Intelligent Video Surveillance Server

Quick Start Guide

V2.1.0

General

This manual describes the structure, function and operation of intelligent video surveillance server (IVSS).

Model

8-HDD, 12-HDD, 16-HDD, and 24-HDD.

Safety Instructions

The following categorized signal words with defined meaning might appear in the Manual.

Signal Words	Meaning
	Indicates a high potential hazard which, if not avoided, will result in death or serious injury.
	Indicates a medium or low potential hazard which, if not avoided, could result in slight or moderate injury.
	Indicates a potential risk which, if not avoided, could result in property damage, data loss, lower performance, or unpredictable result.
©TIPS	Provides methods to help you solve a problem or save you time.
NOTE	Provides additional information as the emphasis and supplement to the text.

Revision History

Version	Revision Content	Release Time
V2.1.0	Add video structuring, vehicle recognition, and vehicle comparison functions.	April 2019
V2.0.1	Add attention in important safeguards and warnings.	January 2019
V2.0.0	Update figures of 16-HDD series IVSS.	December 2018
V1.0.0	First release.	November 2018

Privacy Protection Notice

As the device user or data controller, you might collect personal data of other such as face, fingerprints, car plate number, Email address, phone number, GPS and so on. You need to be in compliance with the local privacy protection laws and regulations to protect the legitimate rights and interests of other people by implementing measures include but not limited to: providing clear and visible identification to inform data subject the existence of surveillance area and providing related contact.

About the Manual

- The Manual is for reference only. If there is inconsistency between the manual and the actual product, the actual product shall prevail.
- We are not liable for any loss caused by the operations that do not comply with the manual.
- The manual would be updated according to the latest laws and regulations of related regions. For detailed information, see the paper manual, CD-ROM, QR code or our official website. If there is inconsistency between paper manual and the electronic version, the electronic version shall prevail.
- All the designs and software are subject to change without prior written notice. The product updates might cause some differences between the actual product and the manual. Please contact the customer service for the latest program and supplementary documentation.
- There still might be deviation in technical data, functions and operations description, or errors in print. If there is any doubt or dispute, please refer to our final explanation.
- Upgrade the reader software or try other mainstream reader software if the manual (in PDF format) cannot be opened.
- All trademarks, registered trademarks and the company names in the manual are the properties of their respective owners.
- Please visit our website, contact the supplier or customer service if there is any problem occurred when using the device.

Important Safeguards and Warnings

The following description is the correct application method of the Device. Read the Guide carefully before use to prevent danger and property loss. Strictly conform to the Guide during application and keep it properly after reading.

Operating Requirement

- Do not place and install the Device in an area exposed to direct sunlight or near heat generating devices.
- Do not install the Device in a humid, dusty or fuliginous area.
- Install the Device at stable places horizontally.
- Make the Device stay away from liquid.
- Install the Device at well-ventilated places; do not block its ventilation opening.
- Use the Device only within rated input and output range.
- Do not dismantle the Device arbitrarily.
- Transport, use and store the Device within allowed humidity and temperature range.

Power Requirement

- Be sure to use the designated battery type. Otherwise there may be explosion risk.
- Be sure to use batteries according to requirements; otherwise, it may result in fire, explosion or burning risks of batteries!
- To replace batteries, only the same type of batteries can be used.
- Be sure to dispose the exhausted batteries according to the instructions.
- The product shall use electric wires (power wires) recommended by this area, which shall be used within its rated specification.
- Be sure to use standard power adapter matched with this device. Otherwise, the user shall undertake resulting personnel injuries or device damages.
- Use power supply that meets SELV (safety extra low voltage) requirements, and supply power with rated voltage that conforms to Limited Power Source in IEC60950-1. For specific power supply requirements, please refer to device labels.
- Products with category I structure shall be connected to grid power output socket, which is equipped with protective grounding.
- Appliance coupler is a disconnecting device. During normal use, keep an angle that facilitates operation.

Attention

Al module does not support hot plug. If you need to replace the Al module, unplug the device power cable first. Otherwise, it will lead to file damage on the Al module.

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Overview

1.1 Introduction

Intelligent video surveillance server (IVSS) is compatible with most video surveillance products. Based on deep learning technology, IVSS has AI functions including human face recognition, and features extraction.

- Supports general system settings, video surveillance, video storage, alarm settings, log management, record search and playback, intelligent analysis (such as human face real-time recognition, search human face by specified image and then play back video).
- User-friendly interface.
- Supports 4K and H.265 decoding, meeting the main development trend of current market.
- Widely used in intelligent building, large parking lot, safe city project, financial planning area, and so on.

1.2 Login Mode

The device supports local, web and IVSS client operation. For details, see Table 1-1.

Operations and system configurations in the Guide are mainly based on IVSS client. There might be differences from local or web operation, and the actual interface shall prevail.

Login Mode	Operation	Description
Local login	Connect the display, mouse and keyboard to the device. View and operate the local menu on the display.	Support all functions of the device.
Web login	Connect the device and PC into the same network, and remotely access the device through browser (Google Chrome and Firefox) on PC.	Support majority functions of the device, except live preview, record playback and video-related function.
IVSS client login	Connect the device and PC into the same network, download and install IVSS Client on PC, and then remotely access the device with IVSS Client.	Support all functions of the device.

Table	1-1	Login	mode
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2 The Grand Tour

It is to introduce front panel, rear panel, port function and button function, indicator light status, and so on.

This section takes 16-HDD for example. For other models, refer to user's manual.

2.1 Front Panel



Figure 2-2 Front panel without LCD



Table 2-1 Front panel description

No.	Name	Description	
		Once the front panel lock is secure, it can prevent HDD from being	
1	stolen or removed by mistake. Unlock the front panel lock and remove		
		the front panel, you can view 16 HDD slots. See Figure 2-2.	
		Boot up or shut down device. The power on/off button has the	
		indicator light. It can display device running status.	
2	Power on/off	• When device is off (indicator light is off), press the button for a	
2	button	short period to boot up device.	
		• When device is running, (blue indicator light is on), press the	
		button for at least 4 seconds to shut down the device.	

No.	Name	Description		
3	System status	Displays the system running status.The blue light is on: Device is running properly.		
	indicator	• The indicator light is off: The device is not running.		
4	Alarm indicator light	 Displays local input alarm status. Red indicator light is on: There is local alarm input event. The indicator light is off: There is no local alarm input event. 		
5	Network indicator light	 Displays current network status. The indicator light is blue: It means at least one Ethernet port has connected to the network. The indicator light is off: No Ethernet ports are connected to the network. 		
6	USB port	Connects to external devices such as USB storage device, keyboard and mouse.		
7	16-HDD slot	After you remove the front panel, you can see there are 16 HDDs. From the left to the right and from the top to the bottom, it ranges from 1–4, 5–8, 9–12, and 13–16. There are two indicator lights on the HDD slot: HDD indicator light and HDD read/write indicator light.		
		 HDD indicator light. The light is yellow after you instant the HDD. Read/write indicator light. The blue light flashes when it is reading and writing data. 		

2.2 Rear Panel



No.	Name	Description	
1	Power input	Inputs AC 100V-240V power.	
1	port		

No.	Name	Description		
		Displays AI module status.		
2 AI module indicator light		 The yellow light flashes: AI module is running properly. The yellow light is on: AI module is malfunctioning. This function is valid if there is AI module. 		
3	RESET button			
4	HDMI port	Reserved.High definition audio and video signal output port.The port outputs the uncompressed high definition video andmulti-channel audio data to the connected display with HDMI port.The three HDMI ports are different source output.		
5	VGA port	VGA video output port. Output analog video signal. It can connect to the monitor to view analog video. The VGA port and HDMI 1 port are same source output.		
6	RS-232 port	RS-232 COM debug. It is for general COM debug, set IP address, transmit transparent COM data.		
7	AUDIO IN	Audio input port		
7	AUDIO OUT	Audio output port		
8	eSATA port	SATA peripheral port. Connect to SATA port or eSATA device.		
9	USB port	Connects to external devices such as USB storage device, keyboard and mouse.		
10	SAS port	SAS extension port. It can connect to the SAS extension controller.		
11	Network port	10M/100/1000Mbps self-adaptive Ethernet port. Connect to the network cable.		
12	Alarm input	 16 groups (1–16) alarm input ports, they are corresponding to ALARM 1–ALARM 16. The alarm becomes valid in low level. A and B: Control the A/B cable of the RS-485 device. It is to connect to the PTZ camera. Connect in parallel 120Ω between A/B cables if there are too many PTZ decoders. : GND end. 		
	Alarm output	 8 groups of alarm output ports (NO1 C1–NO8 C8). Output alarm signal to the alarm device. Make sure there is power to the external alarm device. NO: Alarm output port of Normally Open type. C: Common alarm output port. <u>—</u>: GND end. 		

