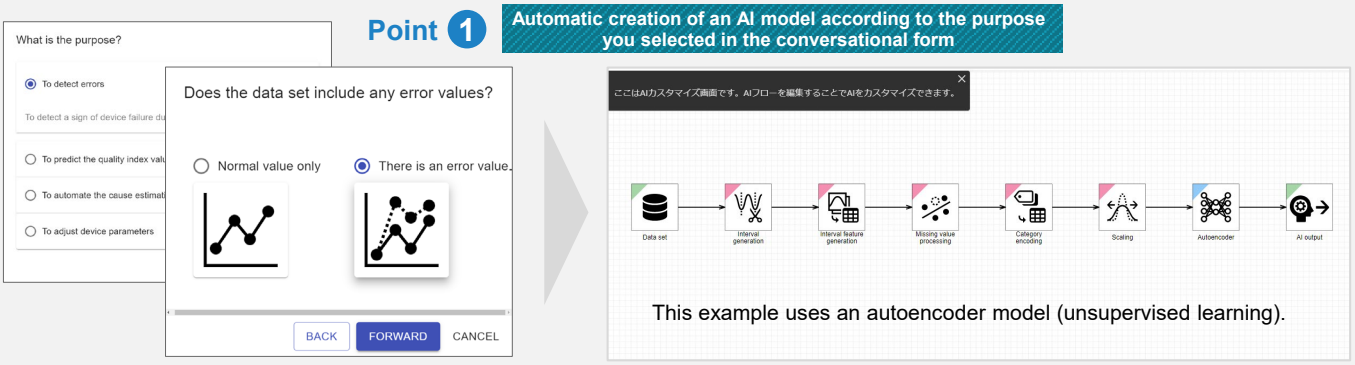
Point 1 AutoML* function automatically creates an AI model for diagnosis. You can easily introduce this system without any AI expertise!

Point 2 High-accuracy, real-time diagnosis is performed with an auto-created AI model. If any sign of abnormality is detected, feedback is immediately sent to the production floor!

- AutoML (Automated Machine Learning): A technology that automates creation of machine learning models and diagnosis of models, which were manually conducted by data scientists before.

1. An AI model for diagnosis is automatically created based on past test results.

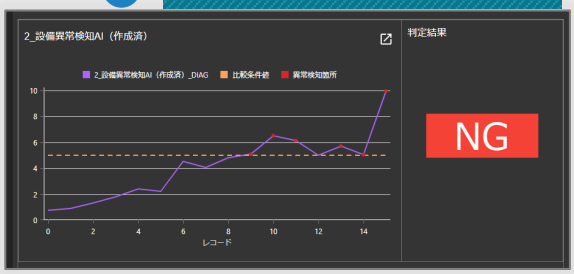
Point 1 Automatic creation of an AI model according to the purpose you selected in the conversational form



This example uses an autoencoder model (unsupervised learning).

2. A notification is sent to the operator when a sign of abnormality is detected.

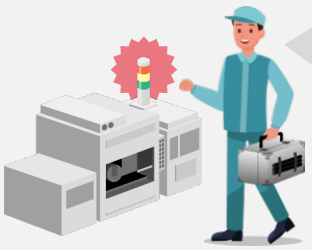
Point 2 Real-time diagnotics detect warning signs



This example uses SPC (Statistical Process Control) to monitor the error level that is calculated by the autoencoder and issues a warning.

3. Operators rush to perform maintenance in response to the notification, preventing machine malfunctions that could have happened without maintenance.

In response to a warning, maintenance is conducted.



I have confirmed that the jig is deteriorated (dirt, distortion, etc.). We can prevent a machine failure that could have happened.

