VCA Function Guide

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Personal introduction:

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- Video Analysis Technology

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Smart IPC vs iDS IPC

	Smart IPC(4-series)	VCA Pro IPC(6-series)
Traversing Virtual Plane	●	●
Intrusion Detection	●	●
Enter Region Detection	●	●
Exit Region Detection	●	●
Rule Number	4	8
Advanced VCA Parameters Configuration		●
No-detecting Area		●
Rules Combination		●
Calibration		●
Scene Change Detection	●	●
Audio Detection	●	●
Face Detection	●	●
Defocus Detection	●	●
Network Access Number	20	20
Defog	●	●
Electronic Image Stabilization	●	●
P-Iris	●	
Auto Back Focus	●	●
Accuracy	**Medium**	**High**

Smart 1.0

- **Smart Codec**

- **Smart Detection(IPC 5.2.0)**
    - Face Detection
    - Intrusion Detection
    - Line Crossing Detection

- **Smart Control**

Smart 2.0

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- **■ Smart Codec**

- **■ Smart Detection(IPC 5.3.0)**

  - ☐ Face Detection

  - ☐ Intrusion Detection

  - ☐ Line Crossing Detection

  - ☐ Region Entrance Detection

  - ☐ Region Exiting Detection

  - ☐ Unattended Baggage Detection

  - ☐ Object Removal Detection

- **■ Smart Control**

Video Content Analysis Technology & Function

Video Content Analysis Technology

Video Content Analysis, which can also be called Intelligent Video Surveillance, is a technology that uses algorithms to automatically detect specific goals and locate related behaviors in images or videos.

Video Content analysis algorithm uses certain mathematical method to detect targets in the video image, to filter irrelevant interference targets, and to analyze the characteristics of objective movement. Combined with pre-set rules, it can also automatically output the corresponding event information based on the result of analysis. For example, target across the cordon defined by rules will trigger the alarm.

 Advantages of Video analysis algorithm
1.The analysis is done automatically by the algorithm , 7x24 hours.
2.The analysis algorithm can advance the prevention before the event, trigger alarm during the event, and offer evidence after the event, which can help to reduce manual work.

Face Detection

Face Detection

- **Recommended installation location**
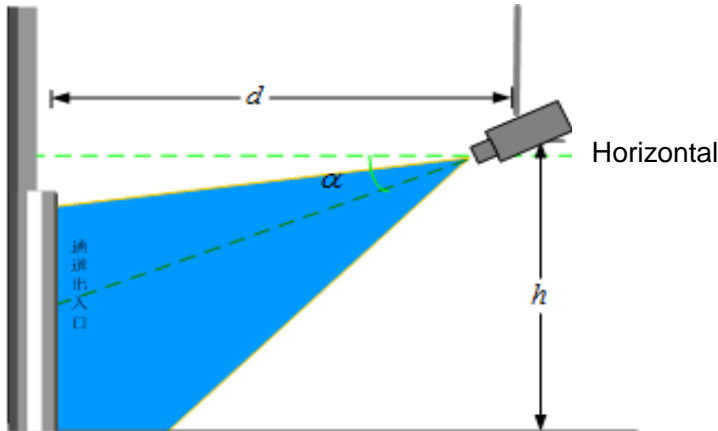
- Cameras should be installed in front of the passageway to snap front faces.

IPC Platform	level deflection angle	vertical deflection angle
R1 & R3	60 °	15°
Other	30 °	15 °

- Recommended height of installation is about **2.0-3.5** meters.

- Recommended depression angle of the camera(α) is **13** degrees.

- d is related to different focal lengths of selected camera lens, the focus is in the passageway entrance, and pixels between two eyes shouldn't less than **40**(for 2 million resolution), there is no limit for the maximum size.

Face Detection

■ Recommended installation location

(Take DS-2CD4024F as an example) :

Model	Monitoring width W/m	Distance U/m	Focal length/mm	Installation height h/m	Depression angle α/degree
DS-2CD4024F	2	3.3	8	2.3	10°±3°
	2	5	12	2.6	10°±3°
	2	6.7	16	2.9	10°±3°
	2	10.4	25	3.5	10°±3°
	2	14.6	35	4.3	10°±3°
	2	22.9	55	5.7	10°±3°
	2.5	4.2	8	2.4	10°±3°
	2.5	6.3	12	2.8	10°±3°
	2.5	8.3	16	3.2	10°±3°
	2.5	13	25	4	10°±3°
	2.5	18.2	35	4.9	10°±3°
	2.5	28.6	55	6.7	10°±3°

Face Detection

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☑ Enable Face Detection

☐ Enable Dynamic Analysis for Face Detection

Sensitivity ———————————————◻——————— 3

Check the box, and face target boxes will be displayed in the live view screen of iVMS4200.

The higher the value, the easier human faces will be detected.