2.3 Dimensions

Figure 2-4 Dimensions with LCD (mm[inch])





The Grand Tour 4





This section introduces HDD installation, cable connection, and so on.

Some series product is heavy. It needs several people to carry or move jointly to prevent person injury.

3.1 Installation Flow

Refer to Figure 3-1 for installation flows. Please follow the steps to install.



3.2 Unpacking the Box

When you receive the Device, check against the following checking list. If any of the items are missing or damaged, contact the local retailer or after-sales engineer immediately.

No.	Name		Contents
1 Whole package		Appearance	There is any visible damage or not.
		Package	There is any accidental clash during transportation or not.
	Accessories (list of accessories on the warranty card)	They are complete or not.	
		Appearance	There is any visible damage or not.
2 D	Device	Device model	The model is the same as ordering contract or not.
		Device	It is torn or not.
		The label on the device	Do not tear off, or discard the label. Usually you need to show the serial number when requiring after-sales service.

3.3 HDD Installation

The section introduces the detailed operations to install HDD.

 \square

- If you have not pushed the HDD box to the bottom, do not close the handle to avoid any damage to the HDD slot.
- Different models support different HDD numbers. See the actual situation.

3.3.1 12-HDD Series

Installing HDD



Removing HDD

таалалалан в		
① Press the button on the front panel of IVSS device,	② On the back of the HDD box, press hard on the position	③ Take out the HDD and reinsert the box to the slot.
open the handle, and then pull out the HDD box.	indicated by the arrow.	Push it to the bottom and close the box handle.

3.3.2 16/24-HDD Series

Installing HDD



①Press the button on the front panel of IVSS device, open the handle, and then pull out the HDD box.	② Put the HDD into the box along the direction shown in the figure.	 ③ Lock the screws on the back of the HDD box. Insert the box into the HDD slot, push it to the bottom, and then close the handle. In the figure, you only need to lock one set of the screws (Group A or Group B). See the actual situation.
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Removing HDD

Button		
	② Unlock the screws on the	
① Press the button on the front panel of IVSS device,	back of the HDD box.	③ Take out the HDD and reinsert the box to the slot.
open the handle, and then	The screws are at different	Push it to the bottom and close
pull out the HDD box.	positions for different HDDs.	the box handle.
	See the actual situation.	

3.4 Connection Diagram

This section takes connecting 16-HDD series device for example. See Figure 3-2. The connection steps may vary depending on the device, and the actual device shall prevail.

- Display, mouse and keyboard are needed for local operation.
- Before using the smart detection functions such as face detection and face recognition, you shall install the AI module first.

Figure 3-2 Connection diagram



4 Turning on the Device

- Before the boot up, make sure the input voltage matches the device power requirement.
- To ensure stable operation of the device and prolong service life of HDD, provide stable voltage with less ripple interference by reference to international standard.
- For device security, connect other cables of the device first, and then connect the device to the power socket.

Boot-up might vary depending on the model you purchased.

- 8-HDD series product: Press the power button on the rear panel to boot up device.
- For other series products:
 - ♦ Connect to the power socket to boot up device.
 - After clicking shutdown button on the GUI to turn off the device, press the power button for a short period of time to boot up device.

5 Initial Settings

For first-time use, you need to initialize the device, set basic information and functions, and so on.

5.1 Initializing Device

If it is your first time to use the device after purchase or after restoring factory defaults, set a login password of admin (system default user). At the same time, you can set proper password protection method.

 \square

This section takes web remote initialization for example.

<u>Step 1</u> Open the browser, input IP address, and click Enter.

The **Device initialization** interface is displayed. See Figure 5-1.

 \square

Default IP address of network port 1 to network port 4 are 192.168.1.108 to 192.168.4.108. Enter the corresponding IP address of the actually connected network port.

Figure 5-1 Initializing the device

Device Initialization			
	1 Input Password	Password Protection	
	👤 admin		
	Password	ج 💿	
	Confirm Password	®	
	_		
		Next	

Step 2 Set admin login password. Refer to Table 5-1 for details.

Parameter	Description
User	The default user name is admin.
Password	Set admin login password, and confirm the password.
	The new password can be set from 8 characters through 32 characters and
Confirms	contains at least two types from number, letter and special characters
Confirm Password	(excluding "i", "i", ";", ":" and "&"). Enter a strong password according to the
	password strength indication.

Parameter	Description
Prompt question	After setting the prompt, when you move the mouse to $\textcircled{0}$ on the login interface, the system pops up a prompt to help you remember the password.
	The prompt question function is for local login interface only. Refer to the actual
	interface for detailed information.

Step 3 Click Next.

The password setting interface is displayed. See Figure 5-2.

Figure 5-2 Password protection

Device Initialization	
Input F	Password 2 Password Protection
	Email (To reset password)
	Security Questions
Question 1	What is your favorite book during your childhood?
Answer	
Question 2	What was the first name of your first boss?
Answer	
Question 3	What is the name of your favorite fruit?
Answer	
	Back Finish

<u>Step 4</u> Set password protection information. For details, see Table 5-2.

Setting the security questions here, you can use the email you input here or answer the security questions to reset admin password.

 \square

- Click to cancel the email or security questions box.
- If the email or security questions box is not set, the password can be reset at local interface only.

Password protection mode	Description
Email	Set email address. Reset the password through the reserved
Eman	email address.
Security question	Set security questions and corresponding answers. Reset
Security question	the password through the security question.

<u>Step 5</u> Click **Finish** to complete device initialization.

The device initialization success interface is displayed.

Click **Enter quick settings** to go to the quick setting interface. It is to set device basic information.

5.2 Quick Settings

It is to set system time, and enable NTP function according to your need. After enabling NTP function, device can automatically synchronize time with the NTP server.

Step 1 Set system time.

- 1) On initialization interface, click Enter quick settings.
 - The **Time** interface is displayed. See Figure 5-3. Figure 5-3 Time

Quick Configuration				
	1 Time	😢 IP Set	P2P Access	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Date 2018.01.22 Time 15:36:34			
Time	 Manual Setting 			
	Date/Time	2018 - 01 - 22 15 : 36 : 33	Sync with your PC time	Sync
	 Sync with Internet Time Set 	rver		
	Server	clock.isc.org		
	Auto Sync Time Interval	1 hours	T	
Time and Date Format	YYYY.MM.DD •	24HR 🔻		
Time Zone	(UTC+08:00)Beijing	T		
				Next

2) Set system time, date and time zone.

You can set manually or set device to synchronize time with the NTP server.

Step 2 Configure IP address.

Device has 4 Ethernet ports by default. Make sure at least one Ethernet port is connected to the network before you set IP address.

1) On the Time setting interface, click Next.

The IP Set interface is displayed. See Figure 5-4.

	Ø	Time			2 IP S	et 🔶				
NIC	NIC Type	Dhcp		IP Addre	55	Subnet Mask	Mac	Speed	Operate	a
• Ethernet	Electric Port	No				255.255.255.0		10M/100MSel		Â
Ethernet	Electric Port	No				255.255.255.0		10M/100MSel		1
Ethernet	Electric Port	No				255.255.255.0		10M/100MSel		ļ
						Default N				
Obtain DN	S server address au	tomatically					ult Ethernet	Ethernet Network:	1 🔻	
	S server address au owing DNS server							Ethernet Network:	1 🔻	
Use the fol			8.	8	. 8			Ethernet Network:	1 🔻	
 Use the foll Pre 	owing DNS server	address						Ethernet Network:	1 •	

Figure 5-4 Set

2) Click \leq of the corresponding NIC.

