



GaonPlatform

www.gaonpf.com



The company name "GAON" is a pure Korean word, with the prime meaning of "Center", and the additional meaning of "Center of the world".

In the current software industry, packaging technology is known to be the core of software business technology. However, if the software platform does not meet the customer's various requirements, or if the customers are required to only use the software in a way that has already been developed or in a specific way, then they may leave the software ecosystem platform.

I believe the role of the software platform is to create a "Value-Evolutionary" software business that can be flexibly expanded and evolved in a variety of ways. We are making every effort to become a company that is the centerpiece of the "Value-Evolutionary" software platform.

CEO Man-Young Cho

> GaonPlatform

Process Plant Monitoring & Predictive Maintenance

Operation Information

"Plant Operation Information System" that is built on a big data platform using measurement sensor data and enables real-time monitoring of equipment.

Process Mimic

Trend Analysis

Alarm Analysis

BIG
DATA
PLATFORM

Predictive Maintenance

Predictive maintenance system that learns patterns from measurement sensor data to detect anomalies and failures in equipment and root cause diagnosis.

Abnormal Detection

Forecast Analysis

Diagnosis Analysis

"Let's become a leading technology company that delivers inspiration and value to customers through practical solutions and high-quality services"

"We are doing our best to lead the trends, satisfy customer needs, and strive for excellence in solution development and market penetration to achieve our vision."





Patent



Certification



Award



Markets

> Smart plant



- Big Data Interface of operation & maintenance solution
- Integrated (un)structured data interface solution
- Unidirectional security solutions for security facilities
- Plant operation information monitoring solution
- Intelligent facility fault prediction and diagnosis solution
- Video analysis solution for safety accident prevention
- Intelligent digital smart gauge solution

> Smart city



- Public facilities/equipment/control data interface
- Integrated (un)structured data interface solution
- Unidirectional security solutions for data networks
- Facility operation information monitoring solution
- Intelligent facility fault prediction and diagnosis solution
- Weather and environment disaster monitoring system
- Video analysis solution for intelligent crime prevention

> Smart factory



- Facilities & production data interface solution
- Integrated (un)structured data management solution
- Facilities & production information monitoring solution
- Facilities & production automation solution
- Intelligent facility fault prediction and diagnosis solution
- Vision analysis solution for quality inspection

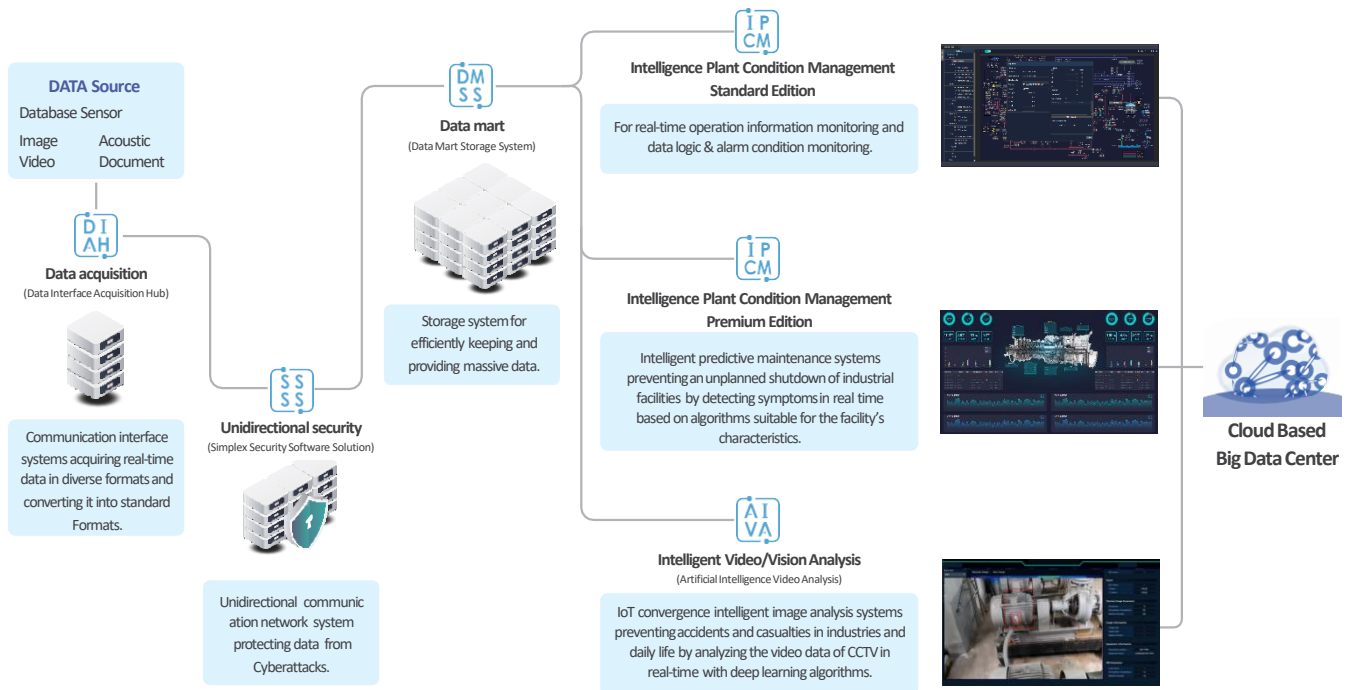
> Smart defense



- Facilities & equipment data interface solution
- Facilities & equipment information monitoring solution
- Intelligent facility fault prediction and diagnosis solution
- Digital twin-based real-time surveillance solution
- Intelligent unmanned surveillance video analysis solution
- Automatic target identification system based on big data

