

How are i-PRO's Security Cameras Different?

i-PRO was one of the first manufacturers to invent a security camera. We offer 130 different models of security cameras globally. I-PRO provides industry-leading solutions to capture, record, manage, and analyze surveillance video. We off a complete comprehensive lineup of video surveillance products and solutions with the highest image quality, mission-critical reliability, and the lowest total cost of ownership in the industry.

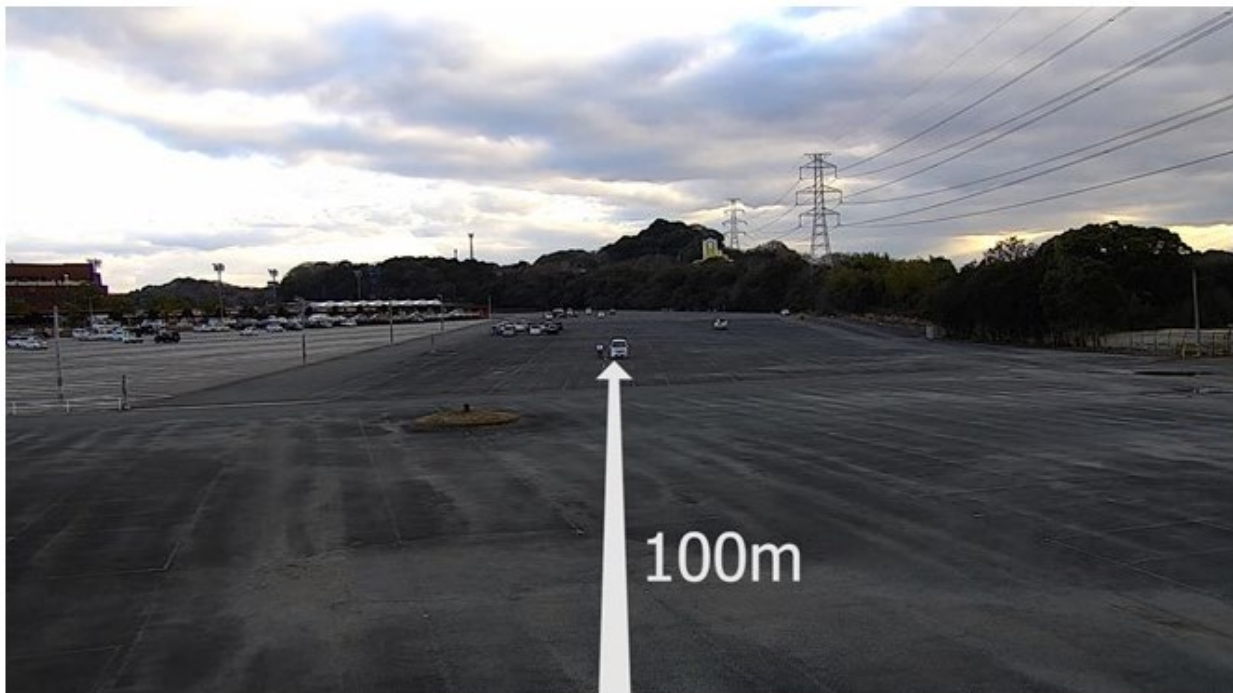
Our goal is to make life easier. We have reengineered our hardware and software into a plug-and-play platform that delivers enhanced point-to-point data security and enterprise level management, wrapped in power, intuitive applications.

i-PRO's surveillance cameras **focus on five core technologies** to provide extreme performance under extreme conditions. These five core technologies are our five pillars:

1. **Extreme visibility**
2. **Extreme reliability**
3. **Extreme analytics**
4. **Extreme compression**
5. **Extreme data security**

Extreme Visibility

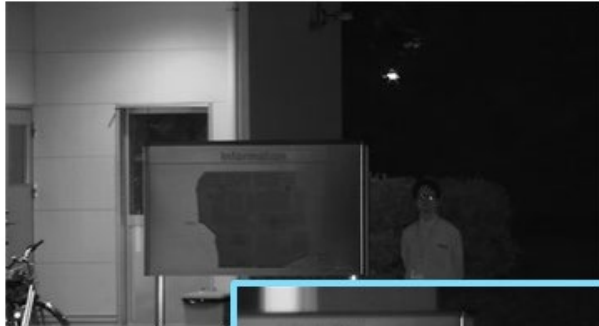
Visibility in Dark. Objects are visible in dark conditions, enabling a user to see an object at 350m away with built-in IR-LED lighting, even in a 0 lux environment.



The auto focus features a visible light cut filter, improving visibility in low-light environments

by mixing visible and IR LED lighting.

Other leading brand camera



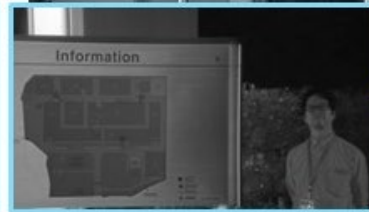
Zoom in



i-PRO Extreme camera WV-X6533LN



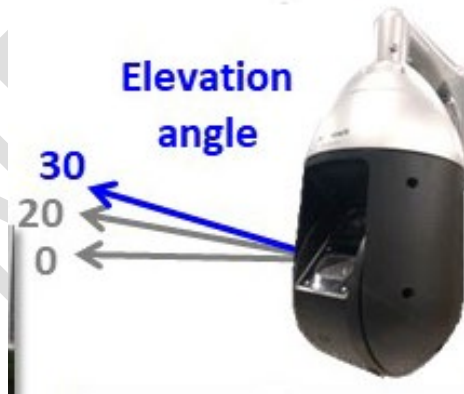
Zoom in



Under visible light

New Auto Focus

30-Degree Elevation Angle. A 30-degree elevation angle enables monitoring of dam releases, landslides, steel towers and sloped roads.