The Edit Ethernet Network 1 interface is displayed. See Figure 5-5.

- When there is a DHCP server on the network, check **Use Dynamic IP Address**, system can allocate a dynamic IP address to the device. There is no need to set IP address manually.
- Check Use Static IP Address. Set static IP address, subnet mask and gateway. It is to set a static IP address for the device.

Figure 5-5 Edit Ethernet network 1

Edit I	Ethernet Network1										×
	Speed	1000 Mb/	/s								
0	Use Dynamic IP Addres	s									
۲	Use Static IP Address										
	Static IP Address	192		168	3	108]				
	Subnet Mask	255		255	0	0]				
	Gateway	192		168	0	1]				
	MTU	1500					?				
									OK	C	Cancel

3) Click OK.

Device goes back to **IP Set** interface.

4) Set DNS server information and default NIC.

Make sure the default NIC is online.

Step 3 Configure P2P settings.

Make sure the system has connected to the network. Otherwise, the P2P function is null.

1) On the **IP Set** interface, click **Next**.

The **P2P Access** interface is displayed. See Figure 5-6. Scan the QR code on the actual interface.

Quick Configuration				
0	Time	IP Set	3 P2P Access	
P2P Access Implement the P2P access of the alarm, cloud storage, device man		ote services for monitoring, video, e services.	Mobile App	Device QR Code
SN: 000000000000000000000000000000000000	→ Download App	2.Add Device	3.Watch monitoring	
			with App	Back Finish

Figure 5-6 P2P access

2) Click to enable P2P function.

<u>Step 4</u> Click **Finish** to save settings.

5.3 Logging in Device

 \square

- The system is logged in by default after you initialize the device. Now you can set system settings and operate.
- This section takes logging in IVSS client for example.

<u>Step 1</u> Download the IVSS installation package.

Open the browser, enter IP address, and click **Enter**. Click the **Click Download** to download IVSS Client installation package. See Figure 5-7.

Figure 5-7 Web login interface



<u>Step 2</u> Double-click the IVSS installation package, and install it according to interface notice. On completion, the completion interface is displayed. See Figure 5-8. Figure 5-8 Installation completed



Step 3 Click Run.

The login interface in Step 1is displayed. See Figure 5-9.

• System display IVSS Client at full-screen by default. Click to display the task column. Enter device IP address, and then press **Enter** or

click 🗲 to login.

Figure 5-9 Login



<u>Step 4</u> Enter device user name and password. <u>Step 5</u> Click **Login**.

5.4 Adding Remote Devices

After you initialize remote device, you can view the live video from the remote device, change remote device settings, and so on.

 \square

- Uninitialized device cannot be added. For details, refer to the user's manual.
- This section takes smart add for example.
- Step 1 Click (1), or click (1) on Setting interface, and then select Device.

The **Device** interface is displayed.

Step 2 Click + or Add, and then select Smart Add.

The Smart Add interface is displayed.

Step 3 Click Start Search.

System starts to search and displays result. See Figure 5-10. $\ensuremath{\textcircled{}}$

Click 💇 to set search criteria.

Smart Add Manual Ad	ld					
Stop Search Searching.	37				Initialize	odify IP
(0) Initialization State 👻	Address	Product Model	Manufacturer	Product Type	Sn	Operate
 Initialized 	100	IP Camera	Private	IPC	AG0	LIVE
✓ Initialized	101	4U	Private	4U	00-4	LIVE
 Initialized 	102	DSS Windows	Private			LIVE
 Initialized 	103	DSS Windows	Private			1116
✓ Initialized	104	IPC-HF8242F-FR	Private	IPC	с АК09	LIVE
 Initialized 	105	16 ports	Private	TS	:31:d4	LIVE
✓ Initialized	106	EVS5016SR	Private	EVS	VB4	[114]
 Initialized 		M70-4U-E	Private	M70-4U-E	January AJ00	LIVE
Total 37 Item(s) Show up to	50 👻		- C	1/1	> > [>]	GO

Figure 5-10 Remote device

<u>Step 4</u> Select a remote device and then click **Add**.

To add multiple-channel remote device, select the channel that you want to add.

<u>Step 5</u> Click **Continue to add** or **Finish**.



Intelligent Operation

Al detection is to process and analyze the video and take the key information, compare the key information with the preset detection rule and trigger an alarm once the detected behavior matches the detection rule.

The device supports AI by camera and AI by device.

- Al by camera: the camera supports smart detection, such as Smart IPC. The IVSS device needs to detect and display the intelligent alarm information from the remote device and use the remote device to set smart detection and record playback.
- AI by device: The camera only provides videos and snapshots, but IVSS device supports smart detection.

 \square

When AI by camera is enabled, complete smart detection configuration at remote device. See remote device user's manual.

6.1 Enabling Al Plan

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- Al plan is available on select models.
- The interface might vary in respect of AI function, and the actual interface shall prevail.

Step 1 Click , or click to on Setting interface, and then select Event.

The **Event** interface is displayed.

- <u>Step 2</u> Select camera in the device tree in the left.
- Step 3 Select Al Plan > Al Plan > Al Plan.

The AI Plan interface is displayed.

 \square

When the remote device is PTZ and a preset point has been added, the system configures AI detection function for every preset point. See Figure 6-1.

Figure 6-1 AI plan (1)



Step 4 Click to enable AI detection plan. The icon turns into

Step 5 Click Save.

6.2 Face Detection

After you configure face detection and face comparison function, the device processes and analyzes video image, extract face information from the video, and compare it with face images in the face database.

The device activates an alarm if similarity reaches or exceeds the designated similarity.

The device supports real-time preview of face detection and face comparison information; searches and plays back video according to face feature.

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IVS and face detection function cannot be enabled at the same time.

6.2.1 Setting Face Comparison

Face comparison operation is displayed in Figure 6-2.

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- Enable AI plan when AI by camera is used.
- You cannot search by image when you are using AI by camera and face comparison.
 Figure 6-2 Face comparison flow



6.2.2 Configuring Face Database

You can create the face database to save face image, and the intelligent detection function can trigger the face database to carry out human face comparison, human face search, and so on. For face database configuration flow, see Figure 6-3.



6.2.2.1 Creating Face Database

Create human face database to sort out and manage the face images uploaded to the device.

Step 1 On the Live interface, click +, select File > Face database, then click Create.

The **Create** interface is displayed. See Figure 6-4. Figure 6-4 Create face database

Create			×
	Face database name	2 Register Face	\rangle
Face	latabase name		
		Register Face 🔸 Save a	nd close Cancel

<u>Step 2</u> Set Face database name, then click Register face or Save and close.

• Click **Register face**, and then add human face on the newly created human database. See Figure 6-5. Refer to "6.2.2.2 Adding Face Image" for detailed information.

Create	Usage 0%				×
	Face databa	ase name	2 Register Face		
Add mode	Manual Add	 Batch Import 			
		* Name			
		Gender	🖲 Male 🔵 Fema	le	
		Birthday			
	.	Country or Region		•	
		Address			
		ID Type		•	
7)	ID No.			
		Back Sa	ve and continue to add	OK Cance	

Figure 6-5 Register face

Click Save and close to create a human face database with no data.
 After creating face database, you can go to the Face Database interface to view the newly created face database information. See Figure 6-6 and 0.



Figure 6-6 Face database

No.	Description
1	Click Create to create a face database. For details, refer to "6.2.2.1 Creating Face
1	Database".
2	Select a face databases, and then click Delete .
	Display number and space information of face database.
	• Number: The percentage ratio of the added face image quantity to the allowable total
3	quantity of face image. Note Device supports maximum 300,000 face images.
	• Space: The percentage ratio of the created face database quantity to the allowable total
	quantity of face database. Human face database creation. Maximum 50 databases.
4	Check All, it is to select all face databases.
5	Display the list of created databases.
	Display abstract state.
6	^o displays face image of current database that failed to abstract.

