



# Wisenet X & P Analytics

## Greg Hadley

# Agenda

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- Introduction
- Overview of Analytics provided
- Detailed description of each Analytic w/ video demonstrations
- Live Demonstration of Analytics configuration
- Q&A

## Power & Performance

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- Hanwha cameras can run any/all analytics at the same time, each with multiple zones, with no performance impact on other functions of the camera.
- All analytics are license-free, and ready to go out of the box.



# Why & When to use analytics

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- **What Can Analytics Do for me?**

- Easier reviewing of events
- Guards do not need to watch so many cameras all the time.
- They can respond to events easier
- Save bandwidth needs for remote locations
- Less reliance on traditional Video Motion Detection, and its' inherent problems
  - False detection due to trees, windows, animals, etc.
  - Sensitivity settings
  - Changing of lighting conditions throughout the day
  - Locations with changing activity levels.



<http://www.matrox.com/graphics/f1>

## Why do I need Intelligent Video Analytics?

Research in the U.S. has shown human observers (of CCTV) start showing signs of viewing fatigue after as little as **12 minutes**, overlooking up to **45 percent** of all activity in the scenes. After **22 minutes**, they overlook up to **95 percent**.

Robert Moore, citing a 2002 study published in Security Oz Magazine in his article "What are the latest trends in intelligent video and analytics?" SP&T News, June 6, 2008. See: [www.sptnews.ca/index.php/Editorials/Ask-the-Expert-Smarter-AI/menu-id-106.html](http://www.sptnews.ca/index.php/Editorials/Ask-the-Expert-Smarter-AI/menu-id-106.html)



Analytics can be used for:

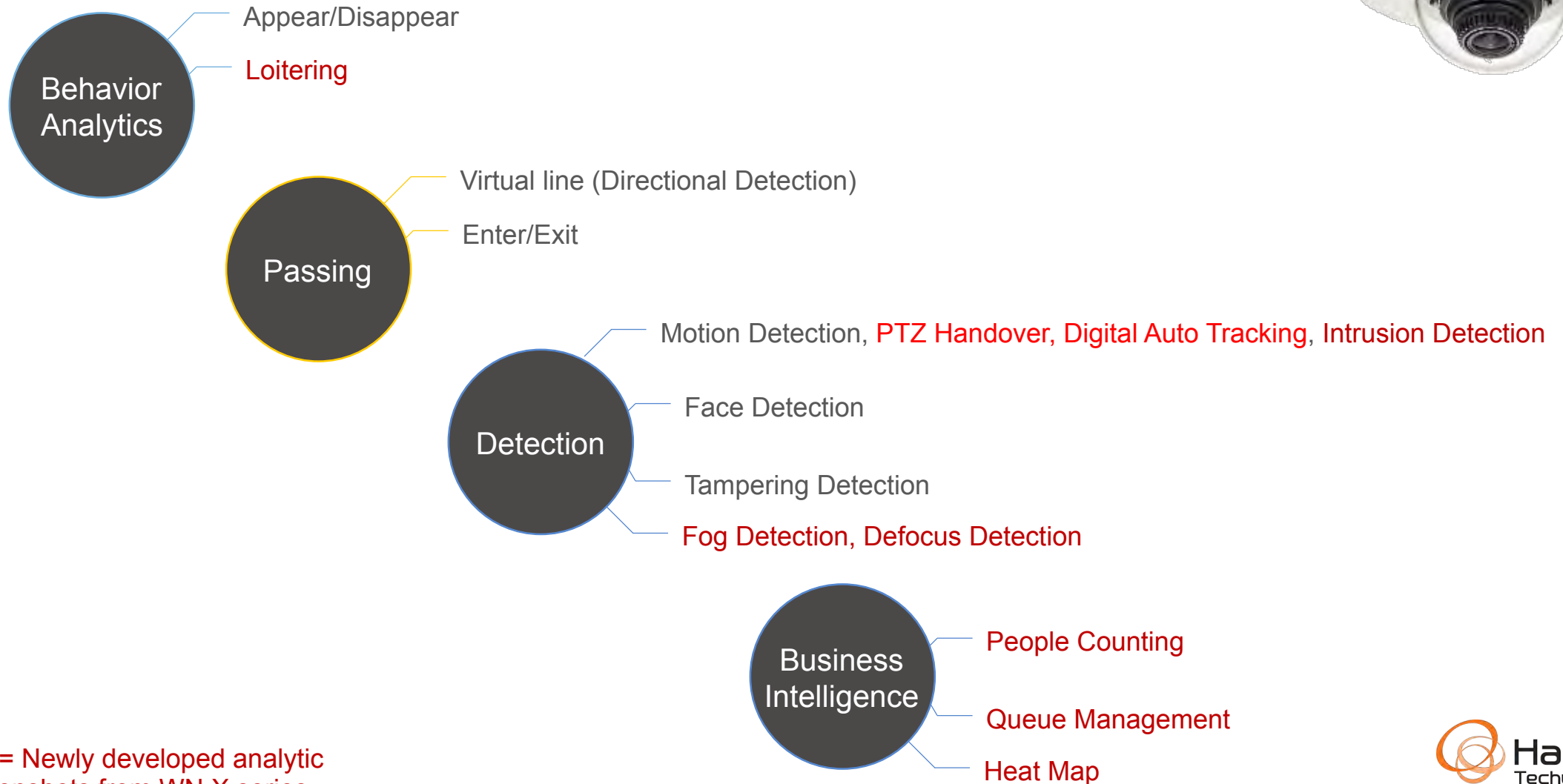
- ✓ Remote monitoring
- ✓ Perimeter Monitoring
- ✓ Process control
- ✓ Restricted access
- ✓ Time and attendance verification
- ✓ Inventory management
- ✓ Retail marketing analysis
- ✓ Manufacturing Process Control



- Analytics can be combined with Edge Recording for a powerful, but simple recording solution.
- Central alarm monitoring or cloud services can be more effective with analytics.



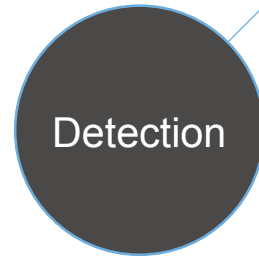
# License-Free Video Analytics



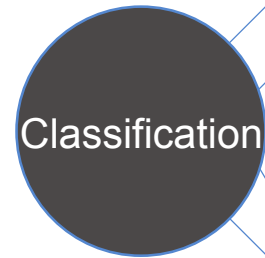
Red = Newly developed analytic  
Screenshots from WN X series.

# License-Free Audio Analytics

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Sound Detection



Scream

Gunshot

Explosion

Glass Break



## WISENET X series

- Appear/Disappear
- Loitering
- Virtual Line
- Enter/Exit
- Intrusion
- Face Detect
- Tampering
- Fog Detect
- Defocus Detect
- PTZ Handover
- Audio Detection\* (Models With Audio)
- Audio Classification\* (Models With Audio)



### \*Fixed Lens Models Only

- ↑+ People Counting
- Queue Management
- Heat Map



## WISENET P series

- Appear/Disappear
- Virtual line
- Enter/Exit
- Tampering
- Defocus Detection
- Audio Detection
- PTZ Handover
- Digital Auto Tracking\* (PNO/V/D only)

- ↑+ Digital Auto Tracking
- People Counting
- Heatmap



PNM-9020V

- ↑+ People Counting
- Heatmap



PNF-9010 Series

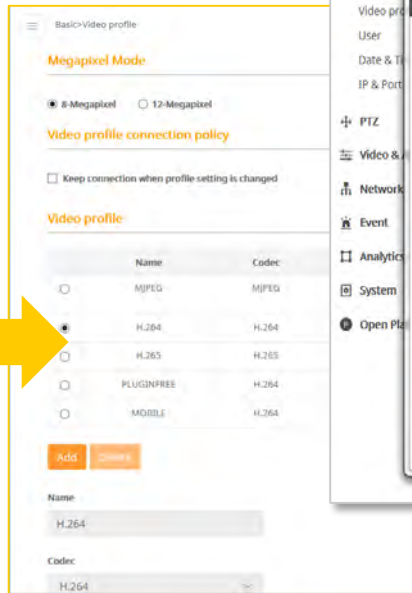
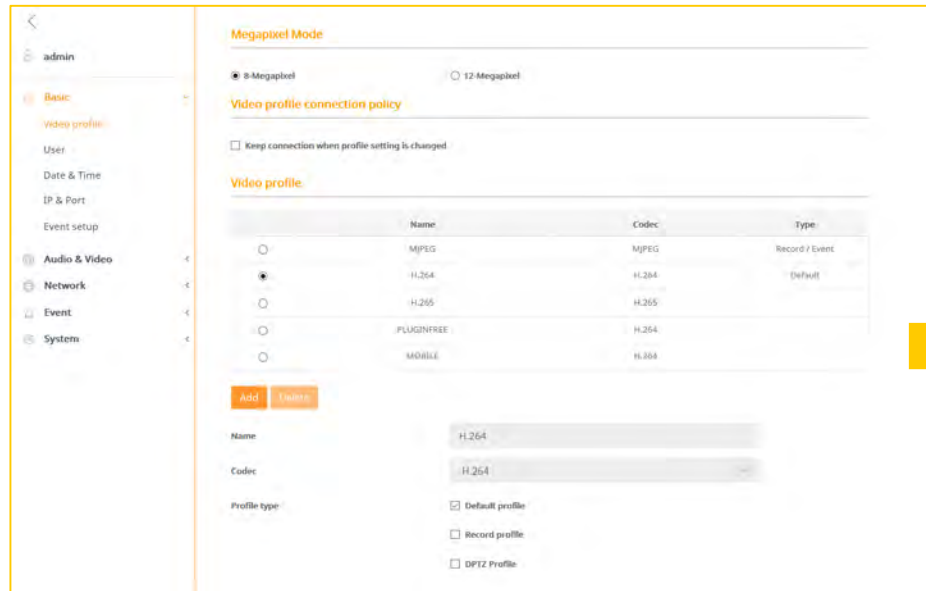
PNM-908xVQ