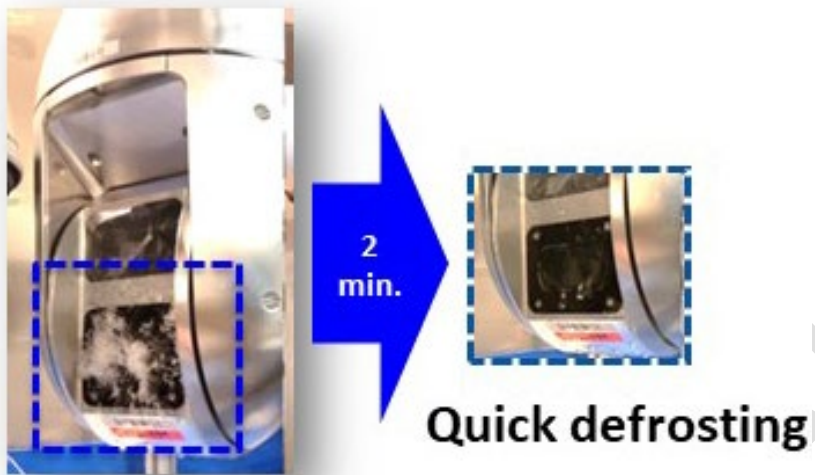




Smart phone camera image

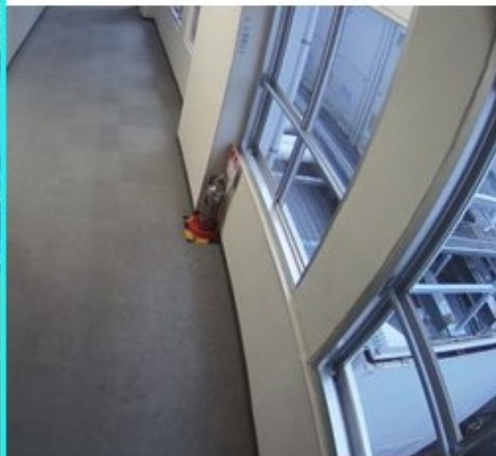
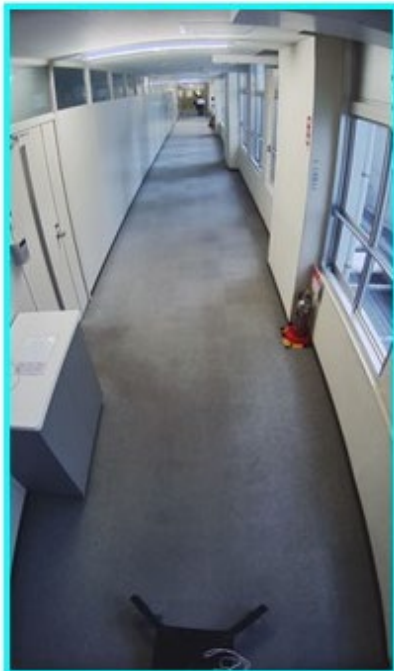
Lens Defroster. A defroster on the transparent cover part of the front of the camera lens protects against temperature drops inside the camera. The temperature inside the camera is kept stable to prevent dew condensation.





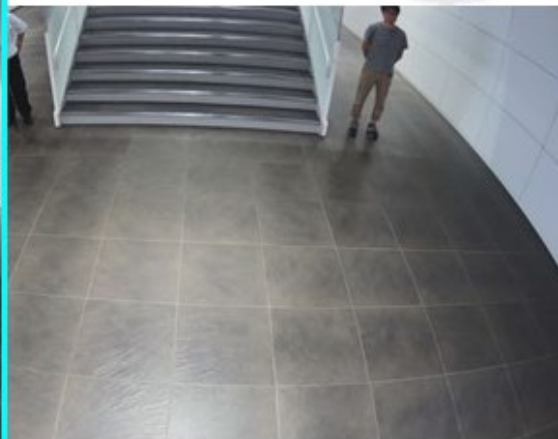
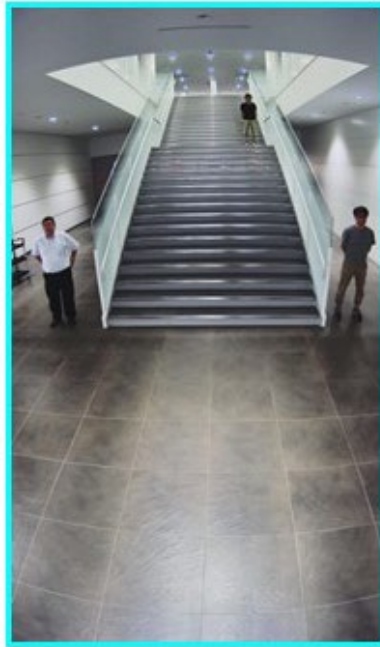
Corridor Mode. Monitoring can be made suitable for corridors, aisles, and other narrow pathways by setting the image to be monitored at an aspect ratio of 9:16.

Corridor mode



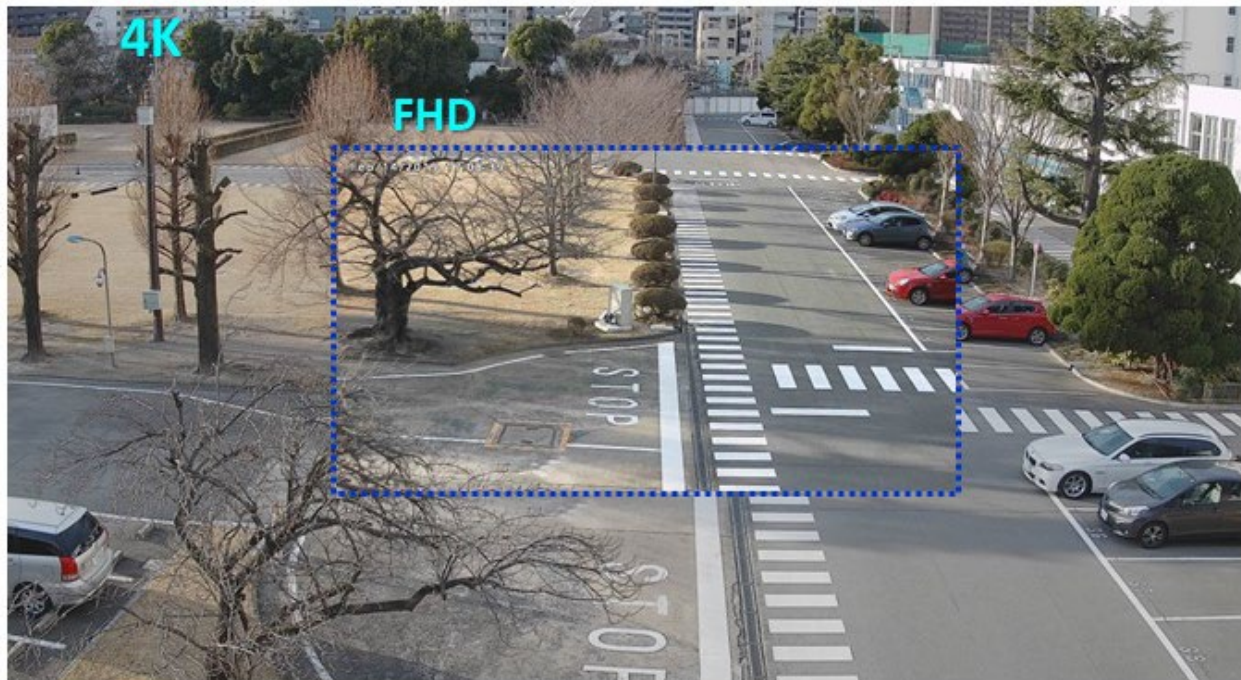
In corridor

Corridor mode



Stairs in the lobby

True 4K Resolution. The i-PRO extreme 4K camera offers 4x the resolution of conventional full HD cameras.