Product Line up

Overview

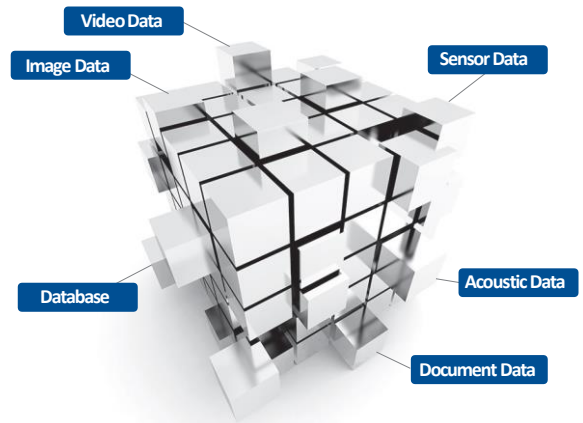


Plant Operation Information System

> DIAH (Data Interface Acquisition Hub)

Top alternative to on-site data communication interfaces with nonstandard/discontinued protocols

- Collects data from diverse systems and devices.
- Displays acquired data and values in real time.
- Capable of monitoring the acquisition and transmission status as well as system resources.
- **Convenient data acquisition from heterogeneous systems**
Provides acquisition and transmission device management wizards to ensure convenience in device-specific connection setup and signal list management.
- **Real-time data view**
Checks the source device, data path, data value, data status, and data time in real time for acquired and transmitted data.
- **Status dashboard**
Provides the dashboard with the status of data acquisition/transmission, system resources, and key log device connection history.
- **Data acquisition support protocol**
OPC DA/OPC UA/CSV File/PI Protocol/Other nonstandard protocol.
- **Data transmission support protocol**
OPC UA/CSV File/Rest API.



> SSSS (Simplex Security Software Solution)

Enhances cybersecurity in public and private security facilities by controlling transmission to prevent packet forgery

- Strictly limits access to servers on a need-to basis.
- Protects data with secure password algorithms.
- Transfers data from secure area to non-secure area.
- **Protection of transmission control servers**
Identifies authorized business servers to allow access to transmission control servers and protects them by blocking access to/from unauthorized servers.
- **Identification of applied protocol**
Identifies application protocols to allow only authorized application protocols to be transmitted from secure area to non-secured area.
※Identified application protocol : FTPS
- **Protection of transmitted data**
Secures data by ensuring data confidentiality and integrity based on SEED CBC and SHA-256 algorithms verified by the National Intelligence Service of the Korean government.
- **Unidirectional data transmission**
Physical/Logical blockage of data from non-secure area to secure area
Transmits the identified application protocols from secure area to non-secure area.



Plant Operation Information System

> IPCM Standard

(Intelligence Plant Condition Management Standard Edition)

Monitoring status by the process by visualizing data based on 2D Symbol / 3D modeling

- Provides real-time data and history.
- 2D Symbol based process diagram display.
- 3D Modeling based process diagram display.

■ Data monitoring

Real-time/Historical data monitoring with basic Trend.
Trends for comparing different signals and timeframes.

■ Alarm monitoring

Provides real-time & historical alarm history according to
User-specified thresholds.

■ Logic monitoring

Provides real-time monitoring and alarms for interlock diagrams
And facility control logic.

■ Spreadsheet

Provides built-in and plug-in spreadsheets for data loading
And analysis with MS Excel.



> IPCM Premium

(Intelligence Plant Condition Management Premium Edition)

Detection of facility anomalies and failures through big data pattern analysis

- Provides predictive maintenance information for decision making.
- Analyzes the early warning information by the machine learning algorithm.
- Analyzes the forecast failure information by deep learning algorithm.

■ Early Warning

Anomaly detection based on unsupervised learning.

※ AAKR Algorithm – Auto Associative Kernel Regression

※ VAE Algorithm – Variational Auto Encoder

■ Forecast Failure

Forecast Failure prediction based on deep learning.

※ LSTM Algorithm – Long Short Term Memory

■ Root Cause Analysis

Provided failure diagnosis information by supervised learning.

※ CNN Algorithm – Convolutional Neural Network.