- Wisenet X varifocal analytics w/o audio

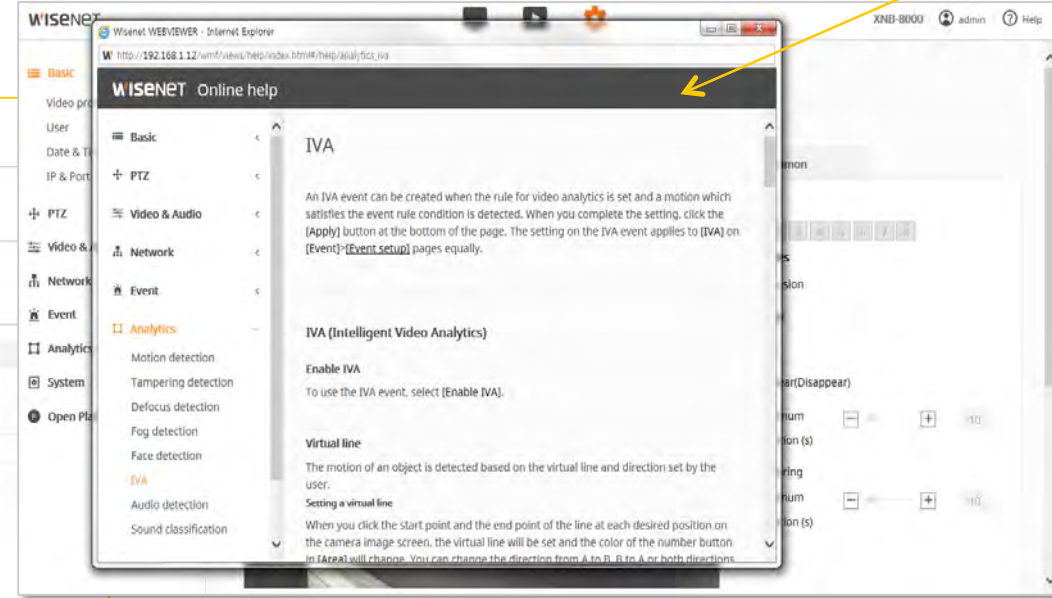


# Easy Setup

- Easy setup with plugin-free browser interface & responsive web technologies allow you to use any browser on any device.



Built-in help



# Easy Setup

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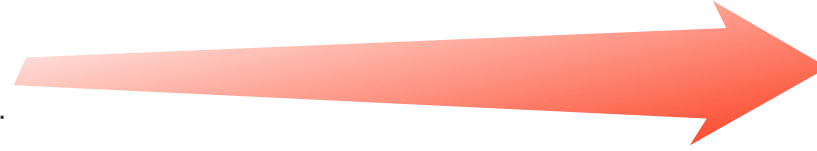
- Detection results & analytics zones can be viewed in SmartViewer & SSM by enabling OSD Metadata overlays, without being burned into the video. Great for setup & tuning.



# Benefits of Edge-Analytics

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- Wisenet X & P DSP allows for more processing power on the edge.
- Leverage other key on-camera technologies to obtain the best image and most accurate analytics results, such as WDR, HLC, SSNR, SSSDR, DIS, etc... Analytics can be done before the image is compressed, without relying on high bandwidth MJPEG streams.
- No expensive servers to buy, license, configure and maintain.
- Easily add/move/change analytics without disrupting infrastructure
- No reliance of 3rd party analytics vendor
- No finger pointing
- VMS agnostic.
- Set it and forget it – no servers to reboot, manage, upgrade, etc.
- Camera metadata can be provided to VMS/Analytics engine.
- Reduce bandwidth needs by eliminating continuous streaming to analytics server or viewing/recording clients.
- PTZ Cameras can intelligently perform analytics per-preset position
- In case of network failure, analytics can still run and record on the edge
- Many cameras support loading of 3rd party apps/analytics for additional analytics, such as LPR.






# Event Actions

- Each event can trigger sending pictures to an FTP server, e-mail notification, recording to SD card/NAS, alarm output, or Preset trigger (PTZ).
- NVR can start recording, display event on monitor.
- SSM can receive any event type and perform a defined action.

No.	Status	Type	Device	User	Time (PC)	Confirmed Time	Description
4491	New	++	Front(192.168.60.195-4505)	-	2014-03-25 10:37:04	-	Passing
4490	New	++	Front(192.168.60.254-10001)	-	2014-03-25 10:37:04	-	Passing
4489	New	±	Camera(192.168.60.195-4505)	-	2014-03-25 10:33:32	-	Face Detection
4488	New	±	Camera(192.168.60.195-4505)	-	2014-03-25 10:33:32	-	Face Detection
4487	New	++	Front(192.168.60.195-4505)	-	2014-03-25 10:29:30	-	Passing
4486	New	++	Front(192.168.60.254-10001)	-	2014-03-25 10:29:30	-	Passing

Defocus detection

Enable Defocus detection



Level of detection: 50

Sensitivity: 80

Minimum duration (s): 10

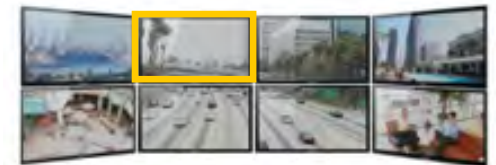
Event action settings:

- FTP:  Enable
- E-mail:  Enable
- Record:  Enable
- Alarm output 1: Off
- Goto preset: Off
- Simple Focus:  Enable

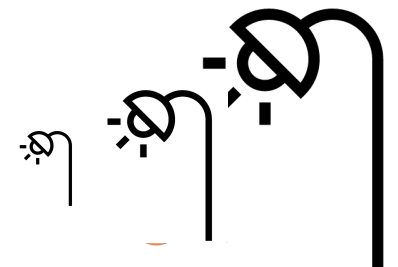


- Defog ON / Simple Focus

- Event



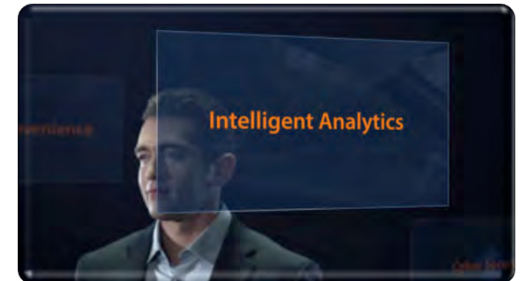
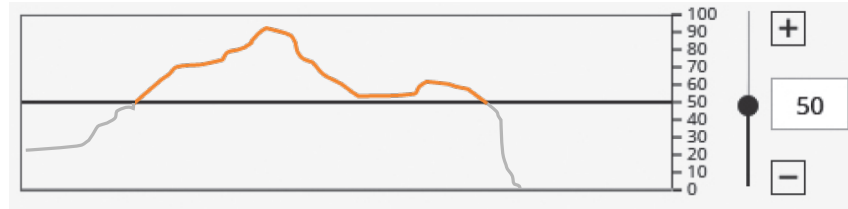
- Alarm out





# Audio Detect / Sound Classification

- Audio Detect
  - Detect audio level above user-specified dB



- Sound Classification
  - Detect sound type based on waveform.
  - Sound classifications:

Classification	Remark
Scream	Adult male / female, child screaming and shouting
Gun shot	Gun shot sound
Explosion	Sudden explosive sound
Glass Break	Glass crash

# Defocus Detection

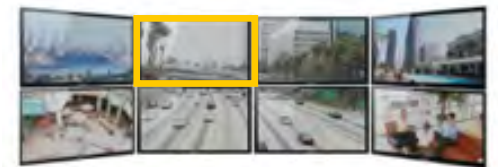
- Detect the focus of the camera become unfocused
  - When the image is blurred due to the focus being turned off, it can be corrected automatically
  - **Can automatically perform Simple Focus on cameras with a motorized lens/back focus.**
  - Interaction with event action : Simple Focus, Event, SD Recording, Alarm out, Email/FTP



- Simple focus



- Event



- Alarm out

# Fog Detection

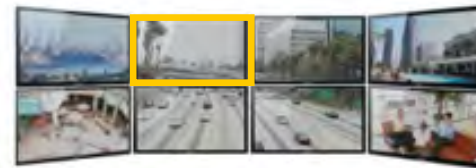
- Detects foggy environment, such as fog, sand, dust, snow, haze.
  - Interaction with event action : Defog, Event, SD Recording, Alarm out, Email/FTP
  - **Can automatically enable defog adjustment. Defog MUST be disabled in [Camera Setup]**