The true 4K high resolution with true 4K lens and large image sensor makes wide area surveillance possible without losing image quality.

Other leading brand camera

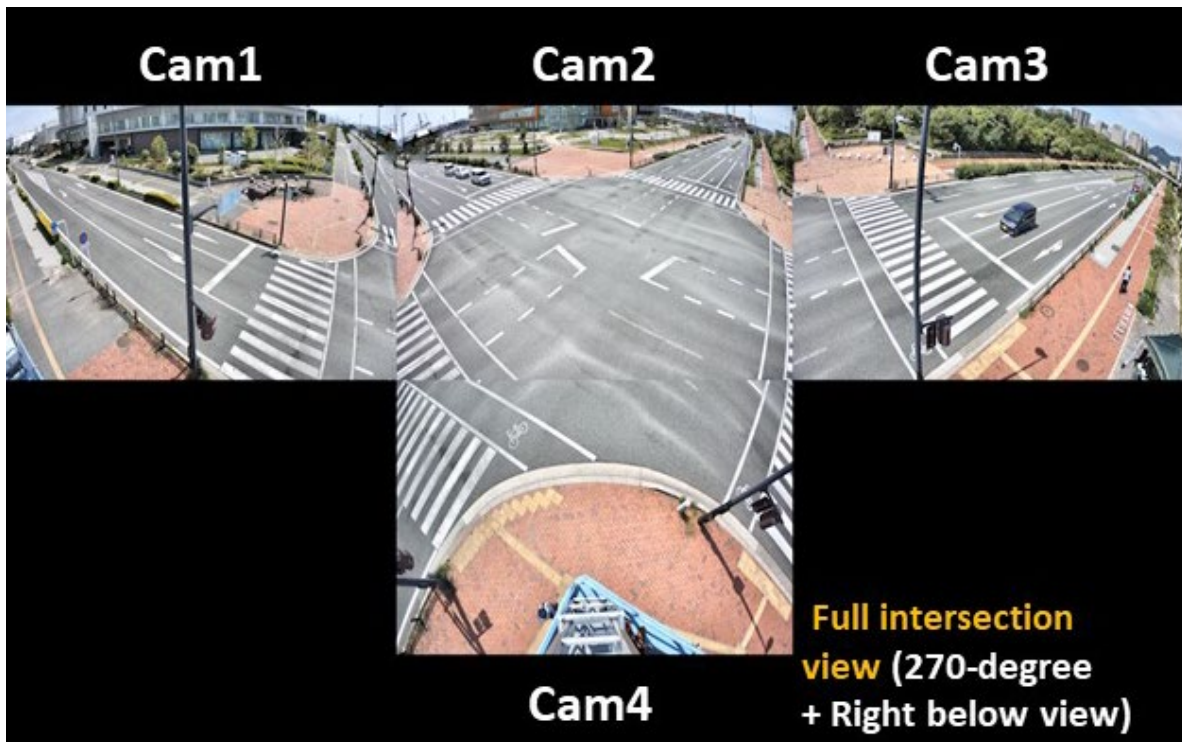
i-PRO Extreme camera WV-S2270L



Ultra 4K High Resolution enables the ability to capture vehicles 100 feet diagonally from intersection corners.



Ultra 4K High Resolution minimizes blind spots with one multi-sensor camera incorporating four repositionable lenses.



Intelligent Auto (iA). Intelligent Auto monitors scene dynamics and motion to adjust key camera settings automatically in real-time. This functionality reduces distortion such as motion blurs on moving vehicles.

Leading brand

i-PRO Extreme PTZ camera WV-X6531N



Color Night Vision. High sensitivity with color night vision shows clear color images in low light conditions. Most cameras on the market switch to black and white in low light situations, removing the ability to identify people or objects by color.

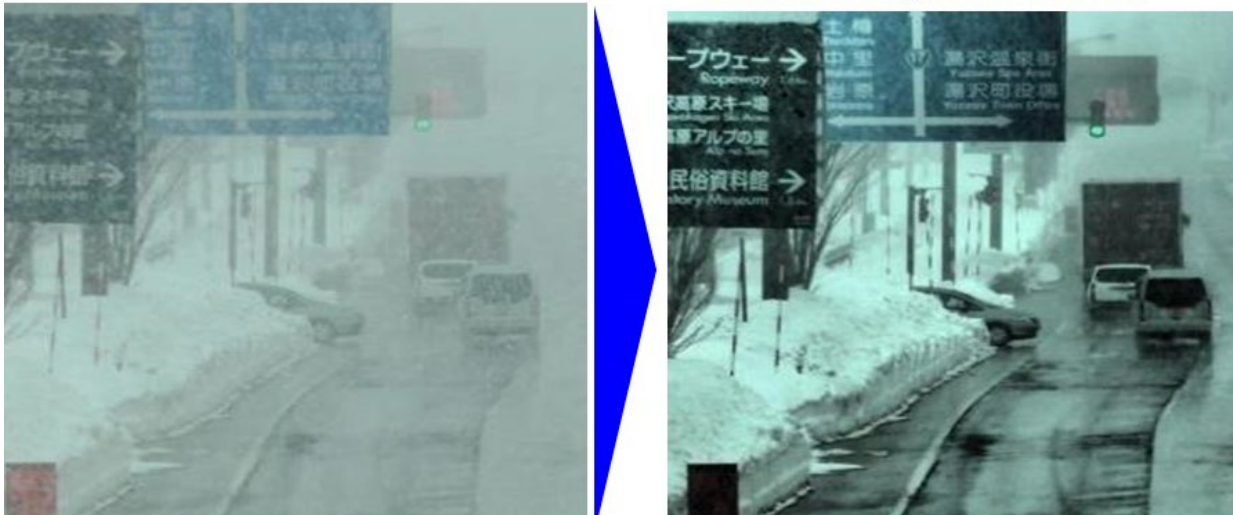
Leading brand

i-PRO Extreme 5MP camera WV-S2550L



Visibility Enhancement Technology enhances visibility by removing snow and rain in real-time or during video playback.

Panasonic Image Enhancement



Intelligent Zoom Stabilization enables viewing of stabilized images even after zooming in to objects at long distances, by absorbing vibrations.