Artificial Intelligence Video Analysis

➤ AIVA(Artificial Intelligence Video Analysis)

Facility Intelligent Video Analysis System through facility IoT sensor and CCTV convergence

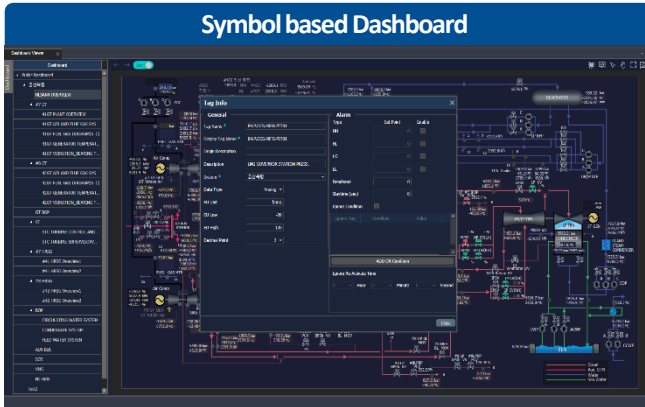
- Real-time prevention of safety accidents for facility failure and predictive maintenance
- Provision of advance accident prevention information through selective control of multi-channel CCTV
- Abnormal behavior detection for safety management of workers in facilities
- **Multi-channel selective control**
Detection of anomalies through real-time measurement sensor data analysis
Provides selective control information for multi-channel CCTV
- **Facility and facility safety management**
Fire/smoke/spark video analysis for facilities and equipment
Intrusion/roaming video analysis for access control areas
- **Worker safety management**
Detect whether workers are wearing protective equipment according to safety rules
Worker health status and safety accident image analysis
- **Digital smart gauge**
Convert digital gauges to traditional analog sensors
Circular/level/LCD gauge numerical recognition through image analysis
- **Measurement sensor data fusion**
Minimize false positives through mutual verification through the convergence of facility and equipment sensor data and CCTV video data
- **High-performance calculation processing**
High-performance object analysis processing of over 120 FPS based on deep learning and Provides real-time streaming video of 25 FPS or more
Expansion of the event storage period before and after an accident through the user Pre-Buffer Time setting
- **Ease of use of the system**
Provides user-defined data-learning labeling for flexible scalability
Unrestricted class add-on and training support that is not limited to the class of the pretrained model



Customer

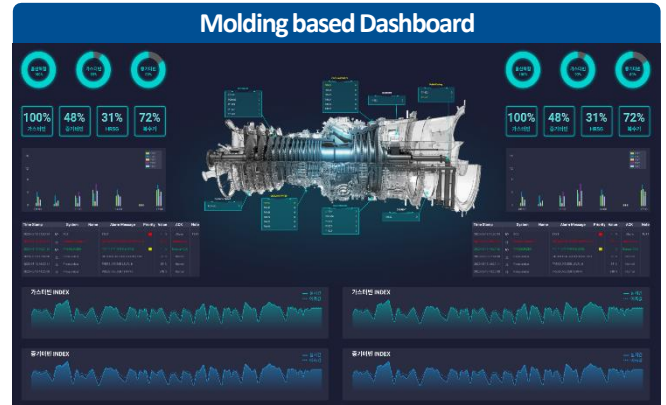


➤ Dashboard



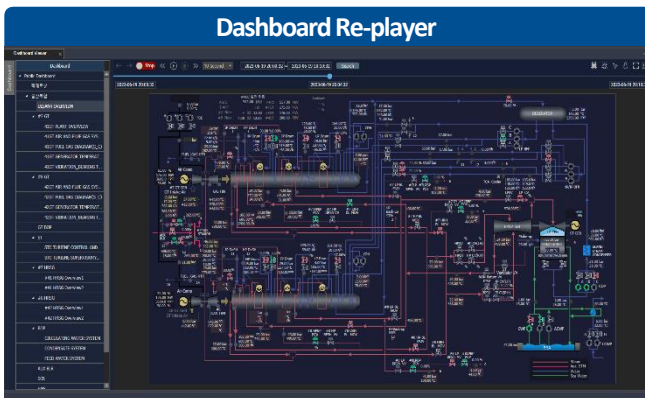
■ Symbol based Dashboard

- IPCM provides 2D symbol based process mimic.
- Can monitor the plant system and sensor data.



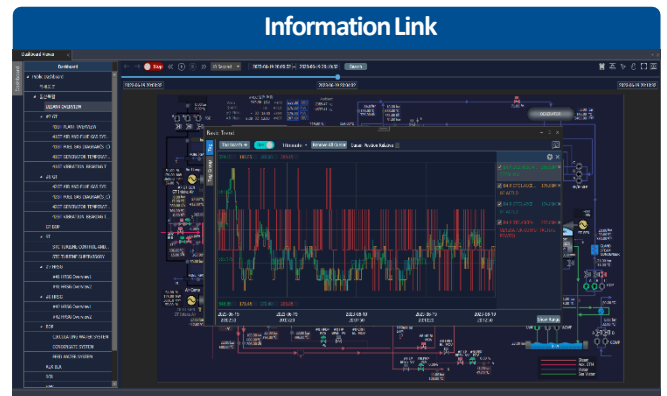
■ Modeling based Dashboard

- IPCM provides 3D modeling based process mimic.
- Can experience the digital twin monitoring.