Demo Video
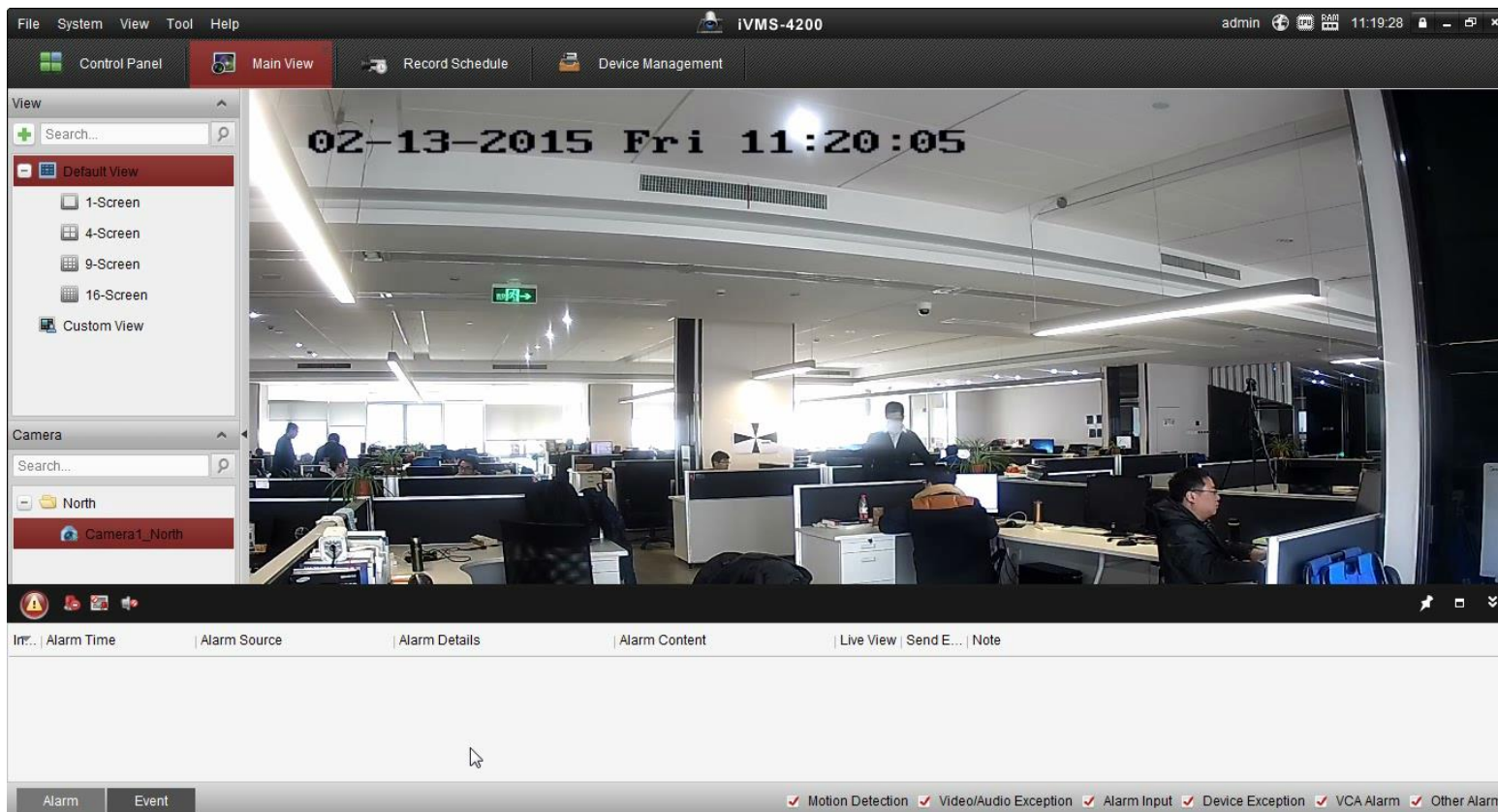
Behavior Analysis

Behavior Analysis algorithm process is as follows:

- Step 1: BGS Module models the background of input image, analyze the difference in values between the image and the background model, and output of the foreground image. Each pixel of the foreground image is expressed by 1 or 0, where 1 represents foreground points and 0 represents background points. Foreground points represents that targeted objects appear or disappear in that region.

Input image   **Foreground image**

BGS

Behavior analysis algorithm flow
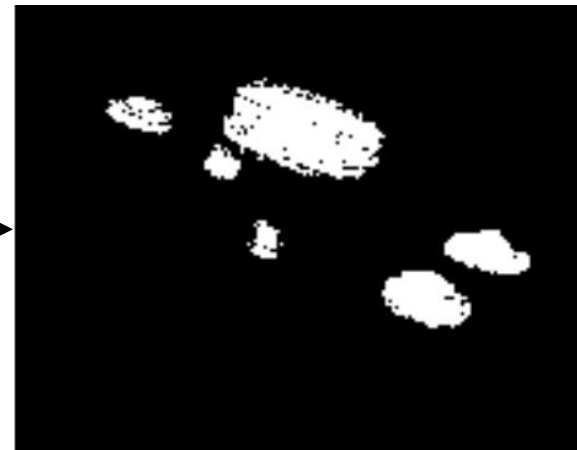
- Step 2: Analyzes the connectivity domain of output foreground image, targeted objects in the foreground image are continuous in space, one mass often corresponds to one video object.

Foreground image
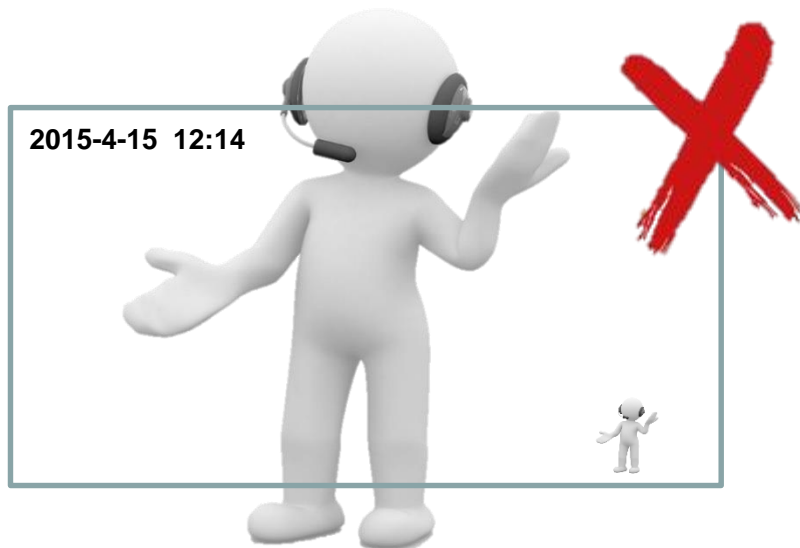
Target

CCL
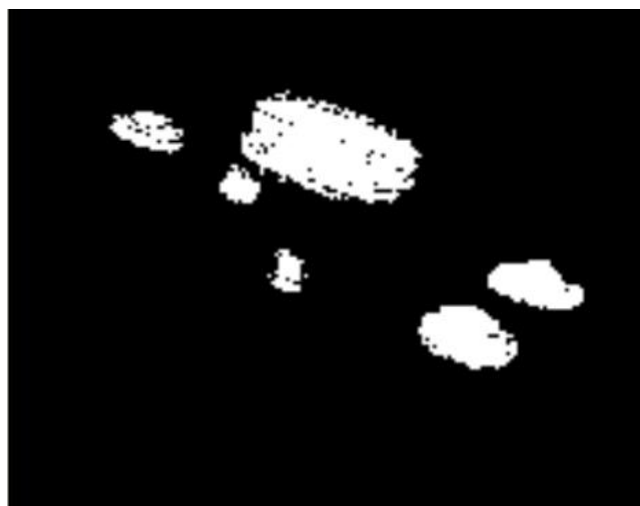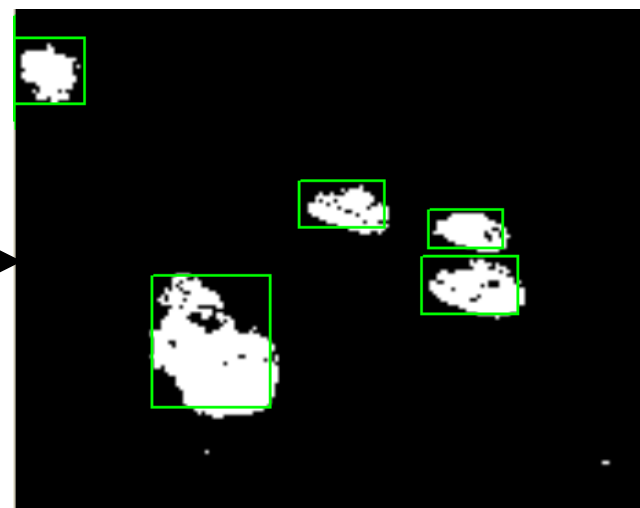
Camera installation

- Cameras should be installed in a fixed place, and too much sway will affect the accuracy of detection.

- The viewing angle of the camera should be generally greater than 15 degrees.

- When the WDR is off, backlighting scene such as sky should be avoided in the camera view.

- When the camera is mounted, the optical axis should be perpendicular to the travel detection of the target.