Clear Sight Coating is a special coating which covers the surface of the camera. The coating resists water stains and dust accumulation, and captures clear images even under rain, reducing the need for periodic maintenance.

Without
any special
coating



With
CleraSight
coating



It shows clear images even if
IR LED dose on when it is rain



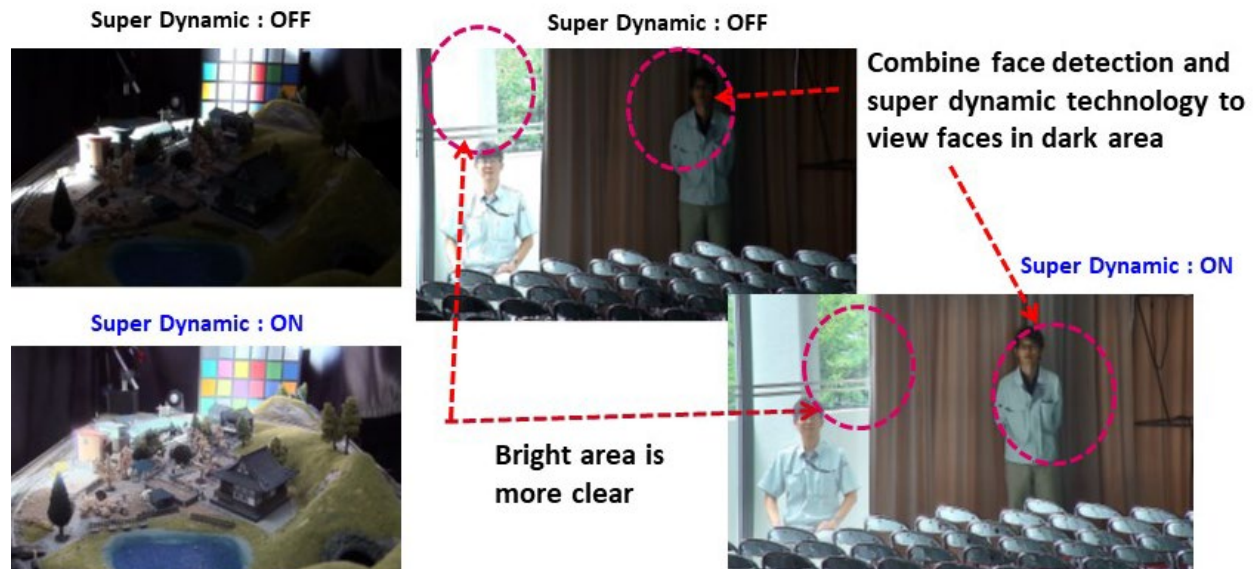
With
CleraSight coating

Without
any special coating

40x Optical Zoom is a high-powered zoom function which can survey objects at long distance clearly.



Super Dynamic Function. Both bright and dark areas are visible when functioning under the extreme super dynamic function.



Extreme Compression

H.265 compression with new smart coding technology
 Compression of high-resolution image data is used to reduce network bandwidth, data storage, and server load costs, while maintaining high quality.

Extreme Compression

GOP control
 Reduces encoding data by using p-frame in place of i-frame when no motion is detected.

Frame control
 Dynamically reduce the i-frame rate to reduce the amount of data.

Auto-VIQS
 Automatically determines areas with and without motion and reduce the data volume of those without motion. It has built in "Smart Facial Coding" which detects faces at high quality.

New frame rate control

(I-frame interval)	4 sec	16 sec	32 sec	64 sec	160 sec	480 sec	480 sec	4 sec
With motion	30 fps	15 fps	7.5 fps	3fps	1fps	1fps	1fps	With motion
Without motion								

Bit rate reduction

Conventional H.264 → i-PRO extreme H.265 + Smart coding **Max.95%**
 Value in bit rate depends on scene

H.265 compression with new smart coding technology

Other leading brand camera vs **i-PRO Extreme camera WV-S2550L with smart coding**

H.264 Recv. AVE: 4.340 Mbps

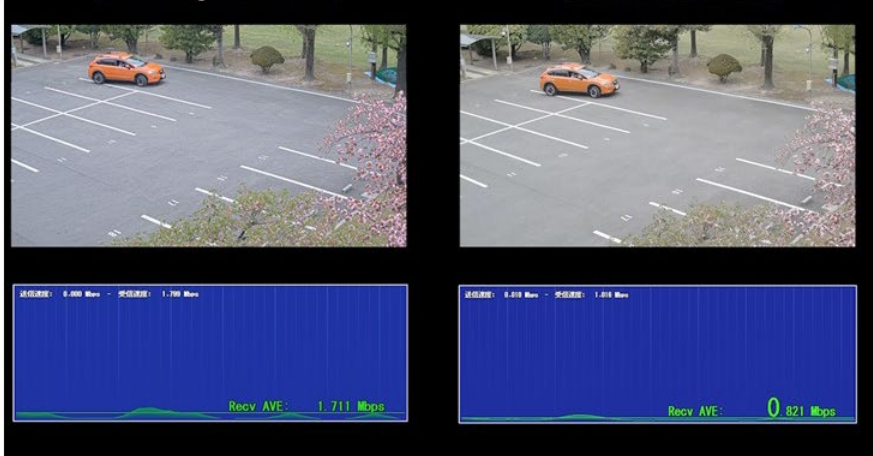
H.265 Recv. AVE: 0.368 Mbps **Max. 95%**
 *Value in bit rate depends on scene

Extreme Compression

H.265 compression with new smart coding technology

Other leading brand camera
with bit rate control

i-PRO Extreme camera WV-S2550L
with smart coding



H.265



*Max.
50%

*Value in bit rate depends on scene

Extreme Compression

H.265 compression with new smart coding technology

Other leading brand camera
with bit rate control

i-PRO Extreme camera WV-S2270L
with smart coding



H.265



*Max.
50%

*Value in bit rate depends on scene

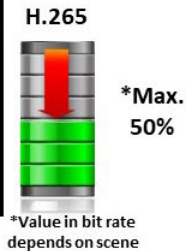
Extreme Compression

H.265 compression with new smart coding technology

Other leading brand camera
with bit rate control

i-PRO Extreme camera WV-U2132L
with smart coding

New



Extreme Reliability

i-PRO's products exceed industry standards.

More than just meeting industry standards



i-PRO's products are tested in extreme conditions in our test facilities. Our surveillance camera technology undergoes rigorous dust, temperature, pressure, shake, water, lifetime, thunder, static electricity, drop, and shake tests.