See the next page for configuration of this system

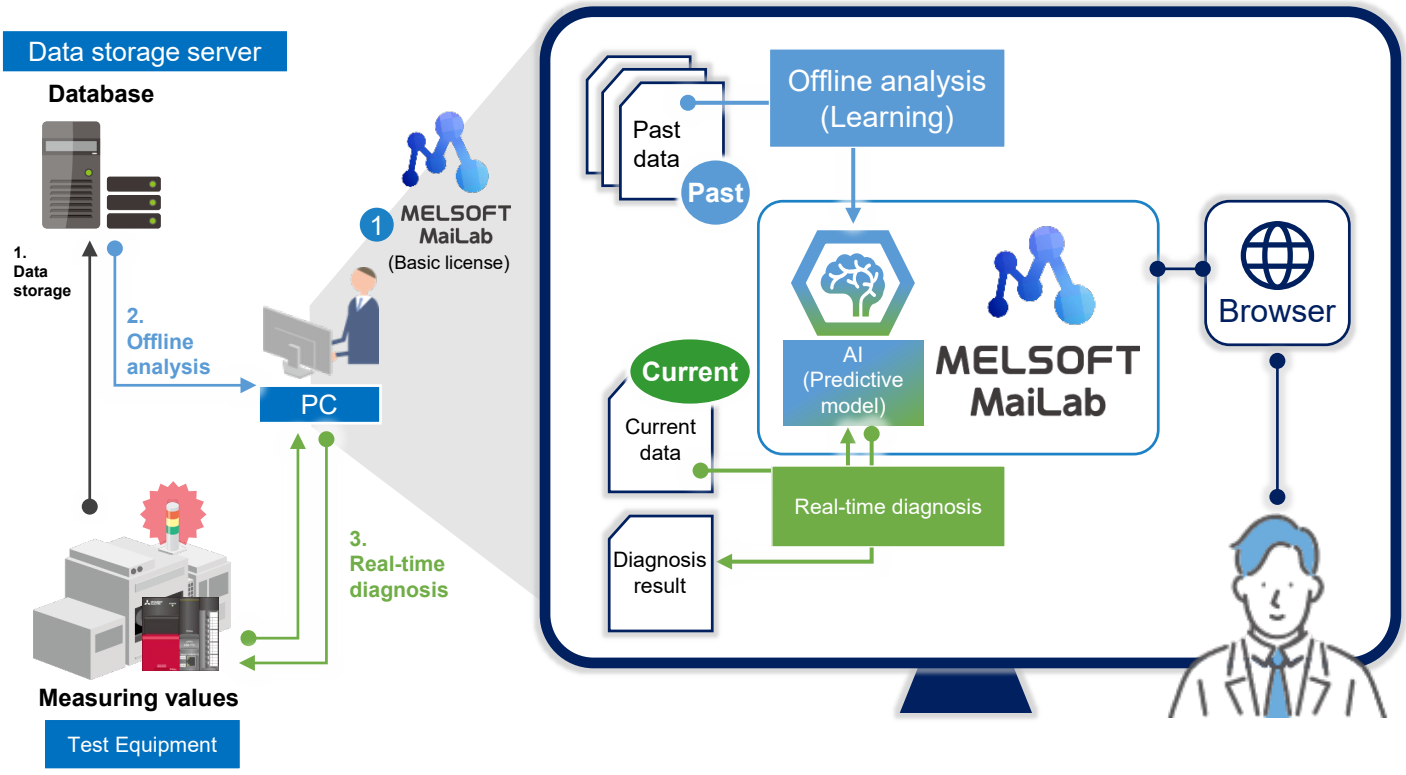
Return on investment (ROI)

Cost	Approx. **2.6** million yen (including system configuration and a personal computer)	Effect	Maintenance time Approx. **67** % reduction
Construction period	Approx. **6** months	Payout period	Approx. **8** months When the labor cost reduction with less maintenance frequency and hours and the profit increase are approx. 330 thousand yen in total, the payout period is approx. 2.6 million yen ÷ 330 thousand yen ≒ approx. 8 months.

System overview

This system consists of a personal computer where the Data Science Tool **MELSOFT MaiLab** is installed and an existing data storage server. It is easy to set up just by connecting the data server and the test equipment to MELSOFT MaiLab.

After the system introduction, the setting is configured in a conversational form on MELSOFT MaiLab, and an AI model that meets the objective you selected will be automatically created, allowing real-time abnormality detection diagnosis.



Product line-up (example)

Please separately prepare a personal computer to run the software listed below.

Type	Model	Description
1 Data Science Tool MELSOFT MaiLab		
Basic license (New purchase)	SW1DND-MAILAB-MQ12	A basic plan to begin data collection and diagnosis (first year)
Basic license (Renewal)	SW1DNN-MAILABRE-MQ12	A basic plan to begin data collection and diagnosis (second year or later)
Additional user license (New purchase/Renewal)	SW1DNN-MAILABAN-MQ12	A plan that can respond flexibly to increases or decreases in the number of analysis users
Additional diagnosis licenses (1 license)	SW1DND-MAILABPR-M	A plan for factory expansion or incorporation into mass production products (1 license)
Additional diagnosis licenses (5 licenses)	SW1DND-MAILABPR-MA5	A plan for factory expansion or incorporation into mass production products (5 licenses)
Additional diagnosis licenses (10 licenses)	SW1DND-MAILABPR-MA10	A plan for factory expansion or incorporation into mass production products (10 licenses)

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