- Cameras indoors are recommended to be mounted on the wall crown. Cameras outdoors are recommended to be mounted 4-8 meters high, and installation height must be greater than the height of the fence.
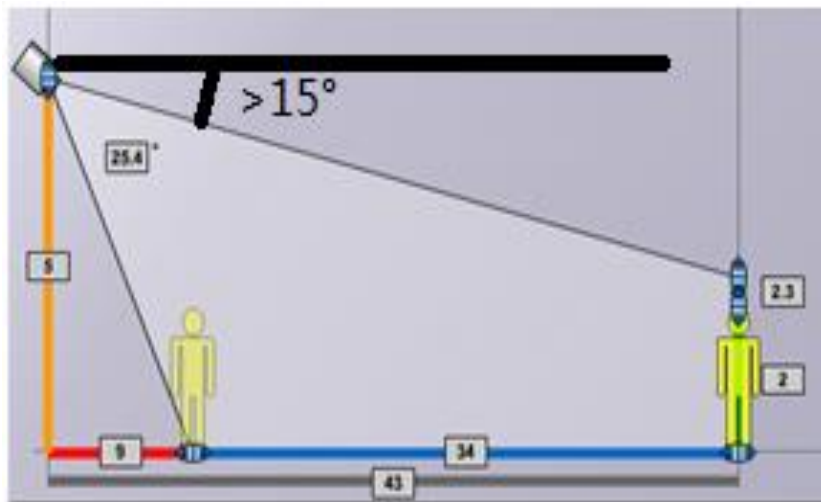
Camera installation

- Target size is recommended to be shorter than 50% of the scene size. The height is recommended to be more than 10% of scene height.

- Avoid to deploy cameras in scenes with excessive and fast changing light.

- Avoid scenes with glass, tiles, and other reflective objects.

- Avoid scenes with many winged insects.

- Camera image quality should has good clarity and good contrast in both daytime and nighttime. If there is insufficient light at night, you need to use infrared light to compensate, make sure that the target will go across the lighting area.

2015-4-15 12:14

2015-4-15 12:14
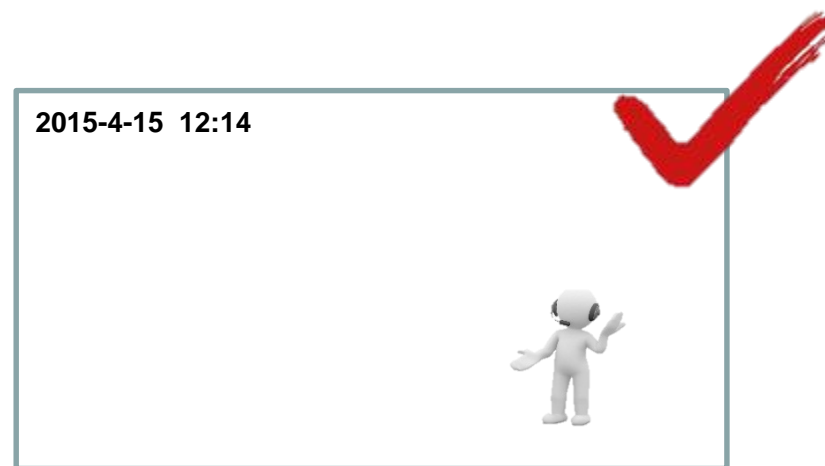
Too Big & Too small

Inappropriate Scenes

Too dark

Too crowded

Target too big

Leaves

The scene is too level, and target motion in the picture is not obvious.

Light changes a lot

Line Crossing Detection

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☑ Enable Line Crossing Detection

Line [1 ▼]

Demo Video

Draw Area   Clear

| Direction | A->B ▼ |

Sensitivity ——○—— [50]

Direction:

A->B：Targets that moving from A to B will trigger alarm.

B->A：Targets that moving from B to A will trigger alarm.

A<->B：Targets that moving between A and B will trigger alarm.

Line Crossing Detection

☑ Enable Line Crossing Detection

Line [1 ▼]

Draw Area   Clear

Direction   [A->B ▼]

Sensitivity ———○——— [50]

Sensitivity:
Sets the minimum size of the target.
The sensitivity decreases from upper left to bottom right corner of the Screenshot below. In order to prevent alarm missing, practical sensitivity values **should** be set 10 to 20 bigger than the values for reference.

Sensitivity:
100 90 80 70   60   50   40

30

20   10

Line Crossing Detection
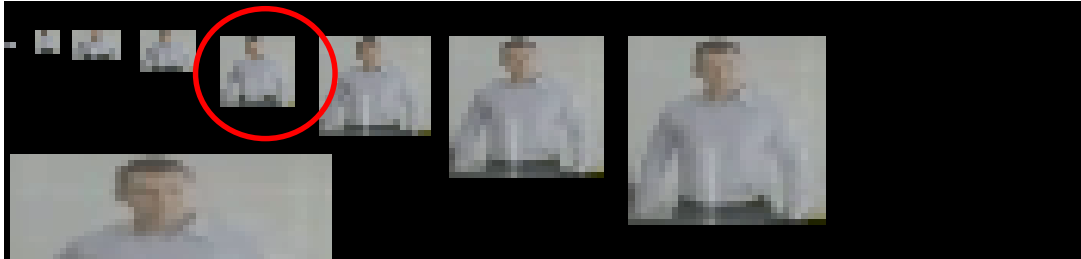
Sensitivity:

Example：

Sensitivity should be modestly adjusted lower if you want vehicles instead of the pedestrian in the lower left corner to trigger the alarm. Boxes in the picture are schematic representations of the area.

Skill:

When a smaller targets trigger false alarms, reducing the sensitivity modestly can remove the alarm generated by small moving targets.

Intrusion Detection

Region   1 ▼

Demo Video

02-12-2015 Thu 16:00:59   #1#   Camera 01

02-12-2015 Thu 17:32:10   Camera 01
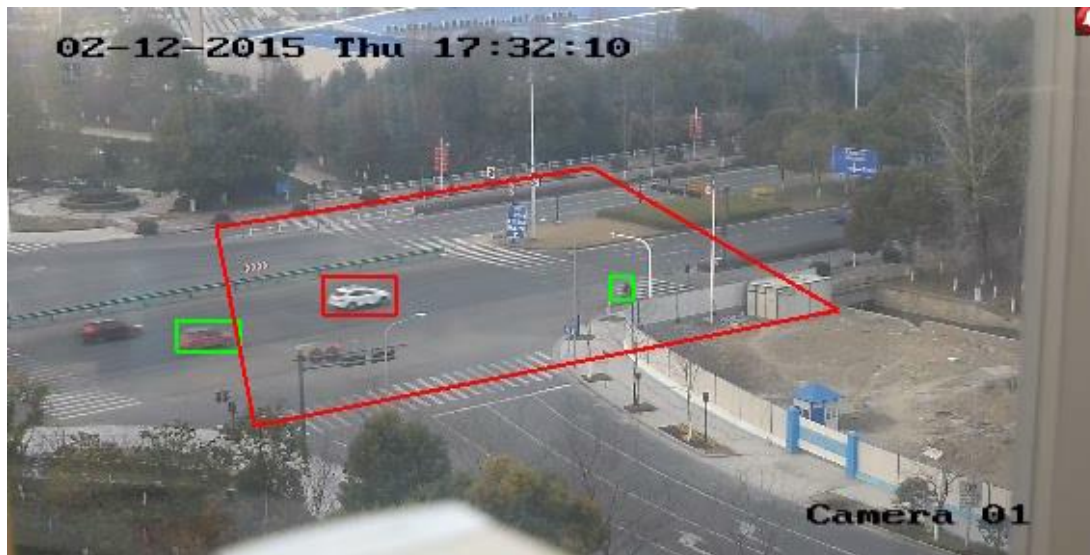
Stop Drawing   Clear

Threshold   0 s
Sensitivity   50
Percentage   1

Threshold:
The threshold for the time of the object loitering in the region. Alarm will be triggered immediately after the object entering the region if length of time exceeds the threshold. The unit time is 1 second.