6.2.2.2 Adding Face Image

Add face images to the created face database in the way of manual add, batch import and detection.

Preparation

- A face image has been obtained, and it meets the following requirements:
 - \diamond The image format is .jpg.
 - ♦ The image size shall be less than or equal to 4MB.
 - \diamond The resolution ranges from 100×100 to 6000×5000.
- You have obtained the face image and saved it in the proper path.
 - When operating on the local interface, save the image in the USB storage device and then connect the USB storage device to the IVSS device.
 - ◊ When operating on the Web or IVSS interface, save the image on the PC in which the Web or IVSS client is located.
- Before the batch import, name the face image according to the following rule: "Name#SGender#BBirthday#NNation#PProvince#TIDtype#MIDnumber#AAddress.jpg" (such as"Tim#S1#B20000101#NCN#PZheJiang#T1#M0000#AAddress").

Name the face image according to the rule. After successful import, the system will identify the face image automatically. For details about naming rule, see the user's manual.

Operation Steps

Step 1 On the Live interface, click +, select File > Face Database.

Face Database interface is displayed.

<u>Step 2</u> Double-click face database.

The face database interface is displayed.

Step 3 Click Batch Import.

The **Batch Import** interface is displayed. See Figure 6-7. Figure 6-7 Batch import

Batch Import			×
		•	
	Upload file(.jpg)	Upload folder	
Example:	Tom#S1#B1990-01-01#NUS#T1#M123	TID Type#MID Number#AAddress.jpg(Name requ 8456789#ANorth Main Street.jpg	ired, others optional)
Birthday:	1.Male 2.Female yyyymmdd 1.ID Card 2.Passport 3.Officer Card		
		OK	Cancel

Step 4 Import face image.

The system supports uploading file and folder. Select according to your actual need.

Step 5 Click OK.

The batch import result interface is displayed.

Step 6 Click Continue to add or OK.

After adding the image, at the bottom left corner of the face image, there is an icon

It means device is creating module. Refer to "6.2.2.3 Human Face for detailed information.

Figure	6-8	Face	database
--------	-----	------	----------

Manual Add 🗣 Batch Import 🔅 Abstract	t + Copy to 📋 Delete			
NI				
Name : /	Name : Birthday :	Name : Birthday :	Name :	
ID Type : Unknown ID No. :	ID Type : Unknown	ID Type : Unknown	ID Type : Unknown	
Address :	Address :	Address :	Address :	

6.2.2.3 Human Face Abstract

The human face abstracting is to abstract the corresponding information of the face image and import to the database, and then create the human face features module. In this way, device can compare human face, and search human face.

• The greater the face image quantity is, the longer the face abstracting time it takes.

- During the abstracting creation process, some intelligent functions (such as human face comparison, search human face and so on.) are null. These functions become normal after the abstracting process is completed.
- When the uploaded image is half-length photo or full-body photo, the system automatically selects the frame of the uploaded image and only the face area will be retained.

Step 1 On the Live interface, click **t**, select **File > Face Database**.

Face Database interface is displayed.

<u>Step 2</u> Double-click face database.

Face database interface is displayed. See Figure 6-9.

Figure 6-9 Face database interface



<u>Step 3</u> Select face images and then click **Abstract**.

System pops up a confirmation box.

- Click the **All** check box, and you can select all face images in the current human face database.
- If there are too many human face images in the human face database, click

Q to set search conditions (such as name, gender, birthday, country, province,

ID type, ID number or abstracting status) to quickly find the human face images.

Step 4 Click Start Abstract.

Device begins creating module. See Figure 6-10.

The abstracting is successful if s no longer at the bottom left corner of the

face image. The abstracting may fail if the face image is not clear or does not

contain complete information, and i appears at the bottom left corner of the face image.

 When the uploaded image is half-length photo or full-body photo, the system automatically selects the frame of the uploaded image and only the face area will be retained.

Figure 0-10 Abstract result				
 Back 	123 32 Disamed			
+ Manual Add 🛛 🥵 Batch Import 🛛 🌣 Abstract	+ Copy to 📋 Delete			
All				
		1		
Name : /	Name : Bithday :			
ID Type : Unknown	ID Type : Unknown			
ID No. : Address :	ID No. : Address :			
Autos.	Audross.			

Figure 6-10 Abstract result

6.2.3 Configuring Face Detection

Configure alarm rule of face detection.

Step 1 Click or click in the Setting interface, and then select Event.

The **Event** interface is displayed.

- <u>Step 2</u> Select remote device in the device tree in the left.
- <u>Step 3</u> Select Al Plan > Face Detection.

Face Detection interface is displayed. See Figure 6-11.

Figure 6-11 Face detection

◆ Exit	EVENT +		≡ @ @ ⊥-
Q, ▼ IVSS ▼ E Device G IPC	 ➢ Video Detect ☆ VideoMotion ☞ Tampering 	Al By Camera Al By Device Evabled If close all, face reception will became invalid, current status: Evable V V	
G P PTZ Camera G 1 ∷	✓ IPC Offline ♥ IPC Offline ✓ AI Plan ② AI Plan ③ Face Detection ① Face Recognition ● IVS Rule	Cick the mouse to draw the area.	4697
		Diployment Time Default Schedule Wein Schedule Wein Schedule > Record (IPC:	×
		>> Snap IPC Log Enable	×
		Addm Refresh	Save Cancel

Step 4 Click AI by camera or AI by device, and then click to enable intelligent function.

Al by camera supports Face Rol function. After enabling Face Rol function, system displays enhanced human face zone on the surveillance window.

<u>Step 5</u> Set detection region.

 \square

It only supports to set minimum size and maximum size.

1) Click , and set detection region in surveillance window. See Figure 6-12.

Figure 6-12 Area



- Press and hold S or white dot on detect region frame, and drag to adjust its range.
- Click I or to set human face detection minimum size or maximum size. System triggers an alarm once the detected human size is not larger than the maximum size or smaller than the minimum size.
- Select the motion detect zone you drew. Click 💼 to delete the zone.
- 2) Click \square to complete the settings.
- Step 6 Click Deployment Time to select schedule from the drop-down list.

After setting arm period, system triggers corresponding operations when there is a motion detection alarm in the specified period.

- Step 7 Click Action to set alarm action. Refer to user's manual for detailed information.
- Step 8 Click Save.

6.2.4 Configuring Face Recognition

You can configure face comparison rule. The system compares the detected face image with face image in the face database, and triggers an alarm when the result conforms to the comparison rule.

 \square

Face detection shall be enabled when AI by device is used. For details, refer to "6.2.3 Configuring Face Detection".

Step 1 Click , or click to on Setting interface, and then select **Event**.

The **Event** interface is displayed.

- Step 2 Select remote device in the device tree in the left.
- <u>Step 3</u> Select Al Plan > Face Recognition.

Face Recognition interface is displayed. See Figure 6-13.

Figure 6-13 Face recognition

◆ Exit	EVENT +	:	≡ ⇔¦¢ ≛-
Q 7	∀ Video Detect	Al By Camera Al By Darkee Enabled The fuction depends on Face Detect.current status: Disable	
VISS Device Grip PTZ Camera O 1 E TPC Grip P PZ PTZ	次 VideoMotion ✓ ⑤ Tampering ✓	Deployment Time Default Schedule View Schedule Add Schedule + Add Schedule	
	➢ IPC Offline IPC Offline ✓	Stranger control mode	A 33
	V Al Plan	sociate Face Database	
Gr 3 F)Acons € RTSP Media	 Qi Ai Pun Trace Detection Qi Face Recognition IVS Rule 		
		Refresh	Save Cancel

<u>Step 4</u> Click **AI by Camera** or **AI by Device**, and then click **to** enable intelligent function.

<u>Step 5</u> Click **Deployment Time** to select schedule from the drop-down list.