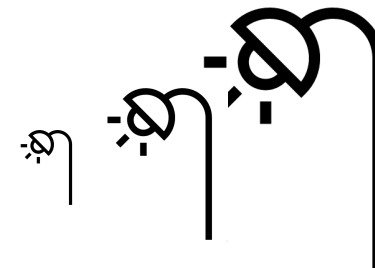
- Defog ON



- Event



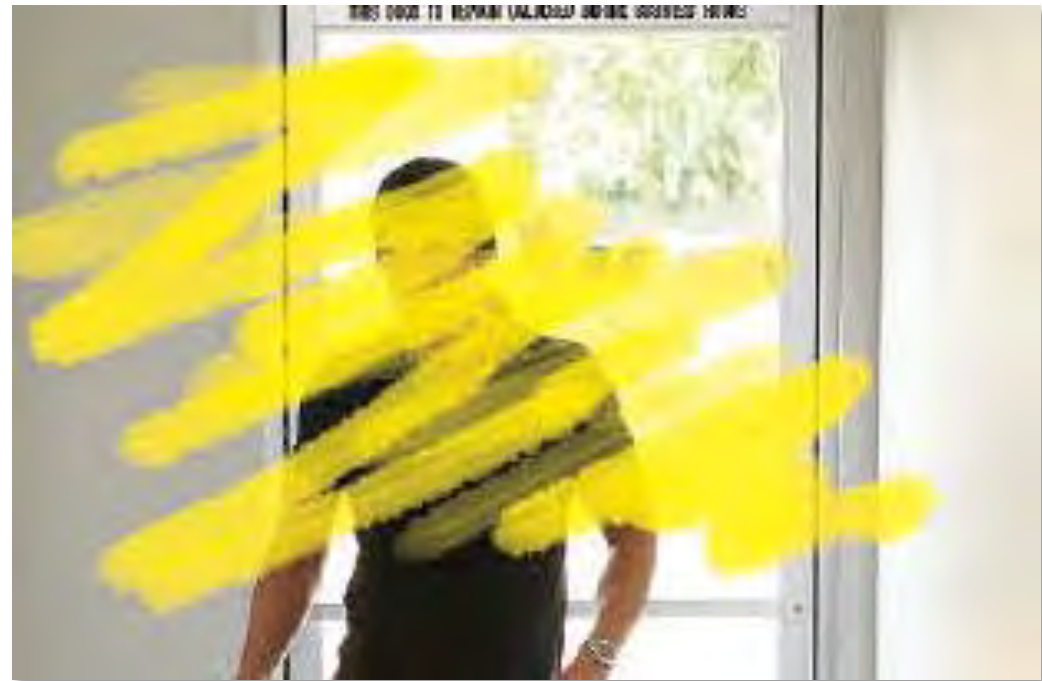
- Alarm out



# Tamper Detection

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- Detect sudden changes to the camera image, from the camera being covered with a bag, spray paint, lens tampering, or change in camera positioning.





# Face detection

- Face detection in the specified area
  - Menu : Web Viewer [Setup] – [Analytics] – [Face detection]
  - Minimum face size is shown in center of zone.
  - 1 Zone can be defined.

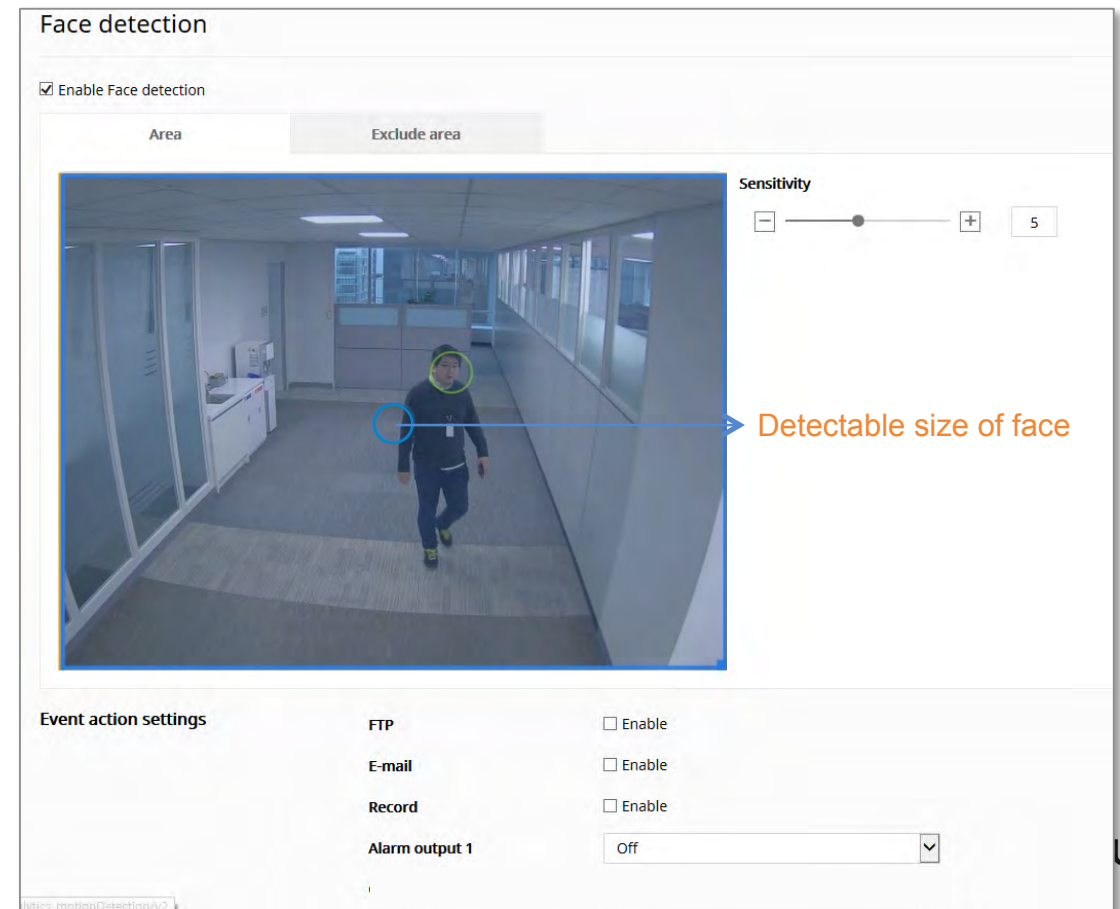


Face detection

Enable Face detection

Area Exclude area

Sensitivity    5



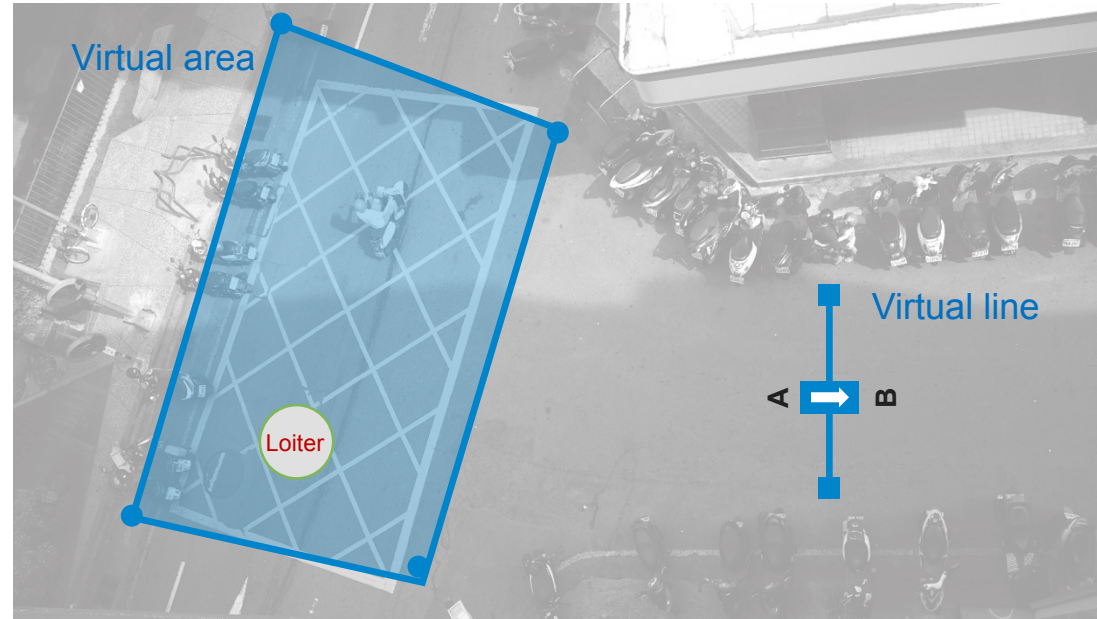
Detectable size of face

Event action settings

FTP	<input type="checkbox"/> Enable
E-mail	<input type="checkbox"/> Enable
Record	<input type="checkbox"/> Enable
Alarm output 1	Off <input type="button" value="v"/>



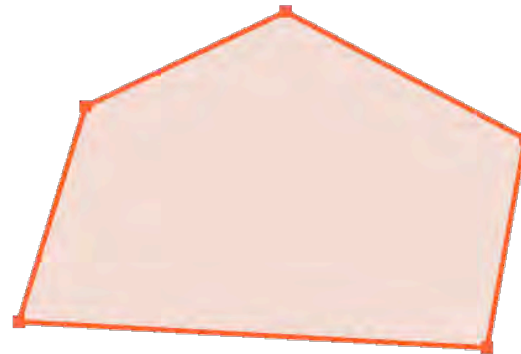
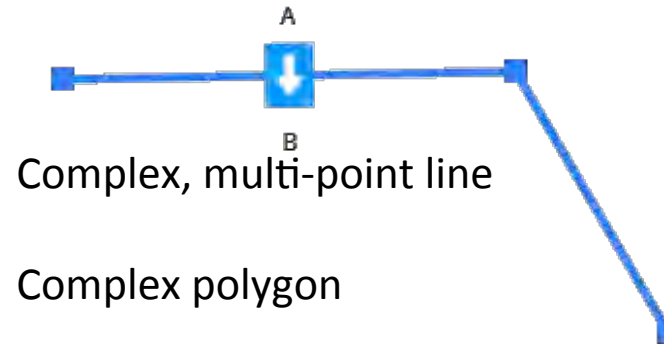
# Intelligent Video Analysis – Virtual Line & Area Definitions



Category	Description
Virtual line	Detect objects passing through a virtual line in the selected direction(s)
Intrusion	Detecting the appearance of moving objects inside virtual areas
Enter	Detecting objects entering from outside to inside of a virtual area
Exit	Detecting objects exiting from the inside to the outside of the virtual area
Appear(Disappear)	Detect a new object appearance or disappearance inside the virtual region and remains for a certain period of time
Loitering	Detects an object is wandering within the virtual region for more than a certain period of time

# Virtual Line / Virtual Area

- Menu : Web Viewer [Setup] – [Analytics] – [IVA]
- Always configure hallway mode before analytic rules
- Click to draw each vertex. Click + icon on line to add vertex to create complex shapes, - to remove.
- Click and drag to move items. Right-Click to delete item.
- You can create a maximum of 8 lines & 8 areas & 8 exclusion zones.