Sensitivity：
The value of the sensitivity defines the size of the object which can trigger the alarm, when the sensitivity is high, a very small object can trigger the alarm. Sensitivity can be used to eliminate false alarms generated by small targets.

Intrusion Detection

Percentage：
To set the smallest proportion target can occupy **the detection area**. When the target is bigger than the minimum size and occupies enough proportion of the protected area, it will trigger the alarm.

Example：
When the percentage is set to 50, alarm will only be triggered when the moving target is bigger than 50% of the protected area.

Skills：

Percentage can be used to eliminate false alarms generated by targets which are not fully enter the protected area. Percentage can be used to eliminate false alarms generated by small targets entering the protected area.

Line Crossing or Intrusion Detection ?

Case Study: As the picture shows below, when someone gets over the fence and enter into the yard, alarms should be triggered. But there are always some people in the yard entering and leaving the protected area, alarms shouldn't be triggered in this case.

Solution 1: If you draw a protected area as the following picture shows, setting the rule as intrusion detection, people acting normally in the yard will trigger the false alarm.
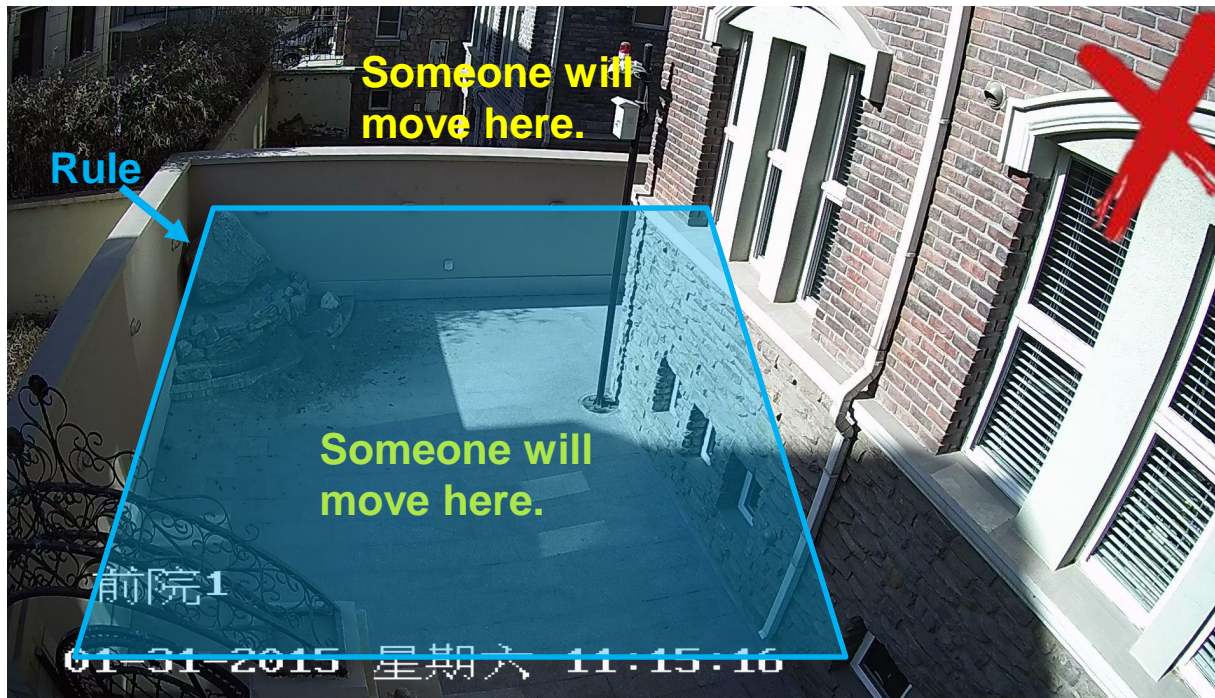
Line Crossing or Intrusion Detection ?

Solution 2: As the picture shows below, draw lines over the fence and set line crossing rules. In this way, people inside or outside the yard acting normally will not trigger the alarm, but only people who get over the fence will trigger the alarm. In this case, Line Crossing rather than Intrusion Detection can improve the accuracy of the detection.

Line Crossing or Intrusion Detection ?

Case Study: As the picture shows below, entry into the garage is prohibited at night, anyone entering will trigger the alarm.

Solution 1: As is shown below, draw Line Crossing Rules all around the garage. As lines are too close to the video edge, camera will not be able to detect fast moving target when it enters the garage, which will cause missing alarms. (When the camera detects a moving target, green 'Target box' around the target can be seen via iVMS4200.)

Rule

Line Crossing or Intrusion Detection ?

Solution 2: As shown below, draw the area with intrusion detection rules, even the target(produce green target box) which wasn't detected when entered the protected area will still trigger the alarm. Alarm condition : As long as moving targets occur in the protected area and stay for more than the preset time, an alarm will be triggered. **Tip:** Intrusion Detection rather than Line Crossing Detection is recommended here, because Intrusion Detection can reduce missing alarms more effectively.

Region Entrance Detection

☐ Enable Region Entrance Detection

Region [1 ▼]