After setting deployment period, system triggers actions when there is a motion detection alarm in the specified period.

<u>Step 6</u> Set stranger mode.

It is to enable stranger mode. Once the face comparison similarity is lower than the specified value, system triggers an alarm.

1) Click to enable stranger mode.

The **Stranger control mode** interface is displayed. See Figure 6-14.

Figure 6-14 Stranger control	mode
------------------------------	------

Stranger control mode		A 200
Al Alarm Rule 🖉 👡	Show Feature Panel	A 203
Log Enable		×
Local Alarm Out Output Port1		×
+ Actions		

2) Set parameters. For details, refer to Table 6-2.

Table 6-2 Stranger control	mode description
----------------------------	------------------

Parameter	Description	
Al alarm rule	Click 🐣 - to set alarm rule box color.	
Show feature panel Check to enable features panel function. System displays strange panel once there is an alarm.		
3) Click Actions to set alarm actions. Refer to user's manual for detailed		

3) Click **Actions** to set alarm actions. Refer to user's manual for detailed information.

<u>Step 7</u> Set triggered face database.

 \square

- Before you use AI by camera function, go to the remote device to set face database. At IVSS interface, set alarm event.
- Repeat the step to trigger several human databases at the same time.
- 1) Click **Associate Face Database**, and then select the triggered human face database.

Face database configuration interface is displayed. See Figure 6-15.

Figure 6-15 Face database configuration

123			â
Similar 80	Al Alarm Rule 🔄 🖓	Show Feature Panel	
Log Enable			×
Local Alarm Out Output Port1			×
+ Actions			

2) Set parameters. For details, refer to Table 6-3.

Table 6-3 Configuration description

Parameter	Description
	It is to set human face similarity.
Similar	System compares the human face with the image on the face database, system
	triggers an alarm once the similarity reaches threshold you set here.
Al alarm rule	Click 🐣 - to set alarm rule box color.
Show feature	Click to enable features panel function. System displays features panel
panel	once there is an alarm.
3) Click Actions to set alarm actions Refer to user's manual for detailed	

 Click Actions to set alarm actions. Refer to user's manual for detailed information.

Step 8 Click Save.

6.2.5 Real-time View

You can view real-time face detection and human face comparison images.

6.2.5.1 Setting AI Display

You can configure display rule of AI detection results.

 \square

Before using this function, make ensure that view has been created. Refer to user's manual for detailed information.

Step 1 On the Live interface, click in and select Face tab.

The **Face** interface is displayed. See Figure 6-16.
Figure 6-16 Face

View 1	Face: Human Vehicle	
₽ 10.11.16.181_1	Show Tracking Box :	
	Name Time Image: Glasses Mask Gender Age Face Detection Face Rec	
	Name Time Name Time Similar% Features Panel : Age Beard Exp. Glasses Mask Gender	
	Sync from Al-Dis. Apply to all win OK Cano	cel

<u>Step 2</u> Enable **Show Tracking Box** and **Features Panel**, and select feature(s) you want to display.

<u>Step 3</u> Click **OK** to save the configuration.

6.2.5.2 Live

Go to the Live interface, enable view, device displays view video. See Figure 6-17.

- The view window displays currently detected face rule box.
- The right side displays features panel.
 - During face detection, features panel displays detection time, the detected face image and feature.
 - Ouring face comparison, features panel displays detection time, the detected face image, face image in the database, comparison result and database name. After setting stranger mode, when the detected face image mismatches face image in the database, features panel will have **Stranger** tag.

Figure 6-17 Live



6.2.5.3 Face Total

On the Live interface, click . Face detection panel is displayed. On this interface, you can

view face detection and comparison image, add face image to face database, play back recorded videos and export them. See Figure 6-18.

Figure 6-18 Detection image

FACE TOTAL			T
2018-11-21 09:37:20	Gender	Quality 2018-11-21 09:37:18 Gender Glasses Mask	2018-11-21 09:37:16 Gender Age Glasses Mask
Face Detection	Face Detection	Face Detection	Face Detection

6.2.6 Face Search

Search face detection information, including face detection image, record and features. Search according to record and image.

6.2.6.1 Search by Attribute

Set event type and attribute, to search qualified face information.

Step 1 On the LIVE interface, click +, select Al Search > Search by Face > By

Attribute.

By Attribute interface is displayed. See Figure 6-19.

Figure 6-19 Search by attribute



<u>Step 2</u> Select the remote device, and set event type, face attribute and time.

Step 3 Click Query.

The search results are displayed in the panel. See Figure 6-20.

Figure 6-20 Search result



Click the panel. The operation icons are displayed. See Figure 6-21. For operations of the icons, see Table 6-4.





Table 6-4 Search by image

lcon	Operation
	• Select one by one: Click the panel or move the cursor onto the panel, and then click
	□ to select the panel. < I means it is selected.
	• Batch select: Check All to select all panels on the interface.
Ē.	Click 🗈 to add the image to the face database.
\odot	Click O or double-click the panel, the system starts to play back the recorded videos (about 20s).
	(about 205).
4	Click or select the panel and click draw to export images, videos and Excel to designated storage path.
	After setting alarm linkage snapshot, during exporting images, the system exports detected
	images and panoramic images at the time of snapshot.

6.2.6.2 Search by Image

It is to upload face image and then compare with the human face in the record file. Device can filter the record file in which the human face similarity has reached the threshold.

Device supports to use the face image on the face database or the local face.

- When you use face database images to search, ensure face database has been configured. Refer to "6.2.2 Configuring Face Database" for detailed information.
- If you want to use the local images, you need to obtain the face image and saved it in the corresponding path.
 - When operating on the local interface, save the image in the USB storage device and then connect the USB storage device to the IVSS.
 - ◊ When operating on the Web or IVSS interface, save the image on the PC in which the Web or IVSS client is located.

6.2.6.2.1 Device Search

Upload face image, compare it with face detection result of remote device, and find face detection information that meets the set similarity.

Step 1 On the LIVE interface, click +, select Al Search > Search by Face > By Image.

The **By Image** interface is displayed. See Figure 6-22.

Figure 6-22 Search by image

iV55	LIVE AI S	SEARCH +		e	0 ¢	- I ≜ -
Search by Face Search by Human	IVS					
By Attribute By Image						
+ Upload Image + P						A 18
Max upload 50 standard face images						
Vevice FaceDB Q Search > @ Device ☐ Access @ RTSP Media			<i>iV55</i> No search results			
2018 - 12 - 17 00 : 00 III 2018 - 12 - 17 23 : 59 : 59 III Qurry A Search range 30 days						

Step 2 Click Device tab.

Step 3 Upload face image.

 \square

Device supports to upload maximum 50 face images. Device supports to select maximum 10 face images at one time.

- Upload the image from the face image database to search corresponding face.
- 1) Move the mouse to

+ Upload Image - and select Face DB.

The **Choose Picture From Face DB** interface is displayed. See Figure 6-23.

Choose P	icture From Fa	ceDB								×
Name		Gender	All	▼ FaceDB	123 🔻	*	Query	Reset	Choosed Pictures	
			Ν	lo search results						
0 in total.	Show up to 20	•			« <	1/1	> >	Jump To	ОКС	ancel
	2)	Select	face da	tabase a	nd then s	et se	arch cri	teria.		
		\diamond If t	here ar	e too mar	ny face im	age	s on the	databas	e, set name, ge	ender

Figure 6-23 Choose picture from face DB

- Click \gg to set the search ID number.
- Click Query. 3)

 \diamond

Device displays the searched face images.

4) Select face image.

to filter.

The selected face image is displayed on the Chosen Pictures on the right side.

- 5) Click **OK** to upload face image.
- Local image: Upload images from local PC or USB storage device.
 - + Upload Image 👻 1) Move the mouse to and select Local.
 - 2) Select face image you want to upload. \square

You can select several face images at the same time.

3) Click **OK** to upload face image.

After uploading the images, device displays the face images on the top left corner. The latest 10 images are selected. See Figure 6-24.