■ Dustproof Test



■ High-Temperature Test



■ Pressure Test



■ Lifetime Test



■ Thunder Test



■ Static Electricity Test



■ Earthquake Test



■ Waterproof Test



■ Drop Test



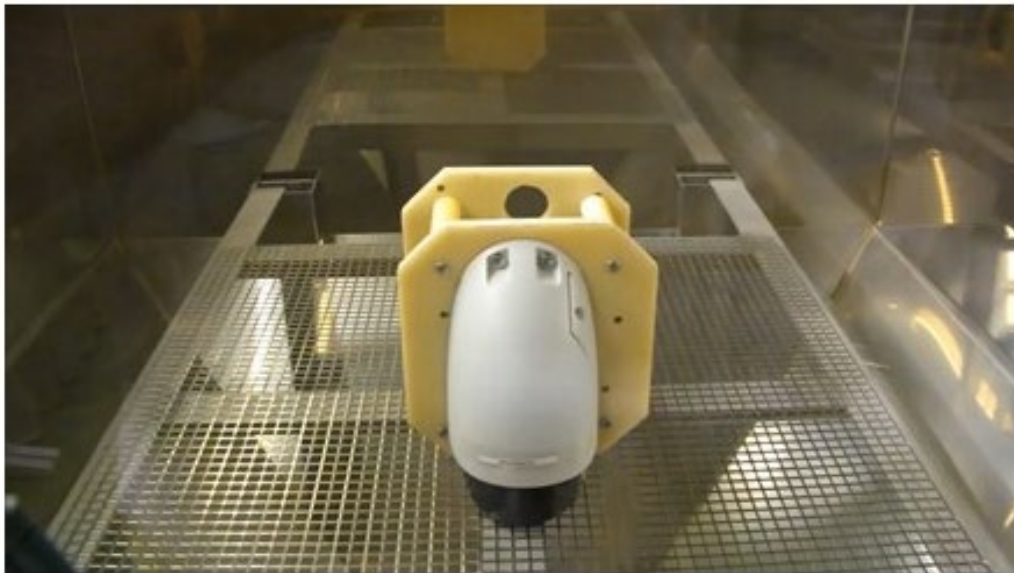
■ Box Shaking Test



Weatherproof Test



Dust Resistance Test



i-PRO surveillance products are salt air corrosion resistant.

- **Salt-air corrosion resistant coating for the part of aluminum die-cast**

[3-layer coating process]
 Over coat, thicker than 35µm
 Middle coat, thicker than 65~100µm
 Oxide film process die-cast
- **Corrosion-resistant screws**
 Prevention from fixation at maintenance. (e.g. Geomet® coatings)
- **ISO14993 Compliant**
 International Standard specifies test procedure of accelerated corrosion tests

1 cycle

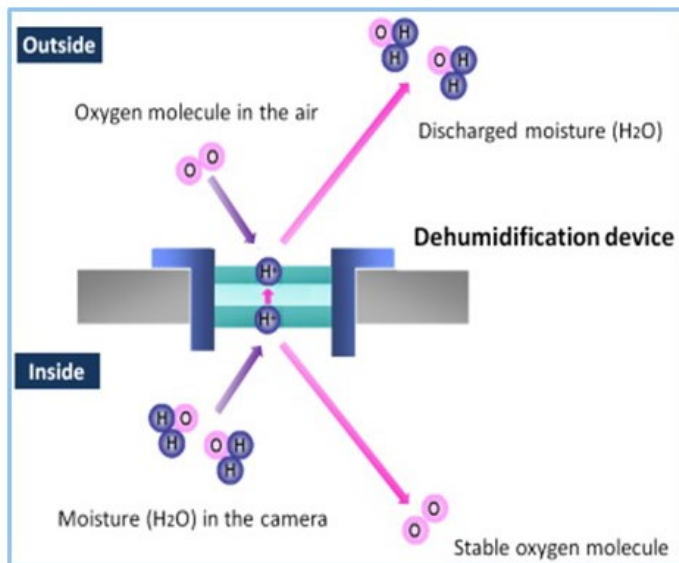
“Salt mist spray” condition (2hours/35°C/5% NaCl)

“Dry” condition (4hour/60°C/Less than 30%RH)

“Wet” condition (2hour/50°C/More than 95%RH)

Cyclic exposure

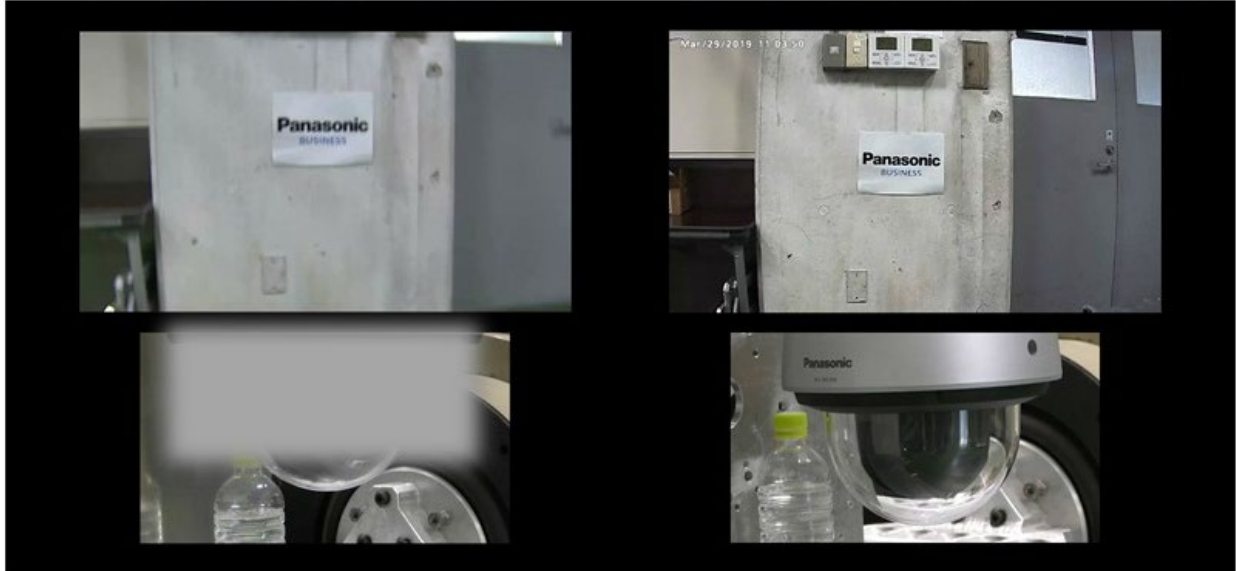
i-PRO’s surveillance cameras feature active dehumidification with a built-in dehumidifier device to remove hydrogen from air to prevent condensation.