Demo Video
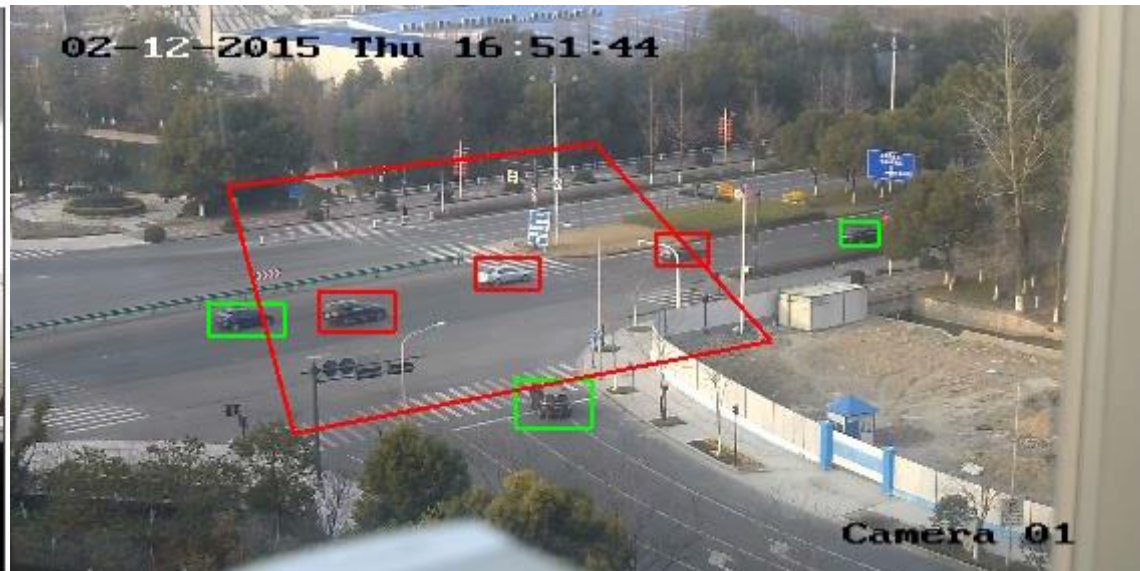
Draw Area | Clear

Sensitivity [———◻——] 50

Sensitivity:
Sets the minimum size of the target.
Skill：

Higher value of sensitivity will make smaller object trigger the alarm.

Intrusion Detection has lower missing alarm rates compared to Line Crossing Detection function, so Intrusion Detection are recommended.

Region Exiting Detection

Enable Region Exiting Detection

Region   1 ▾

Camera 01

Draw Area   Clear

Sensitivity   ——○——   50

Demo Video

Camera 01

Sensitivity:
Sets the minimum size of the target.

Skill：

Higher value of sensitivity will make smaller object trigger the alarm.

Region Exiting Detection Application

Case Study: As the picture shows below, the guard can not leave the protected area, otherwise an alarm will be triggered.

Solution： Draw a detecting area in the region where the guard is on duty, and set a' Region Left 'rule. An alarm will be triggered when the guard leaves the area. It is recommended to avoid ordinary passengers who may cause false alarms when passing the area.
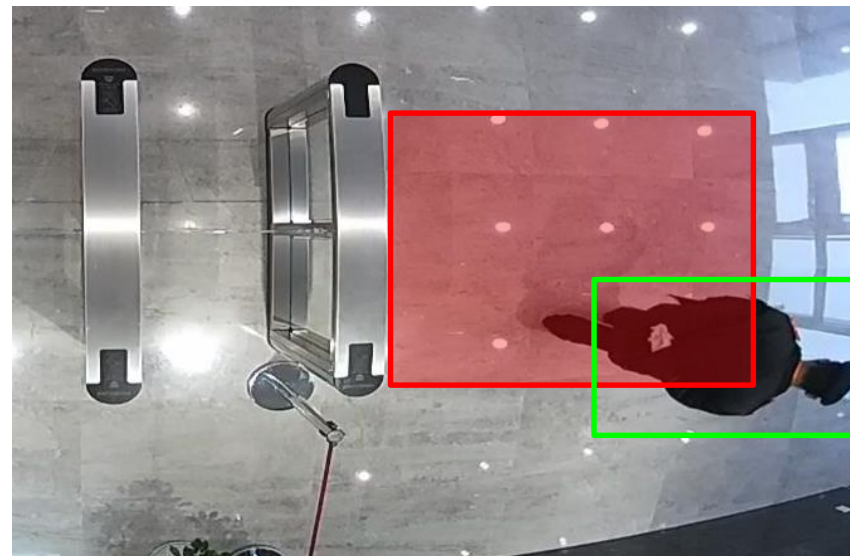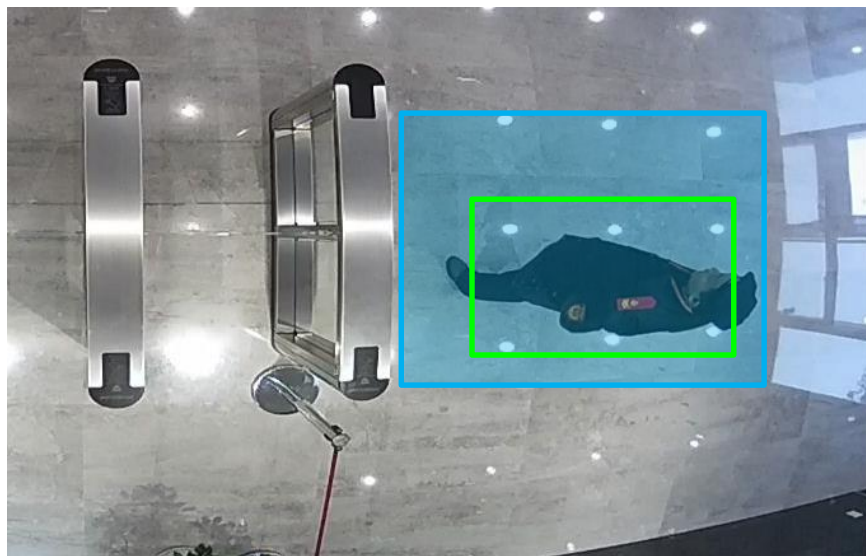
Unattended Baggage Detection

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Region: 1

Demo Video

Draw Area   Clear

Threshold   5 s
Sensitivity   50

Threshold:
Alarm will be triggered immediately after the object being taken away if length of time exceeds the threshold.

Sensitivity:
Sets the minimum size of the target.

Skill：
Higher value of sensitivity will make smaller object trigger the alarm.

Object Removal Detection

Region   1 ▼

02-10-2015 Tue 16:17:11

Camera 01

Draw Area   Clear

Threshold   5   s

Sensitivity   50

Demo Video

02-12-2015 Thu 21:19:47

Camera

Threshold:

After the article was taken away after an alarm over the time.

Sensitivity:

Sets the minimum size of the target.

Skill：

Higher value of sensitivity will make smaller object trigger the alarm.

Project cases

Project Requirements: An alarm should be triggered when someone is detected near the pumping unit.

Rule Type: Intrusion Detection
Rule Set Tip: Draw rules near the pumping unit, avoiding moving parts of itself.

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Project cases

Project Requirements: When someone is detected getting over the fence, an alarm should be triggered.
Rule Type: Intrusion Detection
Rule Set Tip: Draw rules near the fence, when target person gets over the fence, the body detection box will be located in the detected zone and an alarm will be triggered.

Project cases

Project requirements: When someone is detected to get over the fence, an alarm should be triggered.
Rule Type: Line Crossing
Rule Set Tip: Draw a line at the top of the wall, when someone gets over the fence and come cross the line, an alarm will be triggered.

Project cases

Project requirements: When someone is detected to enter the garden at night, an alarm should be triggered.
Rule Type: Intrusion Detection
Rule Set Tip: Draw zones according to the picture below, arming at night, disarming during the day. When someone enters, an alarm will be triggered.

Smart Playback Video

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■ Smart Playback supports three types of smart search: line crossing, intrusion detection, and motion detection.