Figure 6-24 By image



- When the uploaded image is half-length photo or full-body photo, the system automatically selects the frame of the uploaded image and only the face area will be retained.
- When there are multiple faces in the uploaded images, the system automatically identifies the faces in the images and uploads multiple face images according to the number of faces recognized.
- Device supports to select maximum 10 face images.
- Click Cancel to cancel all checked face images.
- Select Selected only, device displays checked human face images only.
- Click Clear to clear all uploaded face images.
- Step 4 Hold on and drag 💽 to set human face similarity. It is 80% by default.
- <u>Step 5</u> Select remote device on the device list and then set record file time period.
- Step 6 Click Query.

The Result is displayed. See Figure 6-25 and Table 6-5.

Figure 6-25 Query

	1		2
iV55	LIVE AI SEARCH FILE +		:≡:@ @: ≛-
Search by Face Search by Human	NS		
By Attribute By Image		a (1955 1955 1955	
Selected only Cancel Clear	Gender All 💌 Age All 💌 Ma	ask All 👻 Beard All 👻 Glasses All 👻	La 13
	All • 🗌 All(0) 쇼.		Total 1000 record(s)
Similar (10) Device FaceDB	2018-11-22 * init conversal init General init Age voto Games Ves	n h h h h h h k k k No h k k k h k k k h k k k k k k k k k k	M383 cameral 133927 cameral 134926 Male No Vis Image: Cameral for the former forme
Q Y Image: Constraint of the second o	3	4	
Constant Search (Constant) Search (Constant) Search (Constant)			

Table 6-5 Device search description

No.	Description
	Displays selected face images. The number at the bottom right of the face image is to
1	display the searched image amount.
	Click one image to view its query result.
2	It is to set filter criteria. It can quickly search the required image according to the face
2	features.
2	Displays searched schedule list.
3	Click a date, you can view the image list on current date on the right panel.
4	Displays the searched face panel, including face image, feature attribute and similarity.

Operation

After query, you can play back video file and export. Refer to Table 6-6 for detailed information.

Icon	Operation
	• Select one by one: Click the panel or move the mouse onto the panel. Click
Select panel	to select the panel. reans it is selected.
	• Batch select: Click All to select all panels on this page.
Playing back	Double-click the panel to play back recorded video (about 20s).
recorded video	Double-click the parter to play back recorded video (about 205).

Icon	Operation
Export file	Move the mouse to panel and click $$, or click the panel and click $$ to export images, videos and Excel to designated storage path. Refer to "6.4 IVS" for detailed information. After setting alarm linkage snapshot, during exporting images, the system
	exports detected images and panoramic images at the time of snapshot.

6.2.6.2.2 Searching Face Database

Upload face image, compare it with face image in face database, and find face image that meets the set similarity.

Step 1 On Live interface, click +, select Al Search > Search by Face > By Image >

FaceDB.

The **FaceDB** interface is displayed. See Figure 6-26. Figure 6-26 Face database

ivss	LIVE	AI SEARCH	+	:≝⁰ ⇔∣ ⊗ ∣ ≗-
Search by Face Search by Human	IVS			
By Attribute By Image				
+ Upload Image + P				A 23
Max upload 50 standard face images				
Device FaceDB			iV55 No search results	
Query				

<u>Step 2</u> Upload face image. Refer to "6.2.6.2.1 Device Search Step 3" for detailed information.

- Step 3 Hold on and drag 💽 to set human face similarity. It is 80% by default.
- <u>Step 4</u> Select the face database.
- Step 5 Click Query.

The Result is displayed. See Figure 6-27 and Table 6-7.

Figure 6-27 Result

Search by Face Search by Human	rvs		
By Attribute By Image	IV55 IV55	123 1/1 IV55 IV55 IV55 IV55	
+ Upload Image 👻 😰			
Selected only Cancel Clear	AI • IA	Total	2 record(s
	test1 database	database	
IV55 IV55	test2	Name 23992 Name 33065	
	database •	Birthday Birthday ID Tupe ID Tupe	
	TestFace	ID NA DI NA	
	xinja	Adress Adress	
Similar ● ≥ 60	123	100% 62%	
Similar			
Device FaceDB			
▶ <mark>✓</mark> FaceDB			
	2	3	
Query			
QBBY			

Table 6-7 Description

No.	Description
	Displays selected face images. The number at the bottom right of the face image is to
1	display the searched image amount.
	Click one image to view its query result.
2	Displays searched schedule list.
2	Click a date, you can view the image list on current date on the right panel.
3	Displays the searched face panel, including face image, information and similarity.

Operation

Operations include select the panel, and export file. See Table 6-8.

	Table 0-0 Tace database operation
Name	Operation
	• Select one by one: Click the panel or move the mouse onto the panel. Click
Select a panel	□ to select the panel. <mark></mark> means it is selected.
	• Batch select: Select the All check box to select all panels on this page.
Export file	Click the panel and click device to export images to designated storage path. Refer to "6.4 IVS" for detailed information.

Table 6-8 Face database operation

6.3 Video Structuring

With video structuring, IVSS can detect, recognize, and extract features from human body, face, motor vehicle, and non-motor vehicle. For example, features such as gender, age, and top color can be extracted from human, and you can then search a certain human face or configure alarm with these features.

6.3.1 Enabling Al Plan

You need to enable AI plan when AI by camera is used. Refer to "6.1 Enabling AI Plan" to enable AI detect function.

6.3.2 Configuring Video Structuring

After enabling and then configuring video structuring, IVSS can only link the current remote device for taking snapshots when alarm is triggered.

 \square

This section takes AI by device for example. AI by camera only supports enabling detection function and setting deployment time.

Step 1 Click 🔯 or +, and then select EVENT.

The **EVENT** interface is displayed.

- <u>Step 2</u> Select a device from the device tree at the left side.
- <u>Step 3</u> Select Al Plan > Video Structuring > Al By Device. The Al By Device interface is displayed. See Figure 6-28.

Figure 6-28 AI by device

🗢 Exit	EVENT +	🖃 😔 i 💩 i 💵
Q. SearchDevice Name/IP ▼ IVSS ▼ @ Device	 Video Detect X Video Motion I Tampering IPC Offline IPC Offline 	Al by Device Feature Vector Extraction 20/09/04/11/16/0532 RuleName Enabled Image: Control of Con
S⊋ IPC I¶Access €RTSP Media	Al Plan Al Plan Al Plan Al Plan Arec Detection Face Detection Face Recognition Video Structuring IvS Vehicle Recognition Plate Comparison	Image: Second
		Deployment Time Default Schedule

Step 4 Click mext to Feature Vector Extraction to enable feature extraction, then IVSS

can extract features of face and human, such as gender, age, and top color.

Feature vector extraction is available only after Human detection is enabled.

Step 5 Select the detection target.

- People: Click next to **Enabled** to enable people detection. Face detection can also be enabled at the same time.
- Vehicle: Click corresponding to enable vehicle detection.

- Non-Motor Vehicle: Click corresponding to enable non-motor vehicle detection.
- Step 6 Click (the icon changes to), then you can configure detection area (orange) in the video image. See Figure 6-29.
 - Click any white dot on the frame, and the dot changes to [∞]. Drag [∞] to adjust the detection area.

Click to draw an excluded area which will not be detected. IVSS does not detect target within the excluded area.

- \diamond Up to 4 excluded areas can be drawn.
- \diamond To delete an excluded area, select the area, and then click \square .
- Click I or to set the minimum size or maximum size of detection target.

Alarm will be triggered when the size of detection target is within the minimum and maximum sizes.





<u>Step 7</u> Click **Deployment Time** dropdown list to select schedule.

IVSS links alarm event when an alarm is triggered within the schedule configured.

- Click Add Schedule to add new schedule if no schedule is added or the existing schedule does not meet requirements.
- Click View Schedule to view details of schedule.

Step 8 Click Save.

6.3.3 Live

You can view the detected features and properties of face, people, motor vehicle and non-motor vehicle on the LIVE interface.

6.3.3.1 Setting AI Display

You can set the features and properties that you want to display in the real-time video image of the LIVE interface.