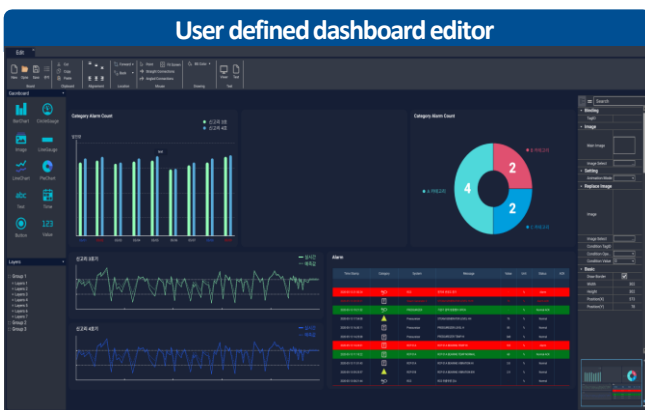
■ Dashboard Re-Player

- IPCM provides the search of historian engine data.
- Can play historical data such as video console.



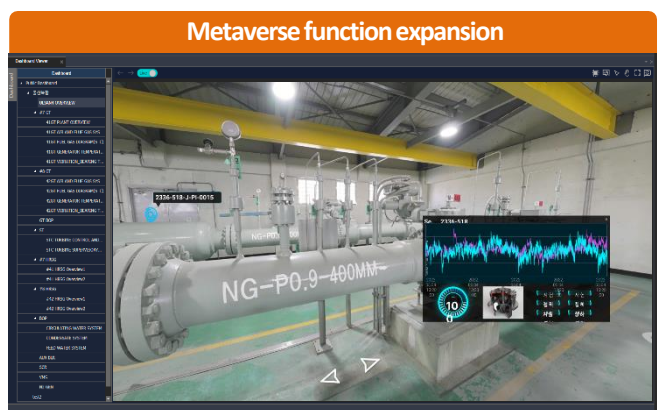
■ Information Link

- IPCM provides the ability to link trend functions anywhere.
- Can monitor every single tag about operation information.



■ User Defined Dashboard

- IPCM provides the dashboard editor for the system manager.
- User can create and modify the dashboard.

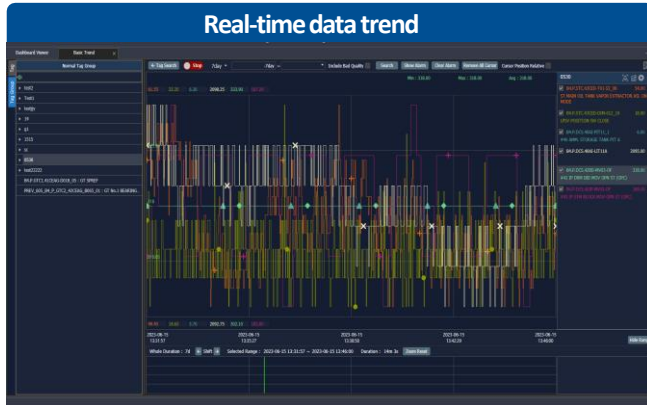


■ Panorama view expansion

- IPCM provides the panorama view of plant facility.
- User can monitor the real status of the facility online.

Plant Operation Information System

Trend



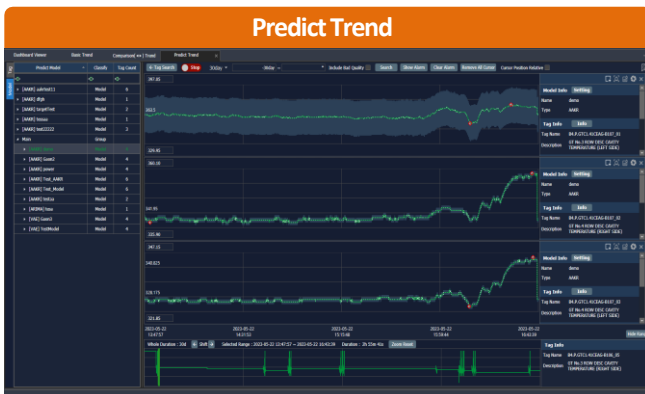
Real-Time data Trend

- IPCM provides a powerful trend analysis function.
- Can handle the data with the fastest historian engine.