# Virtual Line / Area Demo Videos

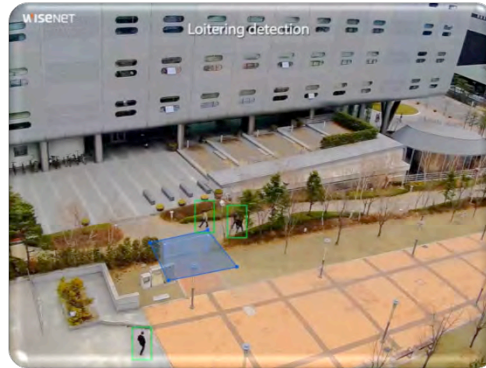
- Appear / Disappear



- Directional / Virtual Line Crossing



- Loitering



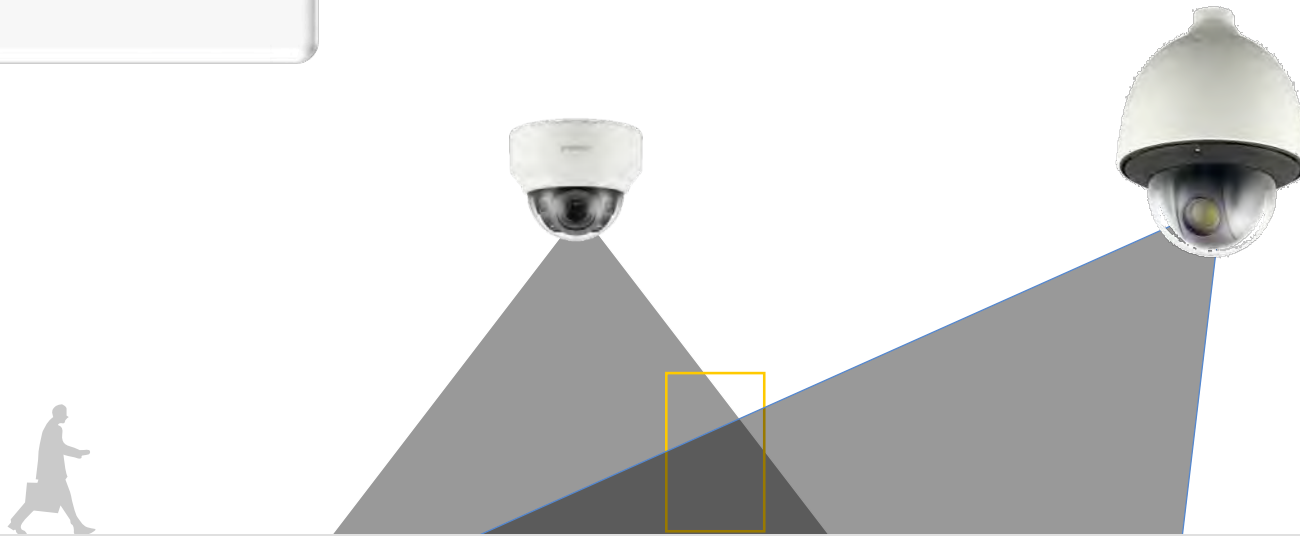
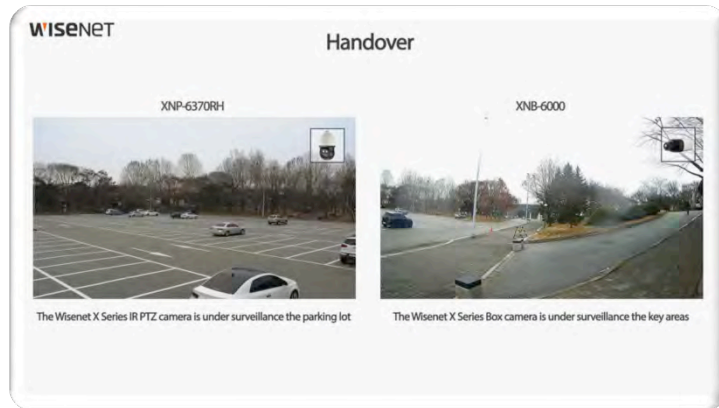
# P Multi Sensor

- Analytics zones **MAY** cross imagers, provided easier configuration and use.



# Motion Detection PTZ Hand over

- Able to link motion detection zones with PTZ camera's preset position
  - Multiple cameras are interlocked to keep track of suspicious objects





# Motion Detection PTZ Hand over

- When motion is detected, it moves a PTZ camera to a specific preset position
  - For each detection area, different PTZ camera can be set

Motion detection  Enable

Area Exclude area

Area 1 2 3 4 5 6 7 8

Level of detection

Sensitivity 80

Hand over  
 Enable  Disable

Receiver Camera  
Add Delete

No.	IP type	IP address	Port	User	Password	Preset No.
1	IPv4	192.168.1.233	80	admin	••••	1

[Hand over] Enable or disable

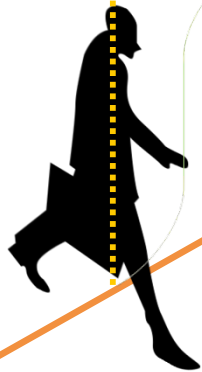
Set the preset information to move

# People Counting

- 1 or 2 counting lines can be defined.
- In & Out counts are recorded.



Installation height  
3 ~ 5 meters



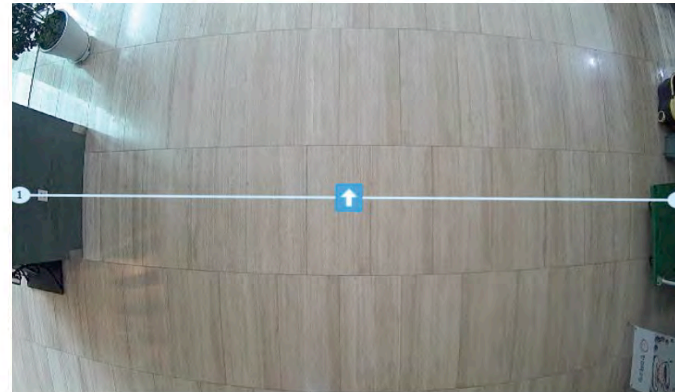
## Setup

Enable People counting

Configuration

Exclude area

Calibration



ⓘ There is no rule that has been established. Establish a rule in the Setup menu.

### Counting rule

<input type="checkbox"/>	No.	Name
<input checked="" type="checkbox"/>	1	Door1
<input type="checkbox"/>	2	

### Live

No.	Rule name	IN	OUT
1	Door1	0	0
2			

## Report

Enable

Schedule

Daily  h  min

File name

.xlsx

Export

Set the FTP and E-mail information to send the report file in [Event]>[FTP/E-mail] page. [FTP / E-mail](#)

Apply

Cancel

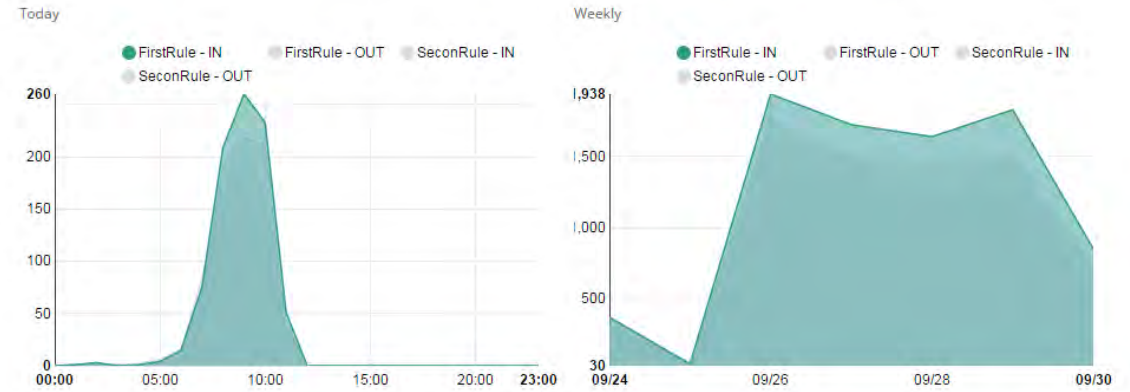
Delete all data

# People Counting

- Searching

- Displays live statistics on top,
- Use Mouse Over to display statistics.
- Search results at bottom.
- Can download results in TXT or XLSX formats.

No.	Rule Name	IN	OUT
1	FirstRule	858	680
2	SeconRule	738	549



## Search

Date: Recent | 1 Day | 2016-09-30

Rule		Rule 01	Rule 02
Camera	IN	<input checked="" type="checkbox"/> FirstRule	<input checked="" type="checkbox"/> SeconRule
	OUT	<input checked="" type="checkbox"/> FirstRule	<input checked="" type="checkbox"/> SeconRule



# Queue Management

- Up to 3 zones can be defined.
- Specify the number of people/time to trigger an event.

## Level of detection

The level of detection is classified into 'High' and 'Medium', according to the number of people in a given queue area. When [Maximum] and [High] are set for the number of people, the 'Medium' value will be set automatically.

'High' for the level of detection refers to the status in which the number of people exceeding the 'High' value and less than the 'Maximum' value is detected. 'Medium' for the level of detection refers to the status in which the number of people exceeding the 'Medium' value and less than the 'High' value is detected.

For example, if 20 is set for the [Maximum] value and 18 is set for the [High] value, 9 will automatically be set for the 'Medium' value. If the number of people queuing in the relevant queue area is over 18 and less than 20, the level of detection will be 'High'. If the number of people queuing in the relevant queue area is over 9 and less than 18, the level of detection will be 'Medium'.