 \square

Before setting the features and properties, you need to create a view by adding cameras to the view so you can check video and pictures captured by the cameras.

<u>Step 1</u> Select a view from Live > View > View Group.

Step 2 Click 1 at the lower side of the LIVE interface, and then select Human, Vehicle or

Non-Motor Vehicle. See Figure 6-30.

 \square

The figure takes **Human** for example. The interface is for reference only, and the actual interface shall prevail.

Figure 6-30 Human

View1	Face	Human	Vehicle	Non- MotorVehicle	
<pre> camera1 camera1 camera1 camera2 </pre>	Ť	Show Tracking Box	:		
	Time Top C Coat Botto Botto Human Detection	m Cc	1		
	Features Panel: Transparence: Top Color Hat Umbrella Sync from AI-Dis		e Gender		Cancel

Step 3 Click mext to Show Tracking Box, then a tracking box is displayed in the video

when target that meets the filtering conditions is detected.

- Step 4 Configure feature panel.
 - 4) Click **I** next to **Features Panel** to enable feature panel.

A features panel is displayed on the right side of the video when target that meets filtering conditions is detected.

- 5) Select the target you want to detect. You can select from Face, Human, Vehicle, and Non-Vehicle Motor.
- (Optional) Drag to adjust the transparency of panel. The higher the value, the more transparent the panel.
- 7) (Optional) Select the features to be displayed in the panel.
 - Up to 4 features can be displayed.
 - 4 features are selected by default. To select another feature, click the selected feature to cancel it, and then click the feature to be displayed.

Step 5 Click OK.

6.3.3.2 Real-time View

You can view the detected features and properties of face, people, motor vehicle and non-motor vehicle in the real-time video image.

On the **LIVE** interface, select a view from View Group, and the video image of the view will be displayed. See Figure 6-31.

- Rule box is displayed in real-time in the video image. Different detection targets correspond to different colors of rule box, and the actual interface shall prevail.
- Features panels are displayed on the right side of the video image.

Figure 6-31 Live

Rule box

Feature panel



Move the cursor to the features panel, and the icons are displayed. See Figure 6-32 or Figure 6-33.

Figure 6-32 Icons (vehicle detection)



Figure 6-33 Icons (other detection)

	Coat	UnKnown
	Top Color	
10	Bottom	UnKnown
-0-0	Bottom Co	

- Click
 to add plate information to plate database.
- Click
 Click I constructed in the detected image to play back the video record (10 s before and after the time of snapshot).

Click designated storage path.

6.3.3.3 Detection statistics

You can view the features and properties of detected human body, face, motor vehicle and non-motor vehicle.

6.3.3.3.1 Human

You can view the features and properties of detected human body and face.

On the **Live** interface, click **I**, the **PEOPLE TOTAL** interface is displayed.

Click A, and then select **Snap With Face** and **Snap Without Face**. The information of detected human and face is displayed. See Figure 6-34.

Figure 6-34 Human detection

IPC	2019-04-15 20:16:00	IPC	2019-04-15 20:15:23	IPC	2019-04-15 20:14:57	IPC	2019-04-15 20:14:46
	Top Color Coat Long Sl Bottom Color Bottom Pants		Top Color Coat Short Sl Bottom Color Bottom Pants		Top Color □ Coat Long Sl Bottom Color ■ Bottom Pants		Top Color Coat Short Sl Bottom Color Bottom Pants
uman Detecti	ion	Human Detectio	'n		ک (ک	Human Detectio	n

Move the cursor to a panel, and the following icons are displayed:

Click it to add the face image to face database.

This function is available when face image is captured.

- D: Click it, or double-click detected picture to play back the video record (10 s before and after the time of snapshot).
- Click it to export the video record to specified save path (PC or USB storage device).

If store the video record to USB storage device, make sure the device is connected.

6.3.3.3.2 Motor Vehicle

You can view the features and properties of detected motor vehicles.

On the Live interface, click and, the VEHICLE TOTAL interface is displayed.

Click A, and then select **Vehicle Recognition**, the information of detected vehicles is displayed. See Figure 6-35.

	Driver CallingUnKnown Safe Belt Yes Ornament UnKnown Place		Driver Calling UnKnown Safe Belt Yes Ornament UnKnown Place		Driver CallingUnKnown Safe Belt UnKnown Ornament UnKnown Place		Driver CallingUnKnown Safe Belt UnKnown Ornament UnKnown Place
Vehicle Detecti	on	Vehicle Detection	ı	Vehicle Detectio	n	Vehicle Detection	n

Figure 6-35 Motor vehicle detection

Move the cursor to a panel, and the following icons are displayed: \mathbb{E} , \mathbb{O} and \mathbb{Z} . Refer to

"6.3.3.3.1 Human" for detailed operation.

6.3.3.3.3 Non-motor Vehicle

You can view the features and properties of detected non-motor vehicles.

On the Live interface, click 5, the NONMOTOR TOTAL interface is displayed.

Click A, and then select **Snap With Face** and **Snap Without Face**. The detected non-motor vehicle features and properties are displayed. See Figure 6-36.

Figure 6-36 Non-motor vehicle detection

-	Helmet Color Occupancy Type	UnKnown 0 Two-wh		Helmet Color Occupancy Type	UnKnown I Two-wh	-	Helmet Color Occupancy Type	UnKnown I Two-wh	1	Helmet Color Occupancy Type	UnKnown I Two-wh
n-MotorVe	ehicle Detect		Non-MotorVeh	icle Detect		Non-MotorVehl	cle Detect		Non-MotorVehi	cle Detect	

Move the cursor to a panel, and the following icons are displayed: (1) and (2). Refer to "6.3.3.3.1 Human" for detailed operation.

6.3.4 Al Search

Select device and set properties to search detection results. For example, you can set human properties such as gender, age, top, pants, and search human with these properties.

6.3.4.1 Search by Human

Select device, and set human properties and features, so you can search human with the defined properties and features.

<u>Step 1</u> On the LIVE interface, click +, and then select **AI SEARCH > Search by Human**. The **Search by Human** interface is displayed. See Figure 6-37.

Figure 6-37 Search by human

iV55		LIVE	AI SEARCH +		: ≡⁵ 	; @ ⊥ -
Search by Face	Search by Human	Search by Vehicle	Search by NonMoto	or IVS		
Q SearchDevic	e Name/IP					
 Device Access 						
RTSP Med	lia					
Human Property						
Gender All	Age All 🔻				iVSS	
Top All	Color				No search results	5
Pants All	 Color 					
Bag All	•					
Umbrella All						
Hat All	•					
2019 - 04 - 16	00 : 00 : 00 🎞					
2019 - 04 - 16	23 : 59 : 59 🔳					
Q	uery					
🛕 Search r	ange 30 days					

<u>Step 2</u> Select device, and set human properties and time period.

Click do or to set the color. do means more than one color.

Step 3 Click Query.

The search result is displayed. See Figure 6-38.

- If face is captured, the human and face snapshots are displayed.
- If no face is captured, the human snapshot and human properties are displayed.