Demo Video

03-31-2014 Mon 19:04:46

Background

Event Playback Video

- Event playback supports three types of event search: alarm input, motion detection, and VCA events.
Demo Video
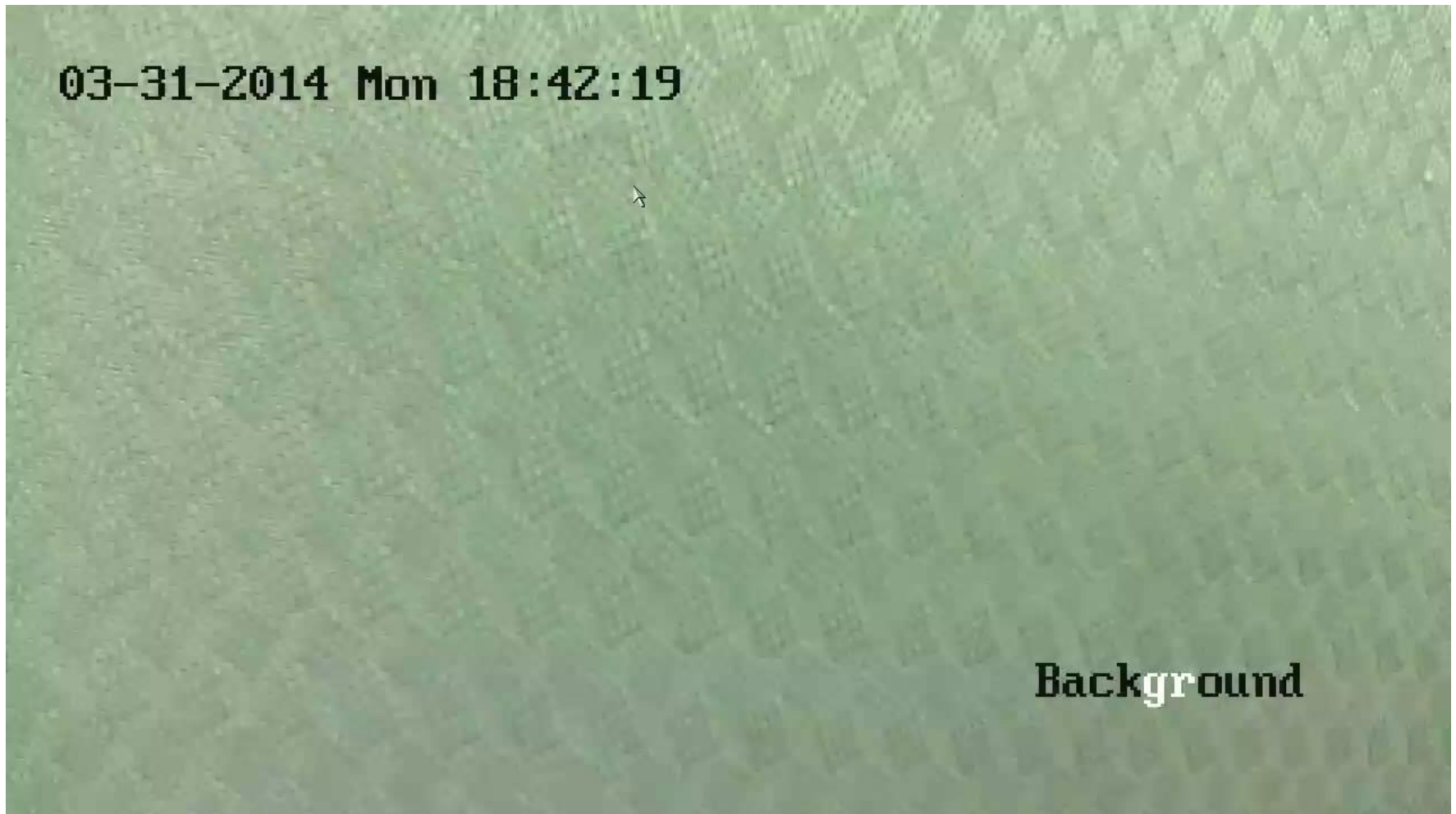
Event Backup Video

■ Event backup supports three types of event search: alarm input,
motion detection, and VCA events.
Demo Video

03-31-2014 Mon 18:43:04

Background
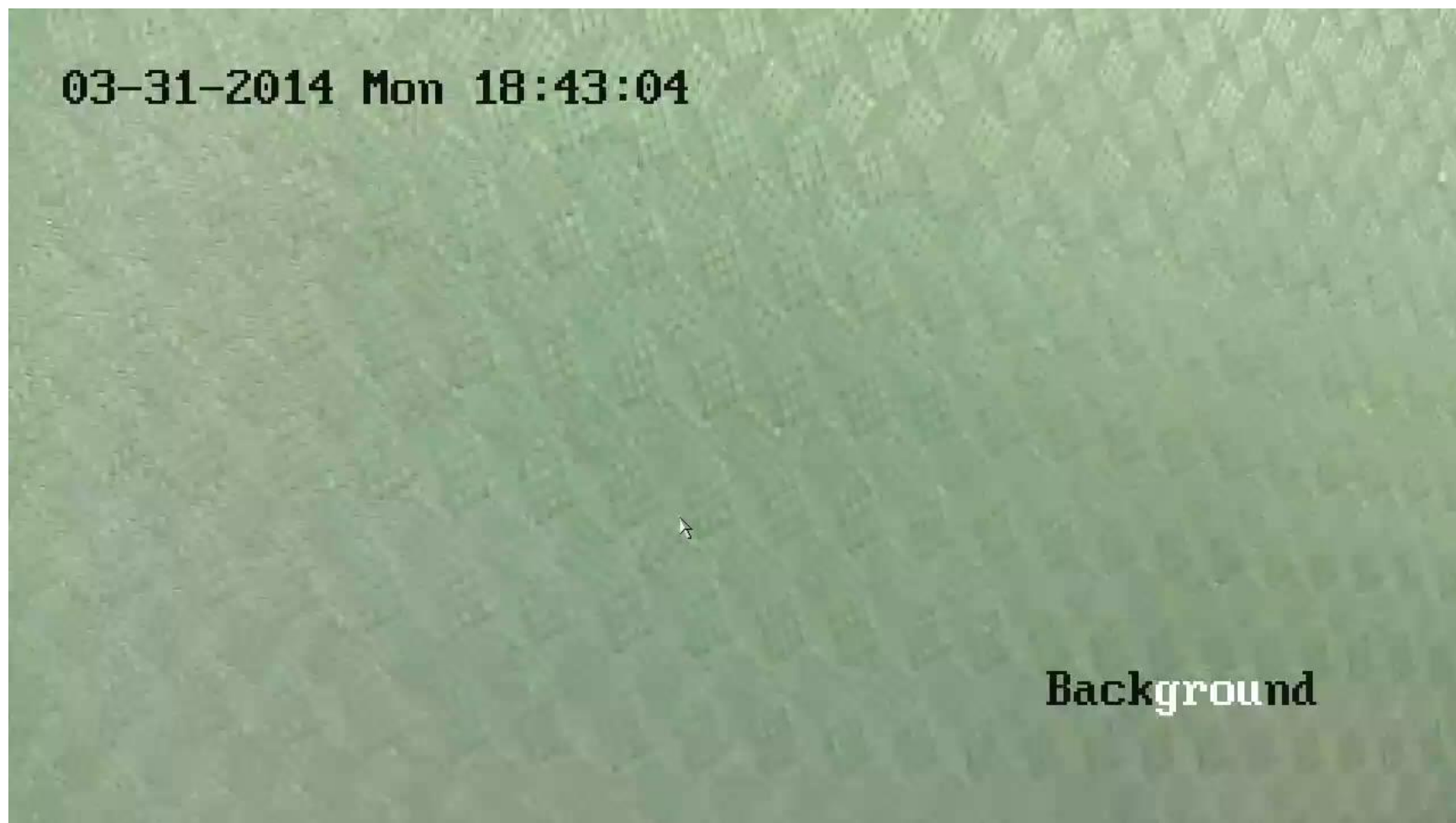
Q&A

VCA Configuration
@ ivms-4200 & NVR

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VCA Rule Config @ ivms-4200

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How to start VCA rule config in ivms-4200 ?