## Minimum duration

The minimum queuing time for creating a Queue event by the level of detection can be set. A queue event is created when the number of people corresponding to 'High' of [Level of detection] queues is longer than the time entered on [High] of [Minimum duration].

In other words, when '18' is set for 'High' of [Level of detection] and '90 seconds' is set for 'High' of [Minimum duration], a queue event is created if 18 or more people are queuing in the queue area for 90 seconds or longer.

## Calibration

Set the camera height or the human size to count in order to improve the accuracy of analyzing the number of queuing people in the queue management function. You can only select and apply either the camera height or human size.

## Setup

Enable Queue management

### Configuration



### Area

<input type="checkbox"/>	No.	Name
<input checked="" type="checkbox"/>	1	Checkout1
<input checked="" type="checkbox"/>	2	CustomerService
<input type="checkbox"/>	3	

### Queue events

### Level of detection

High 16  
8 Medium 32 Maximum  
Maximum 32 People  
High 16 People

### Minimum duration (s)

High  s  
 Medium  s

Queue event is occurred when both level of detection and minimum duration are satisfied

### Report

Enable

### Schedule

Daily 00 h 00 min

### File name

Report1 .xlsx

### Export

Set the FTP and E-mail information to send the report file in [Event]>[FTP/E-mail] page. [FTP / E-mail](#)

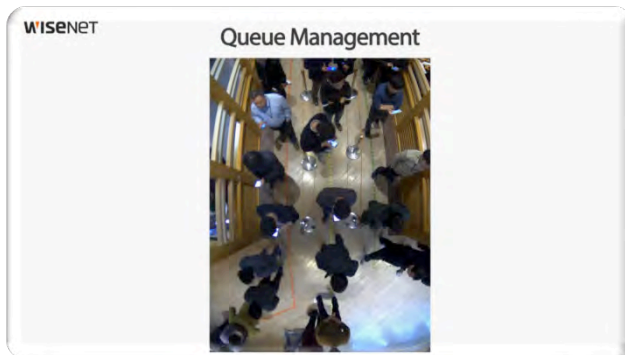
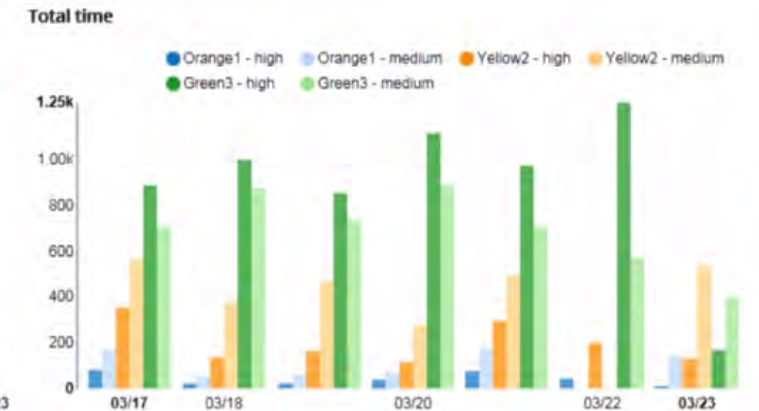
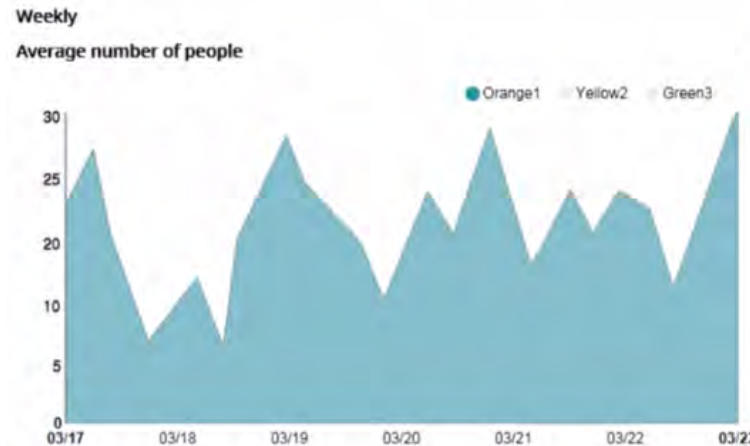
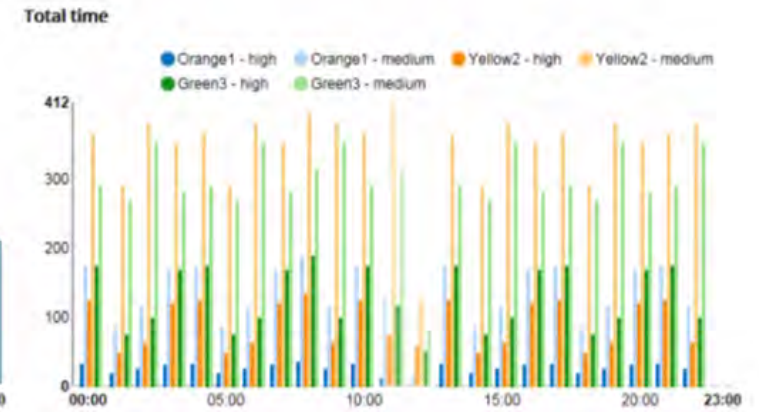
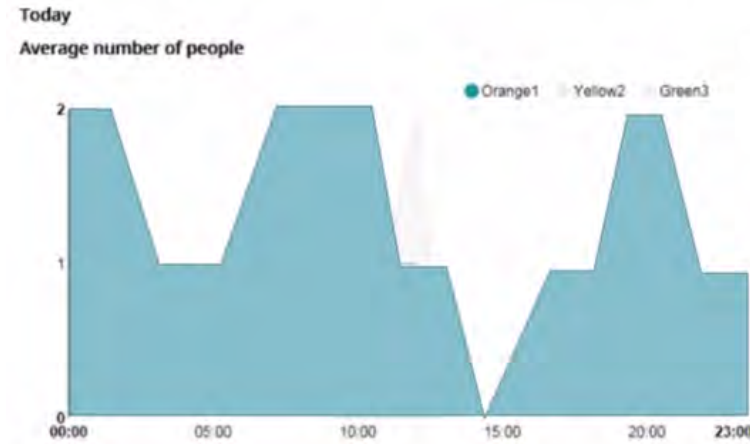
### Event action settings

FTP  Enable

E-mail  Enable

# Queue Management

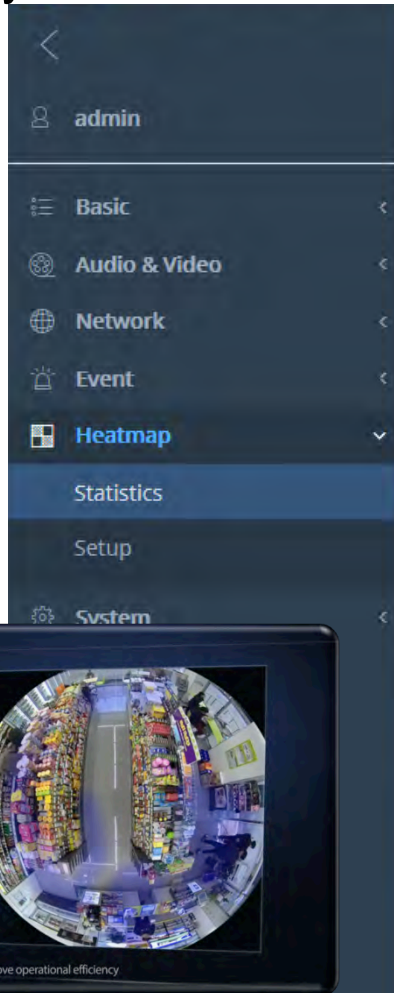
- Search
  - Allows you to view historical data for specific periods





# Heatmap

- Live Heatmap displayed. Search the Heatmap during set period or recent day/week/month



## Statistics



When you select the video input mode, delete data to create data suitable for the selected mode.



## Search

Date

Recent

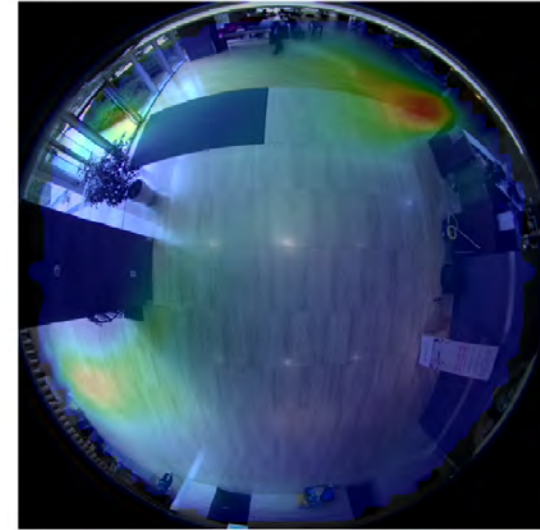
1 Day



2000-01-29

Search

Download



# Digital Auto Tracking

- Detect any moving object on area including people using digital zoom feature
  - Normal : Monitor the full area
  - After detecting the object : Zoom in and track the object