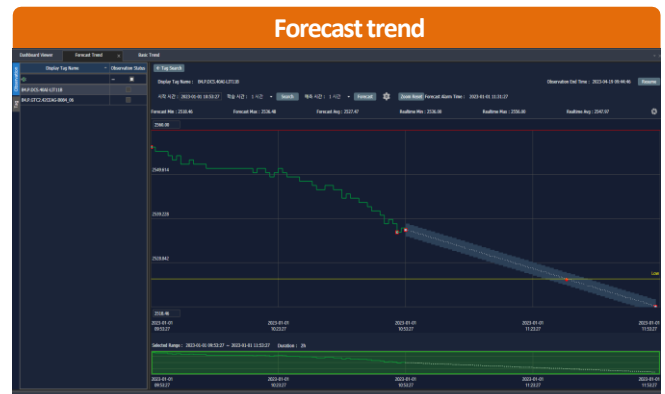
Comparison Trend

- IPCM provides comparison trend (Vertical, Horizontal).
- Can compare the different data and timeframes.



Predictive data Trend

- IPCM provides the predictive data to find abnormal failures.
- Can help to make decision by Condition Based Maintenance.



Forecast Trend

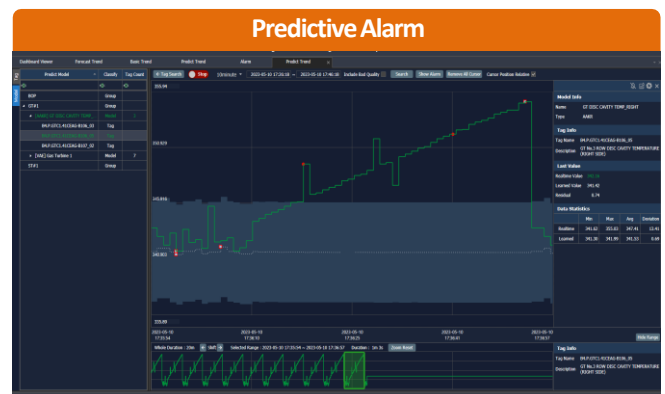
- IPCM provides the future data to find forecast failure.
- Can help to operate how much time from the present.

Alarm

Alarm ID	Alarm Name	Alarm Type	Alarm Category	Alarm Status	Alarm Time	Alarm Value	Alarm Unit	Alarm Description
AL001	Pressure High Alarm	High	Pressure	Active	2023-10-27 10:00:00	10.5	MPa	Pressure High Alarm
AL002	Temperature Low Alarm	Low	Temperature	Active	2023-10-27 10:00:00	50.0	°C	Temperature Low Alarm
AL003	Flow Rate High Alarm	High	Flow Rate	Active	2023-10-27 10:00:00	100.0	m³/h	Flow Rate High Alarm
AL004	Level High Alarm	High	Level	Active	2023-10-27 10:00:00	80.0	%	Level High Alarm
AL005	Speed High Alarm	High	Speed	Active	2023-10-27 10:00:00	1500.0	rpm	Speed High Alarm
AL006	Vibration High Alarm	High	Vibration	Active	2023-10-27 10:00:00	0.5	mm/s	Vibration High Alarm
AL007	Power High Alarm	High	Power	Active	2023-10-27 10:00:00	100.0	kW	Power High Alarm
AL008	Current High Alarm	High	Current	Active	2023-10-27 10:00:00	10.0	A	Current High Alarm
AL009	Voltage High Alarm	High	Voltage	Active	2023-10-27 10:00:00	10.0	kV	Voltage High Alarm
AL010	Frequency High Alarm	High	Frequency	Active	2023-10-27 10:00:00	50.0	Hz	Frequency High Alarm

Set-Point Alarm

- IPCM provides the set-point alarm for each sensor tag.
- Can monitor the set-point alarm to find out failure trend.

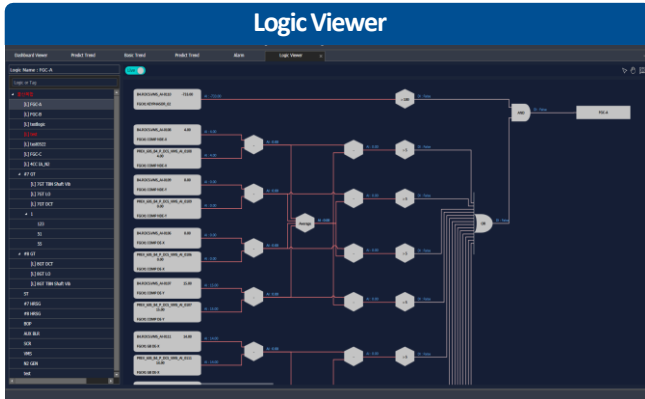


Predictive Alarm

- IPCM provides the forecast data analysis.
- Can predict the future failure by deep learning.