For Smart IPC

For iDS IPC

Tips:
"VCA Config" will merge into "Remote Config" in the later 4200 version.
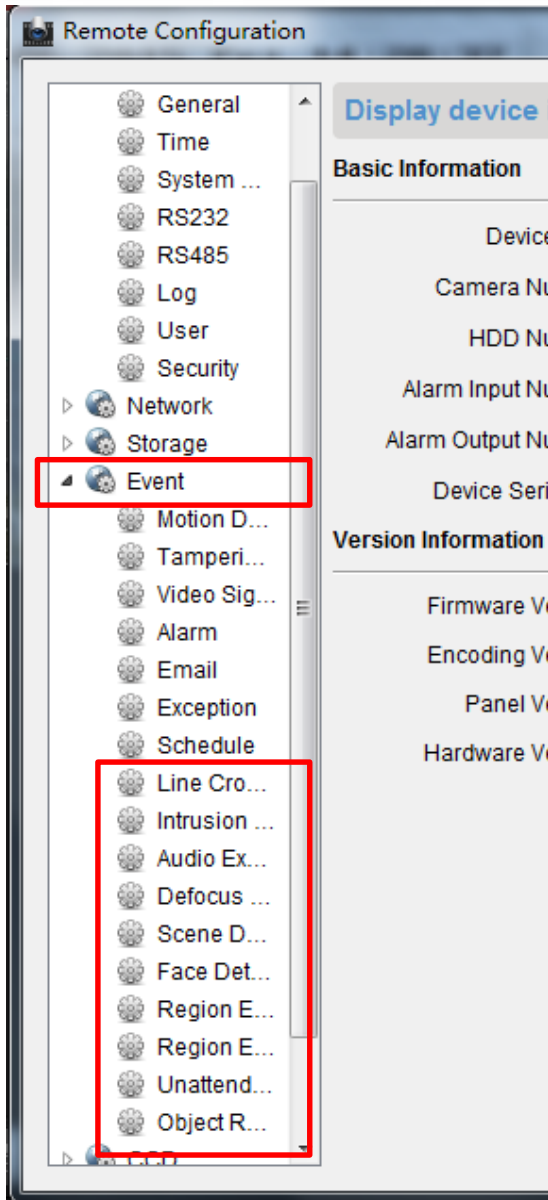
Tips:
1. Remote Configuration -> Event ->
Line Crossing
Intrusion

....

VCA Rule Config @ ivms-4200

Configure Line Crossing Detection.

Camera: Camera1

03-06-2015 Fri 14:32:12

B
A

Camera 01

Sensitivity

Arming Schedule: All-day Template

Linkage Method

☑ Notify Surveillance Center   ☐ Email Linkage

☐ Upload Captured Pictures to FTP
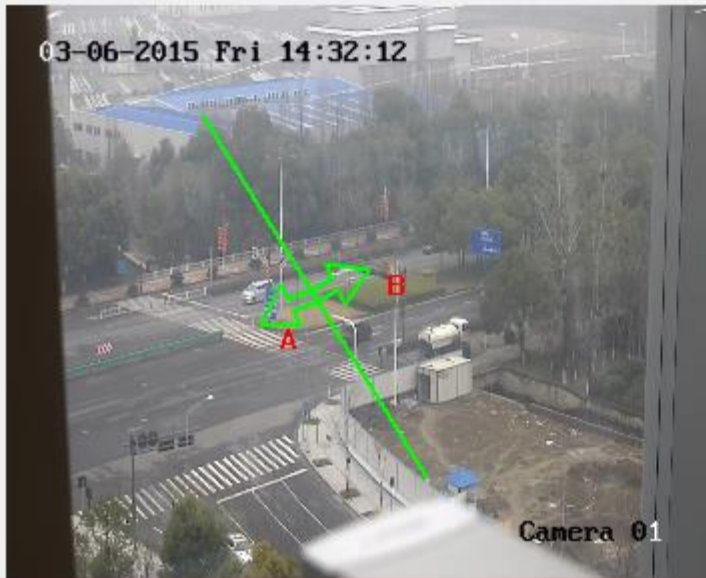
☑ Enable Traverse Plane Detection

Guard Line ID: Guard Line1

Direction: A<->B

☐ Trigger Alarm Output

☐ All

☐ A->1

Triggered Camera

☐ All

☐ Camera01

Apply

Key Settings.

Configuration pages in ivms-4200 are similar with the pages in IPC's Web Client.

Please refer to Smart IPC's Web Client's config guide.

Alarm information

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The information of recent alarms and events can be displayed in Alarms and Events Toolbar on the bottom of Main View interface.

Alarm pictures

Alarm Snapshot: Snapshot captured automatically when an intelligent alarm is triggered.

Function : Alarm Snapshot can help us determine the cause of the alarm，eliminate false alarms, and improve the accuracy rate of alarms.