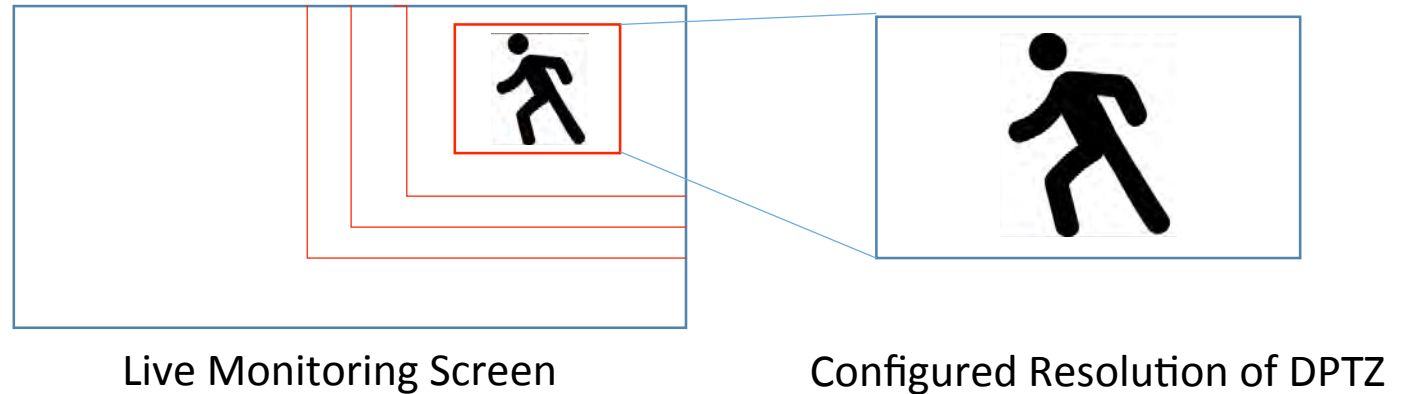
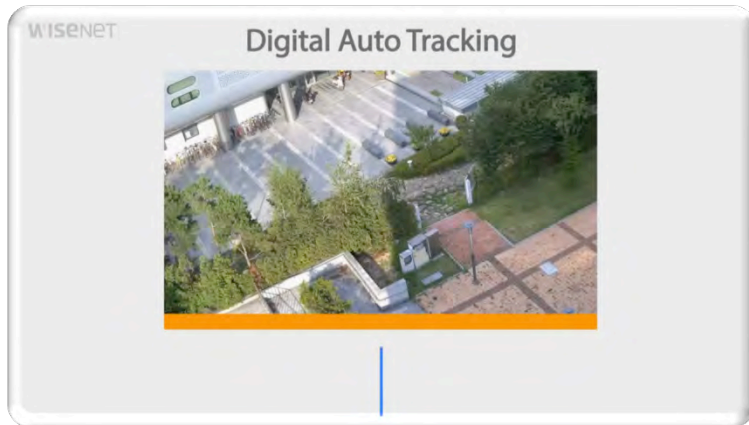
Normal



After detecting the motion  
*Zoom in and trace the object*

# Digital Auto Tracking

- Crop + Resizing
  - After Cropping, it resizes comparing the resolution of DPTZ profile.
  - If moving object cropped is smaller than resolution of DPTZ profile like below example, then It upsizes starting to track
  - Below example is upsizing after smaller object moving is captured and cropped







Thank You!

Questions?

# Resources

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- The following slides show key configuration & notes of each analytic for your reference.




# Defocus Detection

- Detects if camera's image becomes blur
  - Menu : Web Viewer [Setup] – [Video & Audio] – [Analytics] – [Defocus detection]

Defocus detection

Enable Defocus detection



Level of detection

100  
90  
80  
70  
60  
50  
40  
30  
20  
10  
0

+

50

-

Sensitivity

-

+

80

Minimum duration (s)

-

+

10

Event action settings

FTP	<input type="checkbox"/> Enable
E-mail	<input type="checkbox"/> Enable
Record	<input type="checkbox"/> Enable
Alarm output 1	Off
Goto preset	Off
Simple Focus	<input type="checkbox"/> Enable

focus blur

# Defocus Detection

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- Conditions for a new detection of defocus after alarm for defocus detection
  - If you disable and enable defocus detection
  - After simple focus, the image becomes identifiable
  - When an object in the image moves to a well focused position
- Focus detection performance degradation and malfunction conditions
  - The background is monotonous or night time or low-light environment
  - Sudden illumination change (Ex: Indoor light turn on or off)
  - A large single object that occupies most of the screen or blocking of lens
  - Change focus target due to camera position change

# Fog Detection

- Fog detection
  - Menu : Web Viewer [Setup] – [Video & Audio] – [Analytics] – [Fog detection]
  - Can automatically enable defog adjustment. Defog MUST be disabled in [Camera Setup]

Fog detection

Enable Fog detection



Level of detection

Sensitivity

Minimum duration (s)

Event action settings

FTP	<input type="checkbox"/> Enable
E-mail	<input type="checkbox"/> Enable
Record	<input type="checkbox"/> Enable
Alarm output 1	Off
Goto preset	Off
Defog	<input type="checkbox"/> Enable

# Fog Detection

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- After the fog detection alarm, the conditions for the new fog detection
  - Disable and enable fog detection
  - If the fog or smoke disappears and the image becomes identifiable
- Fog detection performance degradation and malfunction conditions
  - The background is monotonous or night time or low-light environment
  - Sudden illumination change (Ex: Indoor light turn on or off)
  - A large single object that occupies most of the screen or blocking of lens
  - Change focus target due to camera position change

# Virtual Line

## IVA (Intelligent Video Analytics)

Enable IVA

Virtual line

Virtual area

Exclude area

Common



Line

1  2  3  4  5  6  7  8

Categories

Crossing

Direction

A → B

A ← B

A ↔ B



# Virtual Area

## IVA (Intelligent Video Analytics)

Enable IVA

Virtual line

Virtual area

Exclude area

Common



Area

1 2 3 4 5 6 7 8

Categories

Intrusion

Enter

Exit

Appear(Disappear)

Minimum duration (s)

Loitering

Minimum duration (s)

# Exclude Areas

## IVA (Intelligent Video Analytics)

Enable IVA

Virtual line

Virtual area

Exclude area

Common



Area

1 2 3 4 5 6 7 8

# Common

## IVA (Intelligent Video Analytics)

Enable IVA

Virtual line

Virtual area

Exclude area

Common



Sensitivity



Size

■ Minimum

98 x 98

■ Maximum

973 x 973

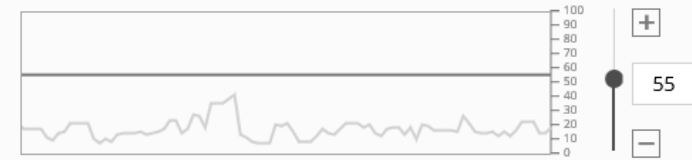
# Audio detection

- Detect sound above a certain level
  - Menu : Web Viewer [Setup] – [Analytics] – [Audio detection]
- Setting
  - [Level of detection]
    - The lower the level, detects lower volume levels
    - Level : 1~100

## Audio detection

Enable Audio detection

### Level of detection



### Event action settings

**FTP**  Enable

**E-mail**  Enable

**Record**  Enable

**Alarm output 1**  ▼

### Event activation time

Always

Only scheduled time

# Sound classification

- Detects specified sound type
  - Menu : Web Viewer [Setup] – [Analytics] – [Sound classification]

### Sound classification

Enable Sound classification

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**configuration**

<b>Noise reduction</b>	<input type="checkbox"/> Enable <b>Eliminate ambient noise</b>
<b>Level of classification</b>	<input type="range" value="50"/>
<b>Categories</b>	<input type="checkbox"/> Scream <input type="checkbox"/> Gunshot <input type="checkbox"/> Explosion <input type="checkbox"/> Crashing glass

---

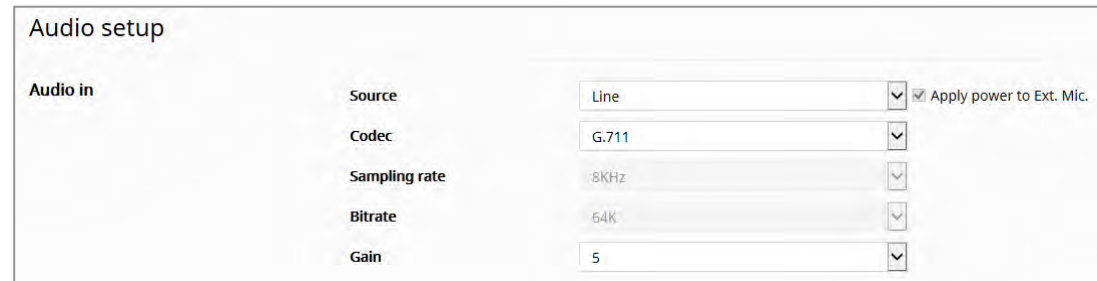
**Event action settings**

<b>FTP</b>	<input type="checkbox"/> Enable
<b>E-mail</b>	<input type="checkbox"/> Enable
<b>Record</b>	<input type="checkbox"/> Enable
<b>Alarm output 1</b>	Off <input type="button" value="v"/>
<b>Goto preset</b>	Off <input type="button" value="v"/>



# Sound classification

- Noise reduction
  - Recommend to use when the ambient noise is 55 to 65 dB or more.
  - [Noise reduction]Function can reduce original source. Therefore, performance degradation and malfunction may occur
- Audio input source setting
  - Menu : Web Viewer [Setup] – [Video & Audio] – [Audio setup]
    - Audio in Gain : 4~6 recommended for Sound Classification
    - Codec is not relevant
    - Not support with external line input