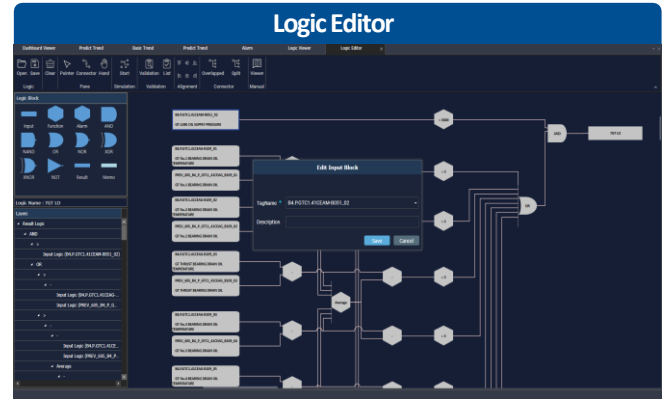
Plant Operation Information System

Logic



Logic Diagram

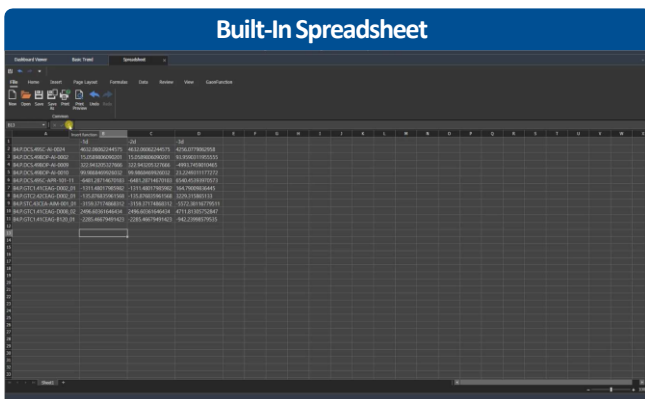
- IPCM provides a logic process of each sensor tag.
- Can find out the various problem regarding the facility process.



Logic Editor

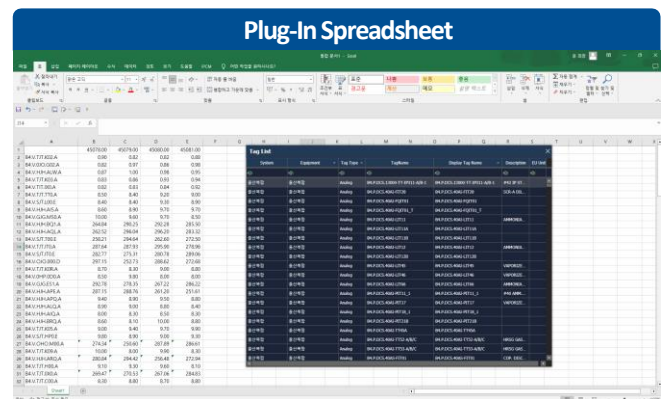
- IPCM provides a logic editor to make various logic.
- Can make any type of logic with user defined function block.

Spreadsheet



Built-In Spreadsheet

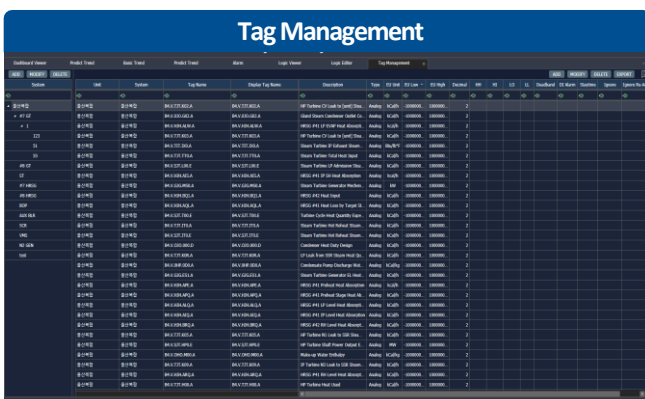
- IPCM provides the spreadsheet function in the program.
- Can handle the operation data for making reports.



Plug-In Spreadsheet

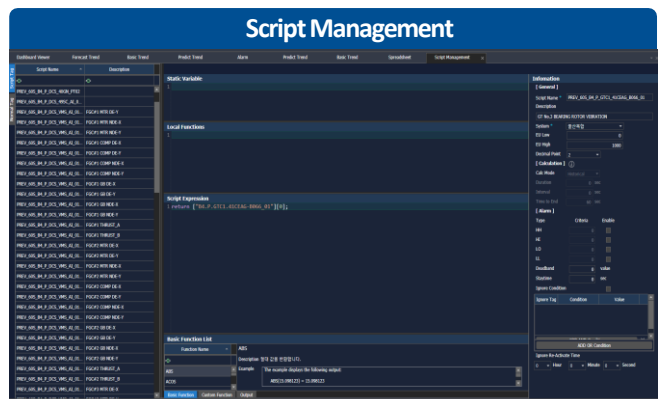
- IPCM provides a plug-in function in EXCEL.
- Can handle all EXCEL function for making reports.

Management



Tag Information Management

- IPCM provides the function to create/edit the tag.
- Can manage tag information for download & upload.



Script Management

- IPCM provides the calculation tag creation function.
- Can create calculation tag by script (C# Language).