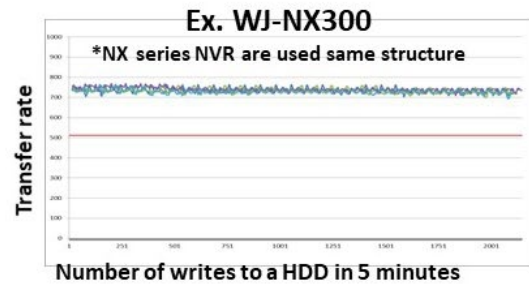
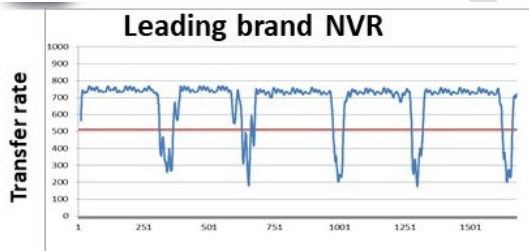
i-PRO's cameras are made with a vibration proof structure, capturing the target subject even in a vibrating environment.

Other leading brand camera

i-PRO Extreme camera WV-S6530N



Our Network Video Recorders (NVRs) continue to record in a vibrating environment.



Vibration test

Vibration frequency 5 Hz-100 Hz in 5 minutes period



*Moving image is WJ-NX300 for reference

It enables to stable recording even when receiving vibration from surrounding environment such as air conditioner, walking if NVR on the desk

Extreme Security

Extreme Data Security

Secure communication with Digicert(Formerly Symantec) certification

In addition to Data encryption and communication encryption, provide secure network access between trusted devices through device certification then prepare for the threat of advanced cyber attacks.

Vulnerability

Protect your devices from cyber attacks



Eliminate vulnerability with the latest CVE* support

*CVE: Common Vulnerabilities and Exposures. Common Vulnerabilities and Exposures is a dictionary of common names (i.e., CVE Identifiers) for publicly known

Spoofing

Prevention data leakage upon data transmission



Realize secure communication between devices by using communication encryption (SSL / TLS communication).

Extreme Data Security

Secure communication with Digicert(Formerly Symantec) certification

In addition to Data encryption and communication encryption, provide secure network access between trusted devices through device certification then prepare for the threat of advanced cyber attacks.

Snooping

Prevent video data leakage



Video encrypted within camera is sent to recorder. Panasonic fully protect the video on the End-to-End System.

Alteration

Securing your evidence



By using Digicert(Formerly Symantec) certificate and hash value, can detect Video alteration and confirm which camera created the video.

Extreme Data Security

Secure communication with DigiCert(Formerly Symantec) certification

In addition to Data encryption and communication encryption, provide secure network access between trusted devices through device certification then prepare for the threat of advanced cyber attacks.



Vulnerability Assessment

- 3rd party assessment and penetration tests made to achieve higher security standards



DigiCert (Formerly Symantec) Device Certification

- Pre-installed DigiCert (formerly Symantec) Certification
- Video tampering detection



End-to-End Data Encryption

- Support full encryption communication
- Camera encryption recording on-the-edge

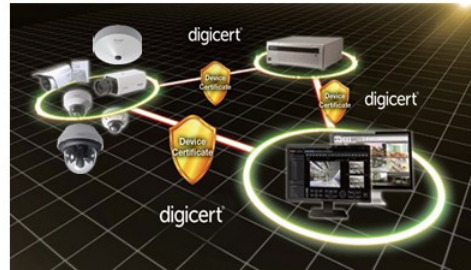


FIPS140-2 Level 1 CAVC compliant

(Federal Information Processing Standardization)

- For federal/public safety usage

*Using encryption module standardized by FIPS publication 140-2



Extreme Analytics

Extreme Analytics

Deep Learning Facial Recognition Solution FacePRO

New deep learning facial recognition technology recognized faces even in challenging conditions as compared to conventional technologies.

High precision

New deep learning facial recognition engine
Image optimization for facial recognition
(Intelligent Auto **iA** / Super Dynamic)
Face best shot technology

Cost reduction

System costs (Distributed computing)
Installation costs (Easy setting)

System expandability

Additional face registration
Integrated into video surveillance system



Recognizes those who don't want to be recognized !

Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

High precision

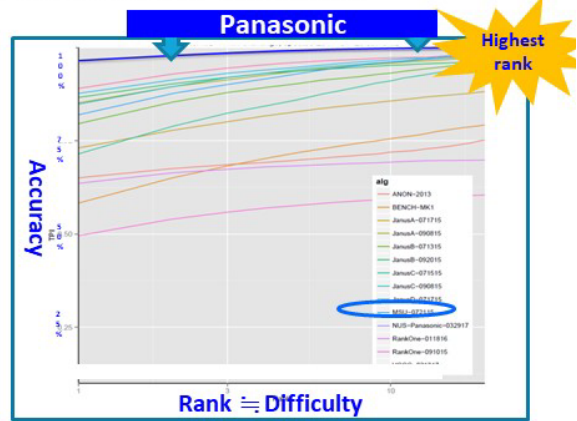
Equipped with a world's highest level (as of April 2017) facial recognition engine as evaluated by NIST.

*Development cooperated with NUS (National University of Singapore)

NIST (IJB-A) competition

NIST : National Institute of Standards and Technology

- Competition between corporate and universities to compete latest technology. (unlike FRVT or FIVE)
- By using data set disclosed by NIST, daily verification is possible. Results are disclosed in a timely manner by NIST

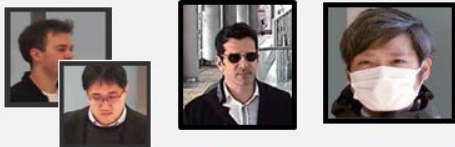


Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

High precision

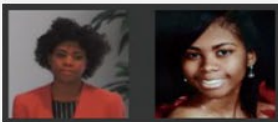
Our world leading deep learning facial recognition technology triggers even when the subject is wearing sunglasses or surgical mask*.



