NEC Advanced Analytics – Invariant Analyzer

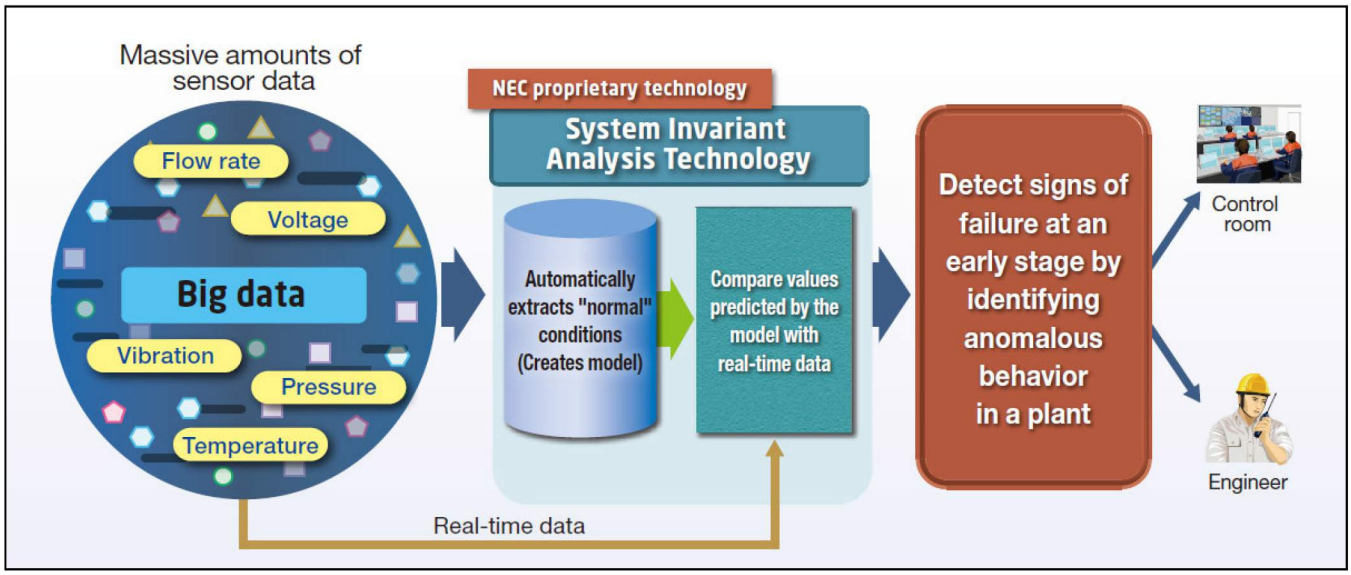
Predictive Monitoring and Diagnostic System

Detects anomalies in facilities by comparing massive amounts of real-time sensor data against data derived from a normal state model.

This solution analyzes massive amounts of sensor data (such as flow rate, voltage, pressure, vibration, and temperature) distributed throughout a facility by using NEC's System Invariant Analysis Technology and quickly detects and reports when abnormal conditions or equipment failure signs arise, prior to an actual failure.

Provides advanced monitoring to complement conventional methods that rely on threshold value monitoring and engineer expertise.

Reduces the risk of operation stoppages and improves maintenance efficiency by detecting signs of failure at an early stage.



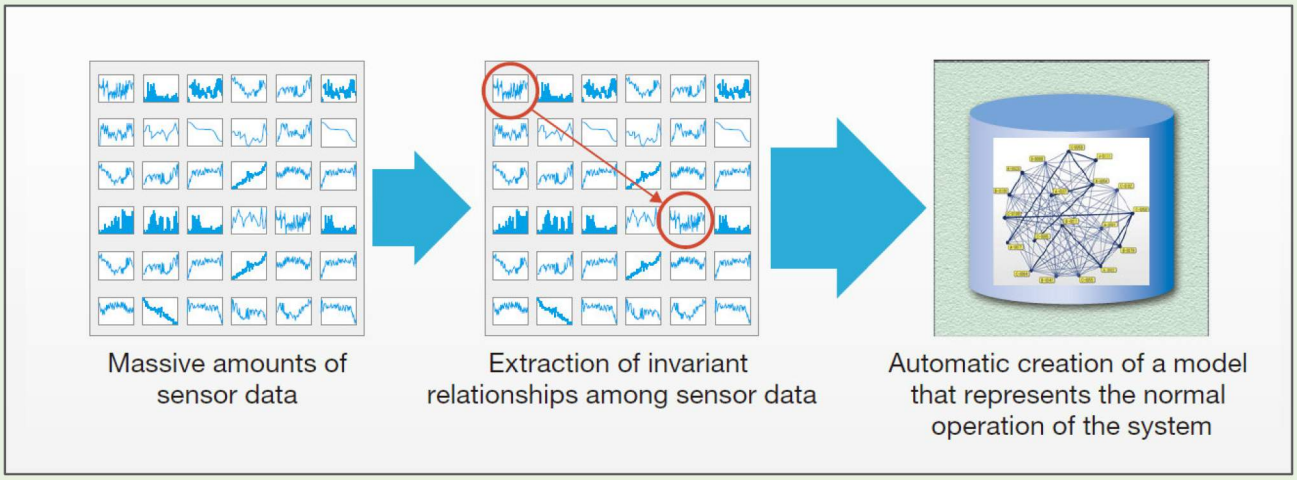
Early detection of failure signs difficult to discover through threshold-based monitoring.

Benefits of using a failure prognosis solution based on System Invariant Analysis Technology

- Possible to automatically and exhaustively extract invariant relationships based on massive amounts of sensor data without requiring expertise.
- Possible to minimize miss-detection of failure signs by using all the invariants extracted throughout the facility.
- Possible to detect unprecedented failures by comparing data with a normal state model.

System Invariant Analysis Technology

This technology uses massive amounts of time-series data gathered from sensors throughout a facility during normal operation to automatically extract invariant relationships between different sensors and create a system model as a collection of relational expressions defined for each invariant. Anomalous behaviors can be detected by comparing the values predicted by the model with real-time data. Since the relationships between the sensors are extracted automatically by machine learning, relationships that even experts find difficult to identify can be discovered. Relational expressions are also simplified so that they can be calculated at high speed, and all the invariant relationships between the sensors can be expressed comprehensively, similar to the holistic judgment process used by humans.



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