Alarm pictures in iVMS4200

1. When installing the iVMS-4200, check the checkbox **Storage Server** to enable the installation of storage server.
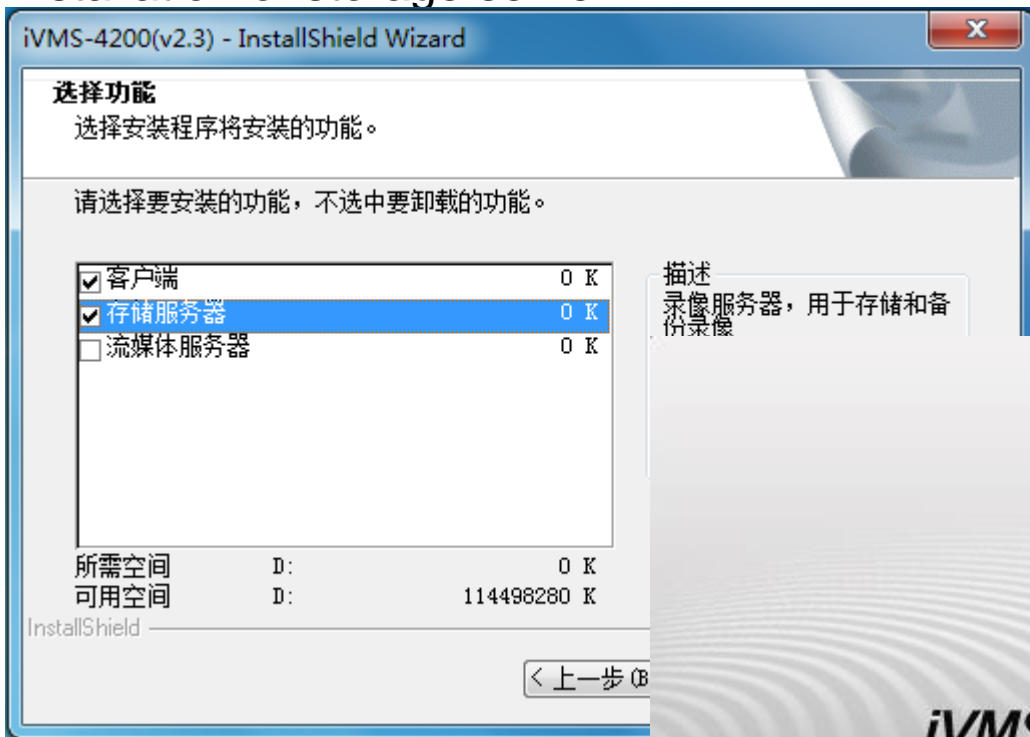
Alarm pictures

2. Right-click the storage server icon in the lower right corner of the desktop, and select HDD Quota Settings.
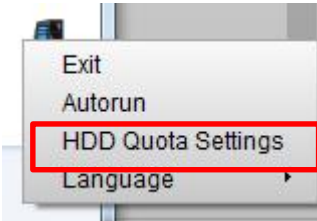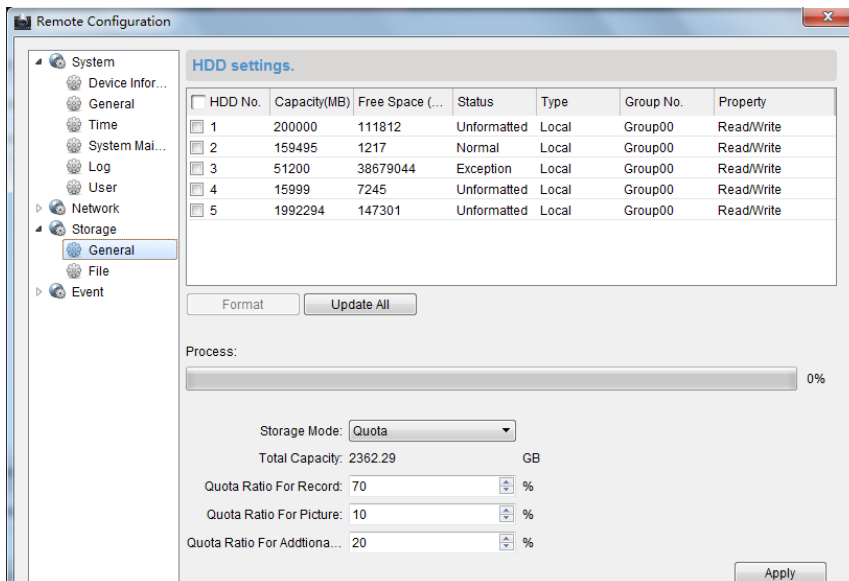

3. Allocate space quota for each type of storage.
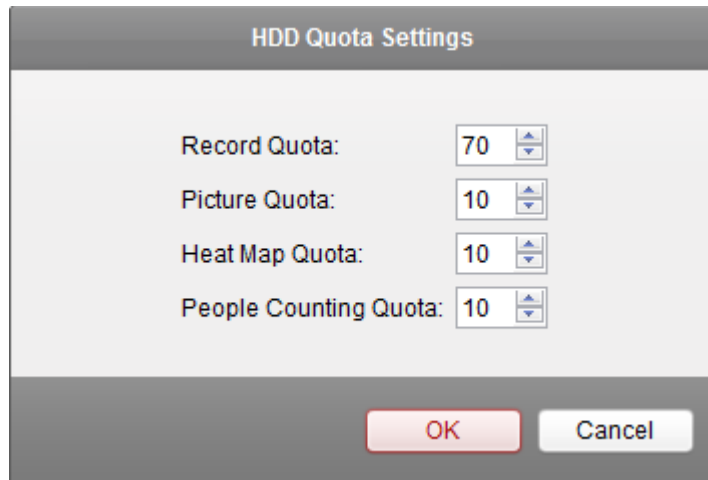
4.Run the iVMS4200, open the Device Management page, and click the Server tab to add the storage server.
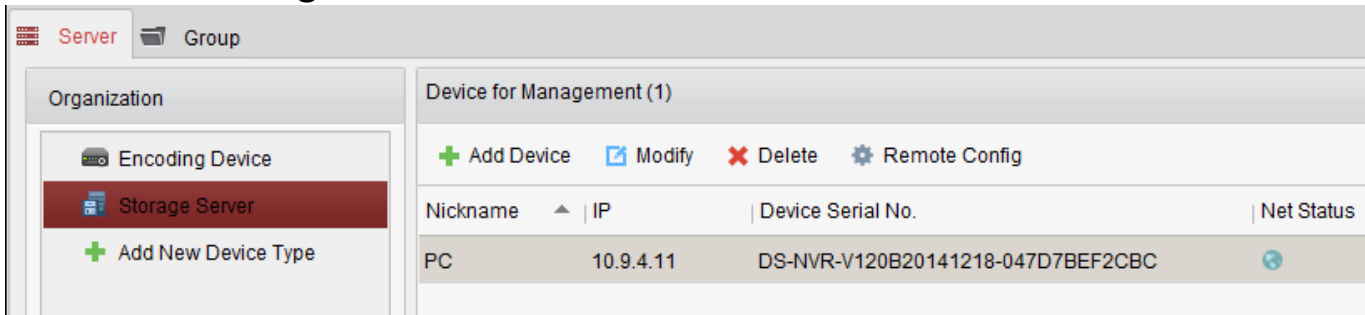
5.Open the remote configuration interface of storage server, go to Storage > Gerenal, and select a hard drive **Format** to format, which will not wipe out existing data. The hard disk will appear **Normal** after formatting.

6.Open the Record Schedule page in iVMS4200, select the storage server tab, and select the previously configured Server from the drop-down list as the storage server. Check the checkbox Picture Storage on the right.

Alarm pictures

7. The information of recent alarms and events can be displayed in the Alarms and Events Toolbar, you can click the live view icon to get the alarm picture of the alarm triggered camera.

In...	Alarm Time	Alarm Source	Alarm Details	Alarm Content	Live View	Send E...	Note
488	2015-02-11 11:42:25	Encoding Device:North Cam...	Camera: Camera1_North Trigge...	Line Crossing Detection Alarm	●	✉	
487	2015-02-11 11:42:24	Encoding Device:North Cam...	Camera: Camera1_North Trigge...	Line Crossing Detection Alarm	●	✉	

VCA Config @ NVR

- Smart Playback

- Event Playback

- Event Backup

Live Demo

Q&A