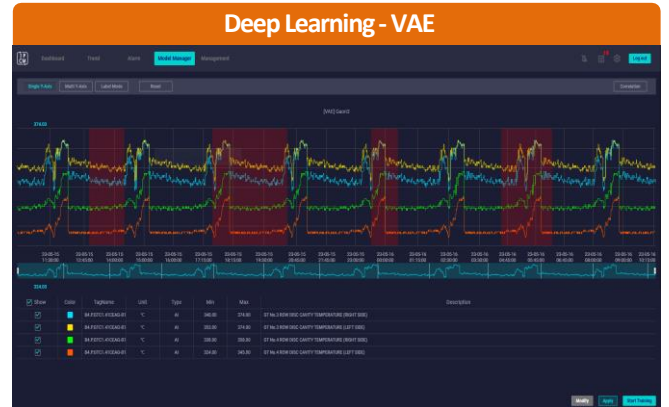
Plant Operation Information System

Model builder



Machine Learning

- IPCM provides early warning for normal operation section.
- Provides predictive warnings by detecting abnormal signs.



Deep Learning

- IPCM provides early warning for normal transient section.
- Provides predictive warnings for all operating sections.

Reference

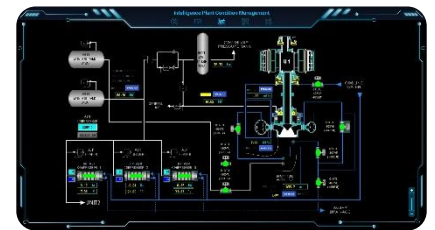
Nuclear/Hydroelectric Power Plant



<Korea Hydro & Nuclear Power>



< Control Tower Solution >

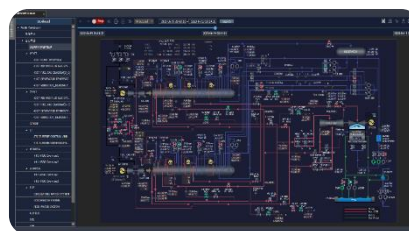


< Pumped Storage >

Combined/thermal power plant



<Korea East-West Power>



<Real-time operation information system>



<Intelligent Predictive Maintenance System>

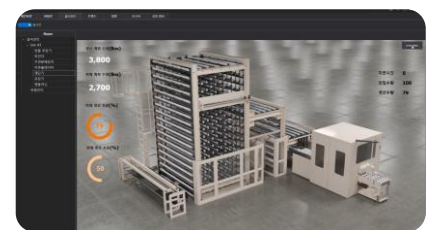
SOC/Smart Factory



<Korea Gas Corporation>



< RAIL Maintenance System >



<Smart Factory>

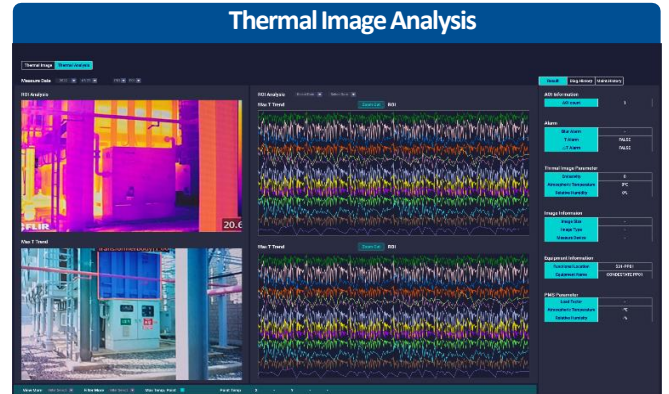
Artificial Intelligence Video Analysis

Plant Facility Monitoring



Safety Analysis

- AIVA provides safety management monitoring for facility CCTV.
- Can real-time monitoring of user-defined objects/actions.



Thermal Image Analysis

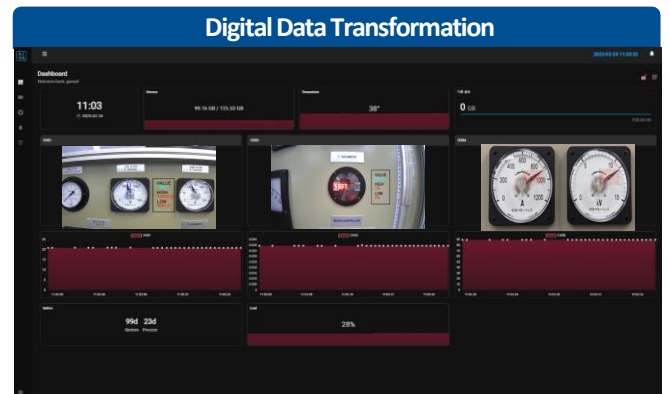
- AIVA analyzes temperature data from thermal imaging cameras.
- Can predict facility failures and provide predictive maintenance information.