Angled face **Sunglass** **surgical mask**

Left/Right $\pm 45^\circ$
Up/down $\pm 30^\circ$

*Scheduled for launch
by the end of 2018



Changed by aging



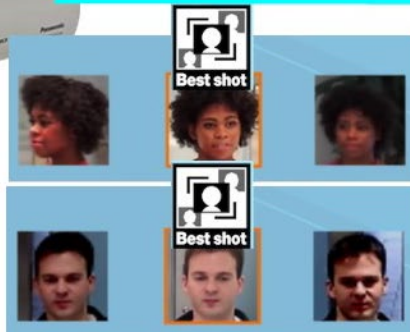
Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

High precision (Best shot technology)

Best shot technology in i-PRO extreme camera transmits only best facial images to facial recognition server

i-PRO
EXTREME



Facial Recognition Server

Improve face match
processing speed

Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

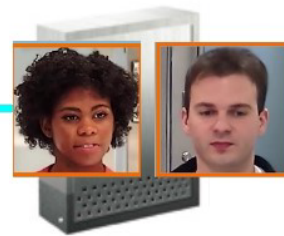
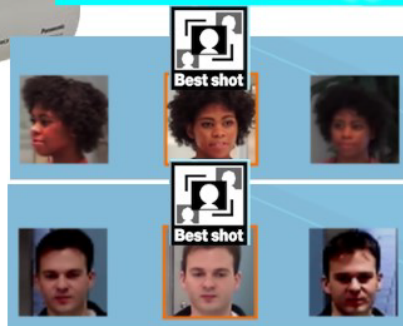
Cost reduction (System costs)

Distributed computing by best shot technology enables reduction of data transmission costs and server costs by reduce network load.

i-PRO
EXTREME



Network load approx. **1/10**



Recognition server workload approx. **1/5**

Max.20 cameras can be connected
per server.

(only 4 cameras if no best shot mode)

Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

Cost reduction (Installation costs)

Utilizing New deep learning facial recognition engine and i-PRO extreme cameras allows easy camera set up and reduce installation costs.

**i-PRO
EXTREME**

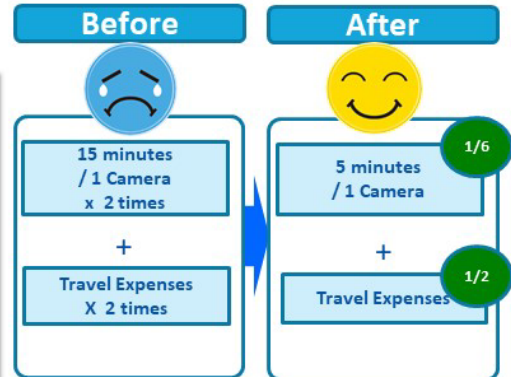


Facial Recognition
Sever Software



Reduce camera setting time for facial Recognition

- Necessary captured face images: **30 pixel or more**
vs. conventional facial recognition: **1/2**
- To be recognized face angle :
Left/Right 45 degree, Up/Down 30 degree
vs. conventional facial recognition : **x2**
→ **Quick and easy installation**



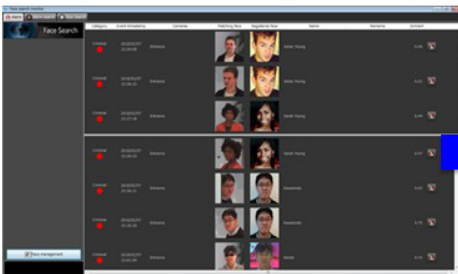
Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

System expandability(Additional face registration)

Improved accuracy through deep learning technology thus enabling up to 30,000 faces registrations at large scale facilities with addition licenses.

Facial Recognition Server Software
WV-ASF950W / ASF950



**Up to 30,000 faces
can be registered**

with
Additional Face
Registration Kit
WV-ASFE951W / ASFE951

Large scale
facilities applications industries



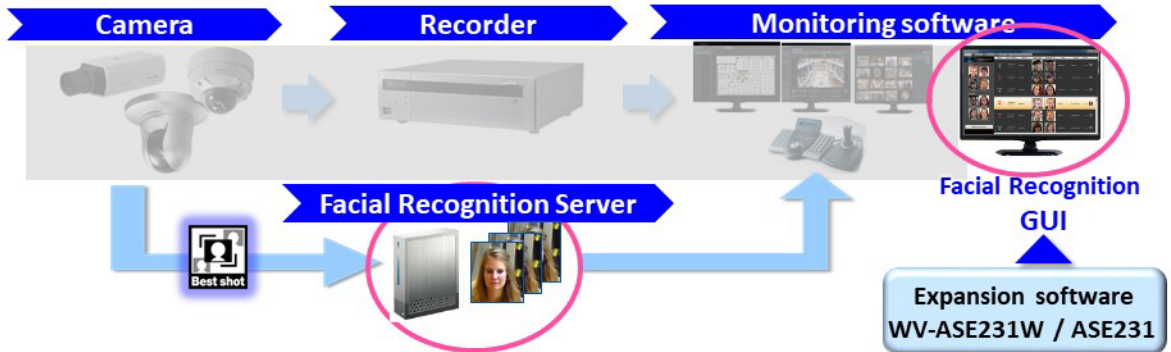
Extreme Analytics

Deep Learning Facial Recognition Solution

FacePRO

System expandability
(Integrated into video surveillance system)

i-PRO security system not including facial recognition system



Facial Recognition Server Software WV-ASF950W / ASF950
(10,000 faces registration + 4ch camera license)

Extreme Analytics

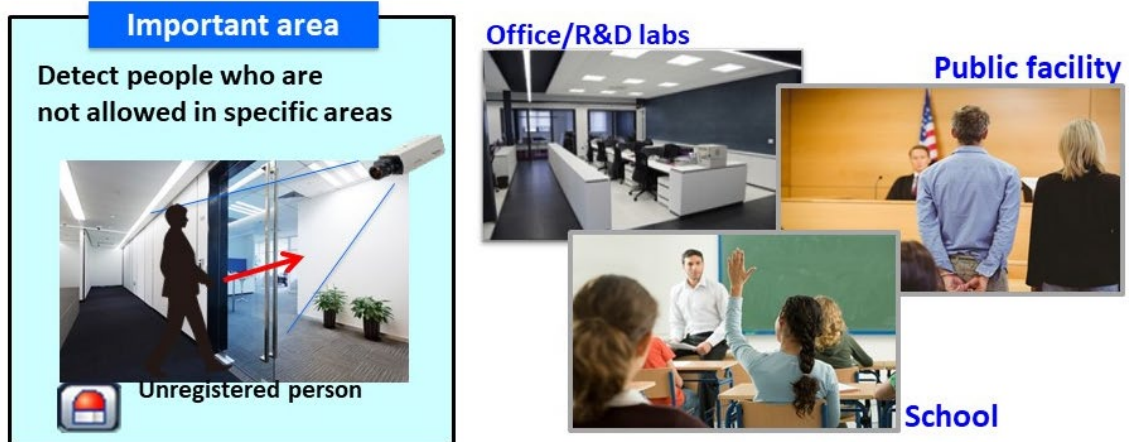
Deep Learning Facial Recognition Solution

FacePRO

System expandability

UNREGISTERED Face Detection

◆ Real-time detection of people who are **NOT** registered.