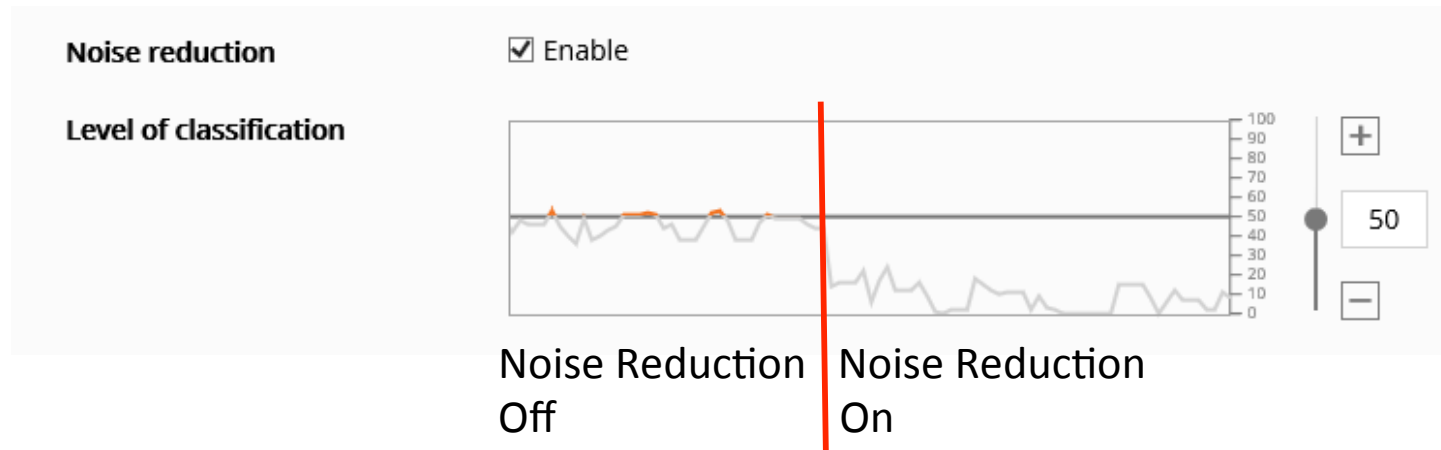
Audio setup

Audio in

Source	Line	<input checked="" type="checkbox"/> Apply power to Ext. Mic.
Codec	G.711	
Sampling rate	8KHz	
Bitrate	64K	
Gain	5	

Recommended external mic	
Frequency range	40 ~ 16000Hz
Impedance	1,500 Ω
Sensitivity	-40±3 dB (7.1~14.1 mV)

# Noise Reduction



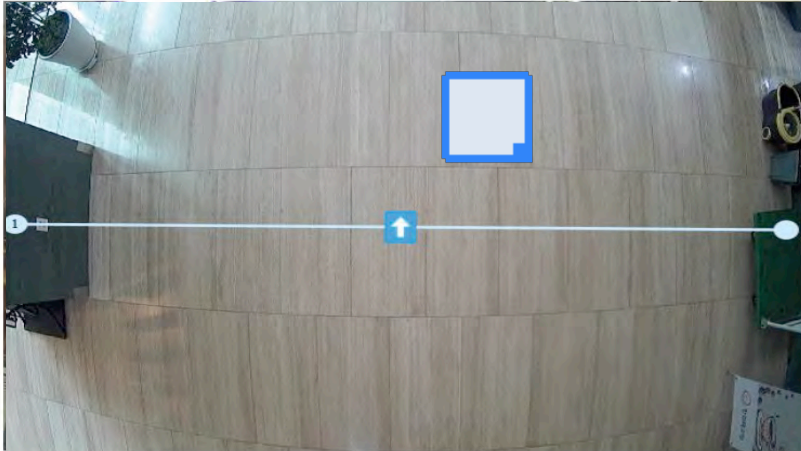
# People Counting

- Calibration for camera height

Setup


Enable People counting

Configuration   Exclude area   Calibration



Size

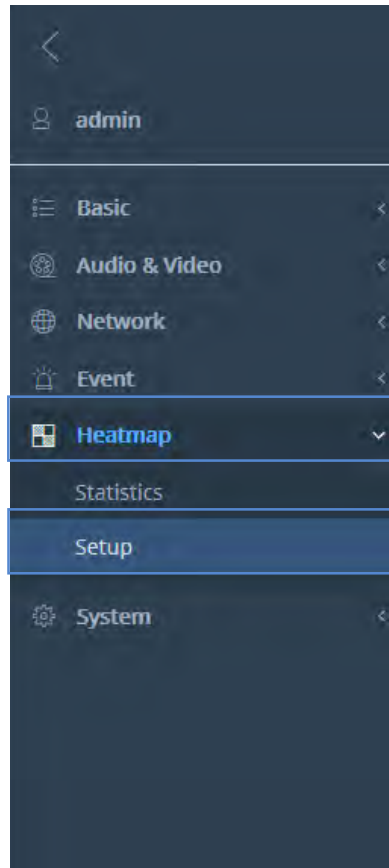
Drag the corner of the rectangle on the image with the mouse to fit it to the size of a human. All will be applied to People Counting, Heatmap.



No.	Rule name	IN	OUT
1	Door1	0	0
2			

# Heatmap

- [Setup] > [Heatmap] > [Setup] > Check the [Use]



## Setup

Heatmap  Use

Report  Use

Schedule

h  minutes

File Name

The file name is automatically created together with the date and time information.

Export

You can configure detailed settings on the FTP/E-mail page. [FTP / E-mail](#)