Digital Smart Gauge



Analog Gauge Analysis

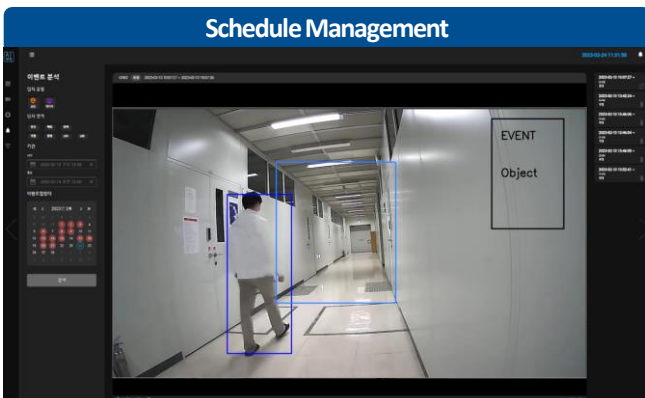
- AIVA provides circular/level/LED gauge real-time analysis.
- Provides digital sensing for existing analog gauges.



Digital Data Transformation

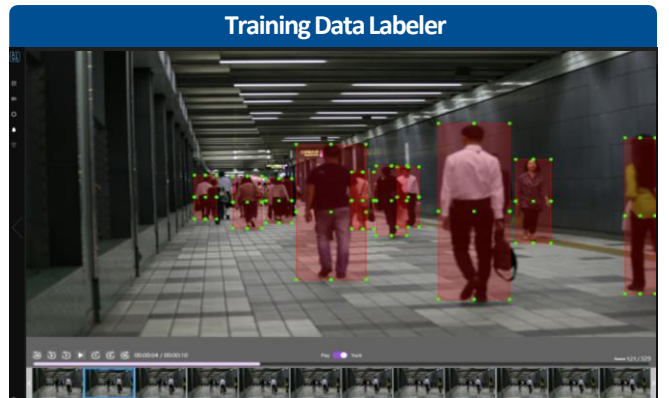
- AIVA quantifies analog gauges through real-time image analysis.
- Can predictive maintenance through time series data conversion.

Management



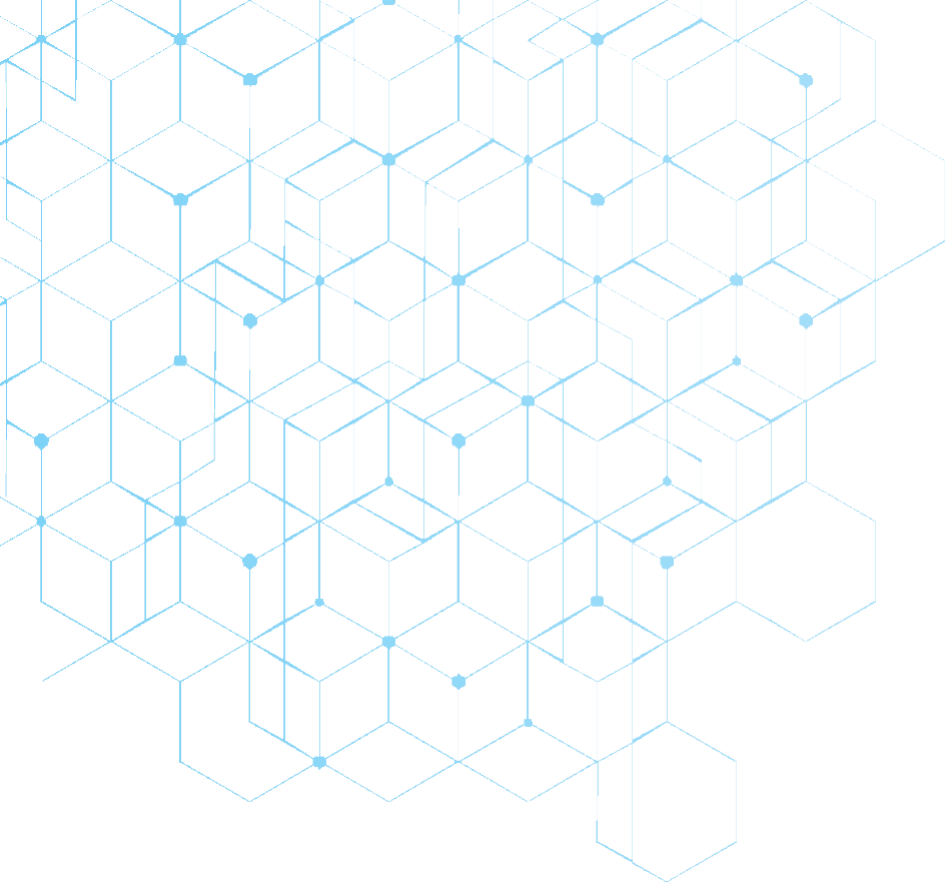
Schedule Management

- AIVA provides an analysis schedule and event detection type/range.
- Provides config tools for system operation and unattended monitoring.



Data Labeler

- AIVA provides the ability to add custom training objects
- Can add models for objects/behavior to the system.



*Of the customer, **by** the customer, **for** the customer*



4F, 74, Techno Jungang-ro, Yuseong-gu, Daejeon, Republic of Korea.

TEL. +82-42-721-0308 FAX. +82-42-721-0309 E-mail. gaonpf.sales@gaonpf.com www.gaonpf.com