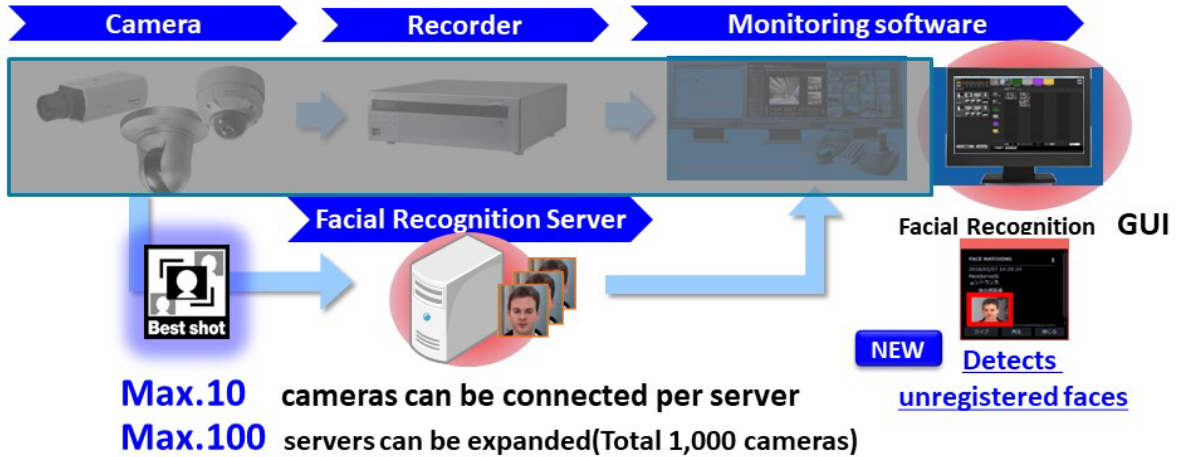
Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

System expandability New

UNREGISTERED Face Detection

- ◆ Enables the detection of unregistered faces in the same facial recognition system

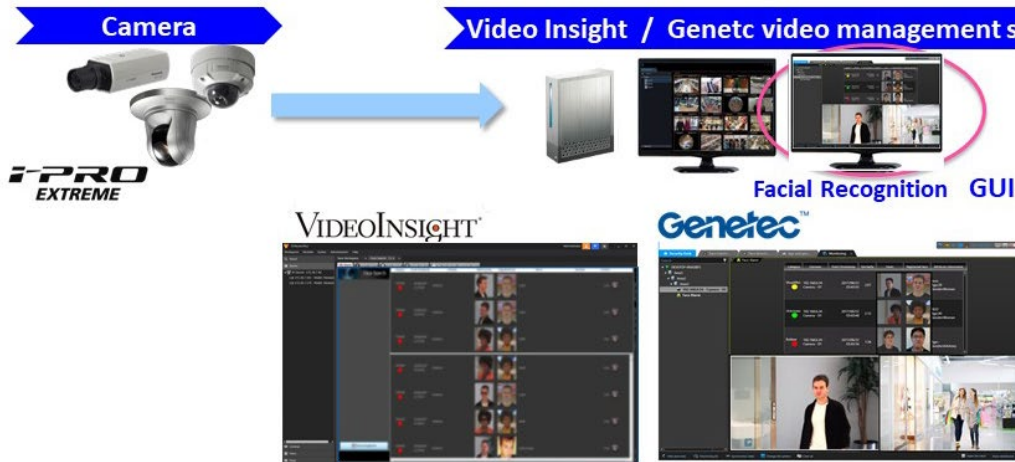


Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

System expandability
(Integrated into video surveillance system)

Both video management system of Panasonic video insight and Genetec can be integrated with Panasonic facial recognition system.

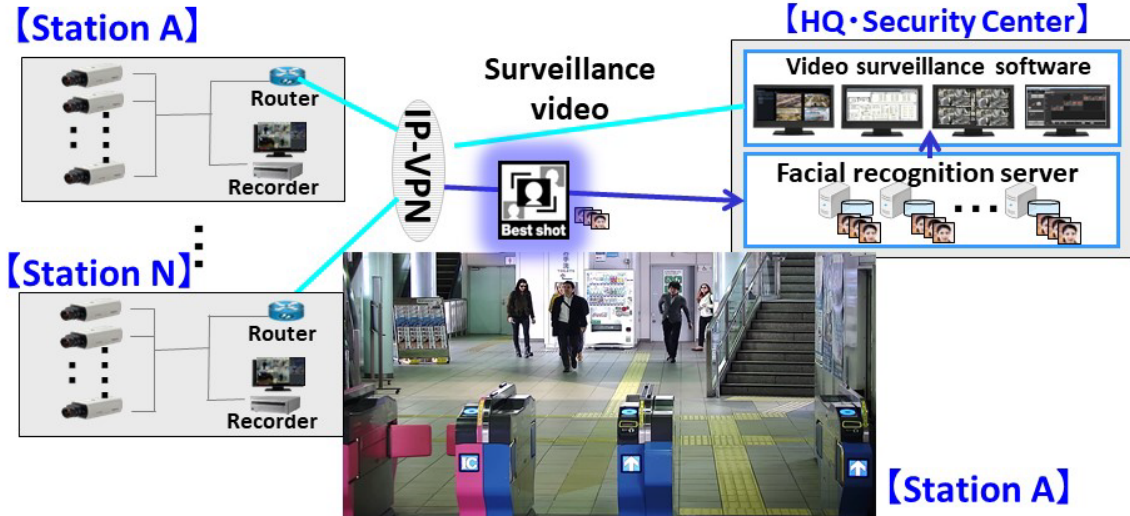


Extreme Analytics

Deep Learning Facial Recognition Solution **FacePRO**

System expandability

Support Max. 2,000 cameras for large scale multi-site systems.



Extreme Analytics

Bundled Intelligent VMD

The camera itself features intelligent functionality for notifying the administrator about changes to situations or dangers using a variety of methods. This eliminates the need to constantly watch the screen in the control room hence reducing the TCO.

Intruder Detection Crossing over the fence 	Loitering Detection Objects staying longer than a specified time 	Direction Detection Objects moving in a specified direction
Scene Change Detection Interference such as blockage of the lens with a cloth or spray paint 	Object Detection Removed Object Detection Abandoned Object Detection 	Cross Line Detection A person who crosses the virtual line to the specified direction

Extreme Analytics

Behavior Analysis / Privacy Protection

With 360-degree camera edge analytics



Heat Mapping

Analyze high-traffic and long-stay zones



Moving Object Removal

Remove people and moving objects from the video

CONFIDENTIAL