Cancel

Apply

WN X Has additional Background Color & Exclusion Areas

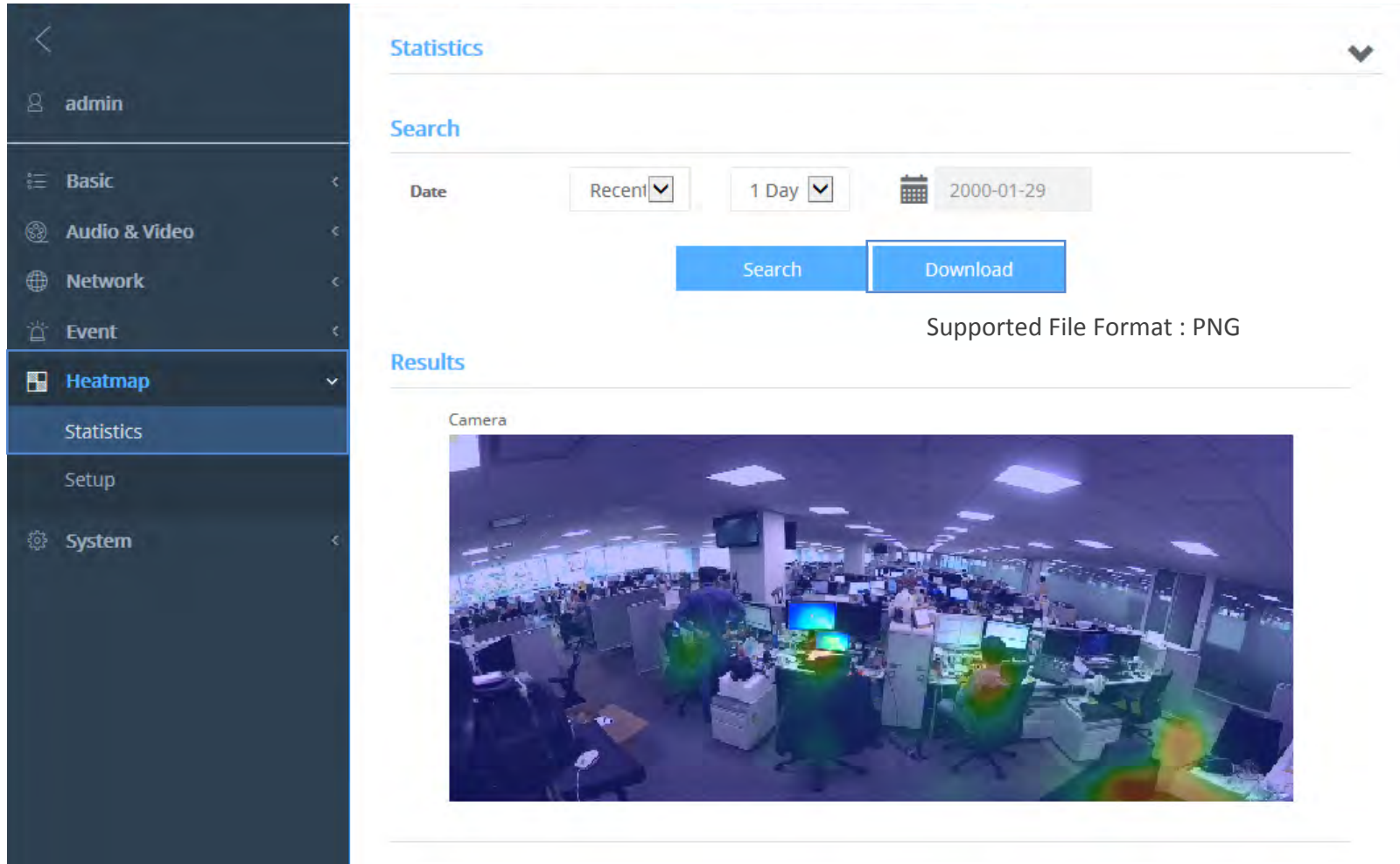
Background color

Color

B/W

# Heatmap

- Download the searched image of Heatmap

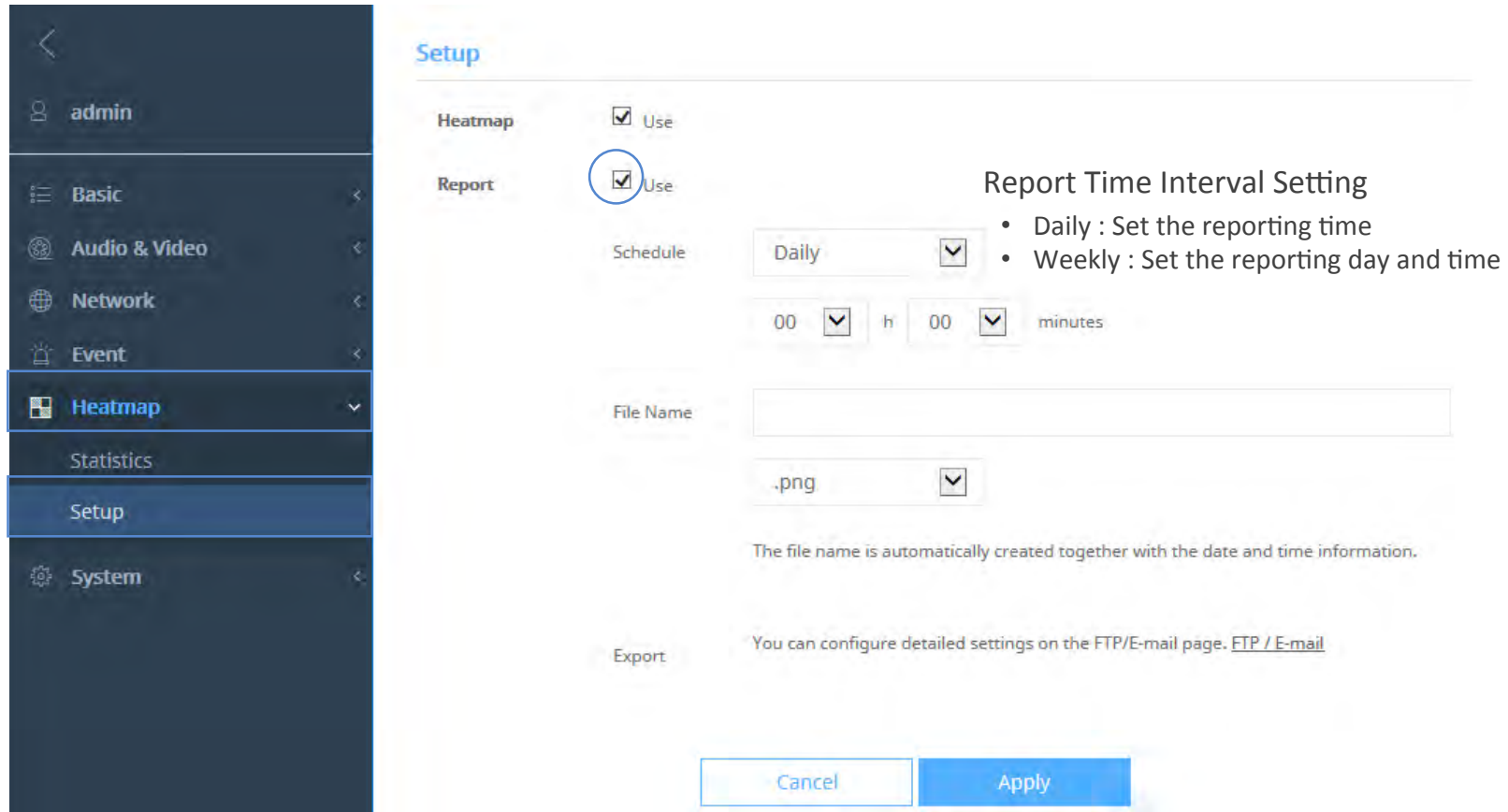


The screenshot displays a web-based interface for managing camera feeds. On the left is a dark sidebar menu with a back arrow, a user profile 'admin', and a list of categories: Basic, Audio & Video, Network, Event, Heatmap (selected), Statistics, Setup, and System. The main content area is titled 'Statistics' and contains a 'Search' section with filters for 'Date' (Recent, 1 Day), a calendar icon, and the date '2000-01-29'. Below the filters are 'Search' and 'Download' buttons. A note indicates 'Supported File Format : PNG'. The 'Results' section shows a camera feed labeled 'Camera' with a heatmap overlay. The heatmap uses a color scale from blue (low activity) to red (high activity), highlighting several people in the server room.



# Heatmap

- Report the Heatmap image periodically (E-mail/FTP)



The screenshot shows a web interface for configuring Heatmap settings. On the left is a dark sidebar menu with options: admin, Basic, Audio & Video, Network, Event, Heatmap (selected), Statistics, Setup (highlighted), and System. The main content area is titled 'Setup' and contains the following configuration options:

- Heatmap**:  Use
- Report**:  Use
- Schedule**: Daily (dropdown), 00 (dropdown) h 00 (dropdown) minutes
- File Name**: (empty text box)
- File Extension**: .png (dropdown)
- Export**: You can configure detailed settings on the FTP/E-mail page. [FTP / E-mail](#)

**Report Time Interval Setting**

- Daily : Set the reporting time
- Weekly : Set the reporting day and time

Buttons: Cancel, Apply

# Heatmap

---

- Recommended : Please delete the previous data if the main profile is modified or camera location/direction is changed.
  - Delete the Heatmap data : [Setup] > [Heatmap] > [Setup] > System management [Delete Data]
- Heatmap is intended to provide statistical data rather than real-time accuracy, moving objects or animals may be counted in the number of movement.
- The error of the measured data may be increased in specific locations.
- Measured data for Heatmap is saved on camera memory, not SD memory card.
  - You can use the Heatmap with out installing SD memory card on camera
  - If spare capacity is less than 2% of full memory capacity, system delete the oldest 1 day.
  - You can check the log when camera memory become full.
    - [Setup] > [System] > [Log] > [System Log] > Log type(Database Full)

# How to set the Digital Auto Tracking (1/2)

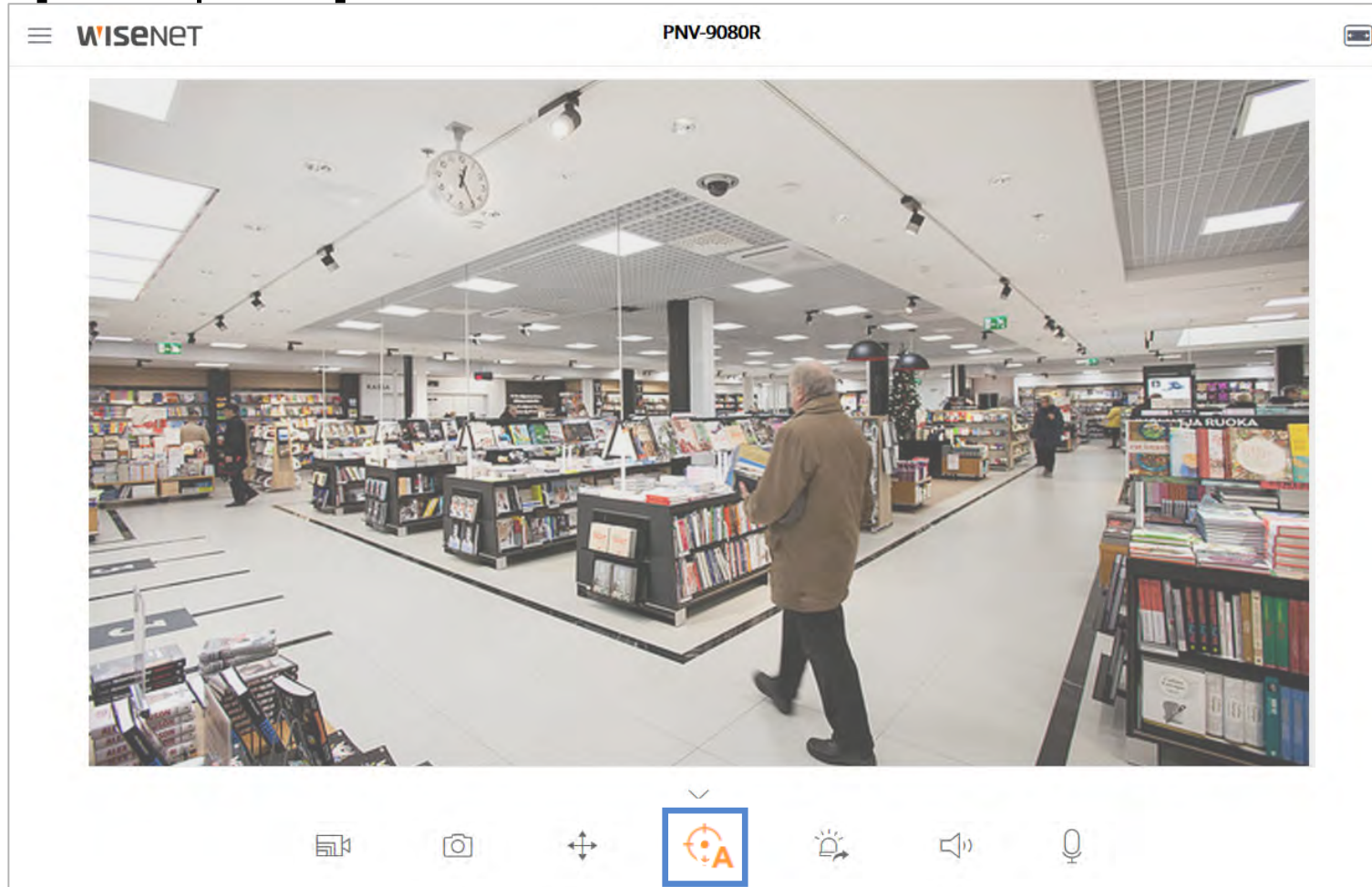
- Select the profile for using digital auto tracking mode
  - [Basic] > [Video profile] > Select the Video Profile > Check the DPTZ Profile

The screenshot displays the 'Video profile connection policy' configuration page. On the left, a navigation menu shows 'Basic' selected, with 'Video profile' highlighted. The main area includes a checkbox for 'Keep connection when profile setting is changed' and a table of video profiles. The 'H.264' profile is selected. Below the table, the 'DPTZ Profile' checkbox is checked and highlighted with a blue box, with an arrow pointing to the 'DPTZ Profile' label.

	Name	Codec	Type
<input type="radio"/>	MJPEG	MJPEG	Record / Event
<input checked="" type="radio"/>	H.264	H.264	Default
<input type="radio"/>	H.265	H.265	
<input type="radio"/>	PLUGINFREE	H.264	
<input type="radio"/>	MOBILE	MJPEG	

## How to set the Digital Auto Tracking (2/2)

- Turn on the Digital Auto Tracking
  - [Basic] > [Video profile] > Select the Video Profile > Check the DPTZ Profile



# Tampering Detection

**Level of detection**

100  
90  
80  
70  
60  
50  
40  
30  
20  
10  
0

+ 50 -

**Sensitivity** - 80 +

**Minimum duration (s)** - 10 +

**Except dark images**  Enable