Search by Face Search by Human	Search by Vehicle Search	by NonMotor	IVS									
Q SearchDevice Name/IP	AB										Total 1	5325 re
Device	2019-04-17 •	camera1	00:00:06	camera1	00:01	03 camera1	00:01:04	camera1	00.01-19	camera1	00:01:20	
Access		T	Coat UnKnown Top Color Bottom UnKnown Bottom Cc		Coalt UnKn Top Color Bottom UnKn Bottom Cc	own	Coat UnKnown Top Color Bottom UnKnown Bottom Cc		Coat UnKnown Top Color Bottom UnKnown Bottom Cc	*	Coat UnKnown Top Color Bottom UniKnown Bottom Cc	8
		Human Detection		Banan De Perfor	n	Human Detectio	n	Human Detection	n	Human Detection		
		camera1	00:01:31	camera1	00:01	33 camera1	00:01:37	camera1	00.01.39	camera1	00:01:39	Ē.,
		Se la	Coat UnKnown Top Color Bottom UnKnown Bottom Cr	-ing	Coat UnKn Top Color Bottom UnKn Bottom Cc	1	Coat UniKnown Top Color Bottom UniKnown Bottom Cr	and the	Coat UnKnown Top Color Bottom UnKnown Bottom Cc	- Alia	Coat UnKnown Top Color Bottom UnKnown Bottom Cc	
		Human Detection		Human Detection	n	Human Detection	n	Human Detection	n	Human Detection		÷.,
		camera1	00:01:40	camera1	00:01	40 camera1	00:01:40	camera1	00:01:47	camera1	00:01:47	
iman Property iender All Age All Top All Color		- Ali	Coat UnKnown Top Color Bottom UnKnown Bottom Cc		Coat UnKn Top Color Bottom UnKn Bottom Cc	The Party Pa	Coat UnKnown Top Color Bottom UnKnown Bottom Cc	1 AN	Coat UnKnown Top Color Bottom UnKnown Bottom Cc	-	Coat UnKnown Top Color Bostom UnKnown Bottom Cc	
ints All Color		Human Detection		Human Detection	n	Human Detection	a	Human Detection	n	Human Detection		÷.
		camera1	00.01:49	camera1	00:01	49 camera1	00:01:49	camera1	00.01:50	camera1	00:01:50	
Bag All		A. A	Coat UnKnown Top Color Bottom UnKnown Bottom Cc		Coat UnKn Top Color Bottom UnKn Bottom Cc	-	Coat UnKnown Top Color Bottom UnKnown Bottom Cc	-	Coat UnKnown Top Color Bottom UnKnown Bottom Cc	1	Coat UnKnown Top Color Bottom UnKnown Bottom Cc	
2019 - 04 - 17 00 : 00 : 00 🕅		Human Detection	_	Human Detection	n	Human Detectio	n	Human Detection	1	Human Detection	_	ł.
2019 - 04 - 17 23 : 59 : 59 🛄		camera1	00:01:50	camera1	00:01	53 camera1	00:01:53	camera1	00.01.53	camera1	00:01:53	1
Query			Coat UnKnown Top Color	-	Coat UnKn Top Color	own	Coat UnKnown Top Color	1	Coat UnKnown Top Color	1	Coat UnKnown Top Color	

Other Operations

Click on one displayed panel, and the icons are displayed. See Figure 6-39 or Figure 6-40. For details, see Table 6-9.



Figure 6-40 Icons (2)





Figure 6-39 Icons (1)

Icon	Operation
	• Select one by one: Click 🔲 to select the panel. 🗹 means the panel is selected.
	• Select in batches: Select All to select all the panels on the interface.
ightarrow	Click O or double-click the panel to play back the video record (10 s before and after the time of taking the snapshot).
Ē	Click E to add picture to database.
	Click Click conserved and then click constraints to export picture, video, and Excel file to specified save path.

6.3.4.2 Search by Vehicle

Set event type and vehicle properties to search vehicle detection results. For example, you can set vehicle properties such as type, logo, plate, and search vehicles with these properties.

Step 1 On the LIVE interface, click +, and then select AI SEARCH > Search by Vehicle.

The Search by Vehicle interface is displayed.

<u>Step 2</u> Select device, and then click **Property** tab. The **Property** interface is displayed. See Figure 6-41.

		F	igure 6-4	Property					
iV55		LIVE		+		:=		<u>ن</u>	
Search by Face	Search by Human	Search by Vehicle	Search by NonMo	tor IVS					
Q SearchDevic	ce Name/IP								
Device									
Access	fia								
Property	Vehicle DB								
Event Type									
All	•				No searc		ults		
Vehicle Property									
Type All	🔨 Color 🎽 🖕								
Logo All	Plate								
Plate Enter Plate	Number								
	*								
2019 - 04 - 16	00 : 00 : 00								
2019 - 04 - 16	23 : 59 : 59 🎞								
Q	uery								
🛕 Search r	ange 30 days								

<u>Step 3</u> Select Vehicle Detection as Event Type.

<u>Step 4</u> Set vehicle properties and time period.

Click do r rest the color. Reans more than one color.

Step 5 Click Query.

The search result is displayed. See Figure 6-42.

If license plate is detected, both the scenario and the license plate will be displayed.



	Search by Vehicle Search	h by NonMotor	IVS								
) SearchDevice Name/IP	A										Total 61762 re
Z 🖪 Device	2019-04-17 •	camera1	00.00.1	camera1	00:00:10	camera1	00:00:13	camera1	00:00:13	camera1	00:00:13
Access		7 10.00	Plate	P COM PI	ate.	Pla	ite	PL	ate	Plat	te
RTSP Media		AND T	Color		olor 🚺	Service and servic	kor 🚺		xlor 🚺	Col	
		-	Type UnKnow Logo Unknow		rpe UnKnown sto Unknow	Tra			pe UnKnown go Unknow	Typ Los	
		and the second		and the second second							
		Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	
		camera1	00:00:1	camera1	00:00:16	camera1	00.00.16	camera1	00:00:17	camera1	00:00:17
		E /	Plate		ate	Pu			alc .	Plat	
		100	Color	and the second se	olor 💽	Contraction Co			xor 🚺	Col	
		0000	Type UnKnow Logo Unknow	and the second s	pe UnKnown go Unknow	Tro Log		Lo Lo	eo Unknown	Typ Log	
		And a state of the local division of the loc		The second se		and the second s					
		Vehicle Detection		Vehicle Detection		Vehicle Detection		Vehicle Detection		Vehicle Detection	
		camera1	00:00:1	camera1	00:00:17	camera1	00:00:17	camera1	00:00:18	camera1	00:00:18
Property Vehicle DB		and the second s	Plate		ate olor 🚺	Pla			ste slor	Plat	
nt Type		- 200 m	Color Color		olor 🚺	The		Courses States	pe UnKnown	Typ	
			Logo Unknow		ago Unknow	Lo		C.M. Lo		Log	
•				-							
cle Property		Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	_
pe All 🔹 Color 🎽 🚬		camera1	00:00:1	carnera1	00:00:19	camera1	00:00:19	camera1	00:00:19	cameral	00:00:19
go All 🔻 Plate		10	Ptate	PL PL	ate	PL	ite	PL	ate	Plat	to
te Enter Plate Number			Color	Conception in the local division of the loca	olor 🚺	Co			xlor 🚺	Col	
			Type UnKnow Logo Unknow	Contraction of the local distance of the loc	rpe UnKnown so Unknow	Tra Lo		Ty Lo		Typ Log	
¥			Lugo on or		40 010101		01000				p. Grander
019 - 04 - 17 00 : 00 : 00 🔟		Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	_	Vehicle Detection	
		camera1	00.00.1		00:00-19	camera1	00:00:19	camera1	00:00 20	camera1	00:00:20
019 - 04 - 17 23 : 59 : 59 III											

Other Operations

Click on one displayed panel, and the icons are displayed. See Figure 6-43. For detailed operations of icons, see "6.3.4.1 Search by Human."

Figure 6-43 lcons



6.3.4.3 Search by Non-motor Vehicle

Set event type and non-motor vehicle properties to search non-motor vehicle detection results. For example, you can set non-motor vehicle properties such as type, color, helmet, and search non-motor vehicles with these properties.

Step 1 On the LIVE interface, click +, and then select AI SEARCH > Search by NonMotor.

The Search by NonMotor interface is displayed. See Figure 6-44.

Figure 6-44	Search by	non-motor	vehicle
-------------	-----------	-----------	---------

iV55		LIVE	AI SEARCH +			:= *	\$	≛-
Search by Face	Search by Human	Search by Vehicle	Search by NonMotor	IVS				
Q SearchDevic	e Name/IP							
Device								
Access	lia							
					iVS			
NonMotor Property					No search	results		
Type All	-							
Color 🎽 🖕								
Hum All	-							
Hel All	•							
2019 - 04 - 16	00 : 00 : 00 🛅							
2019 - 04 - 16	23 : 59 : 59 🛅							
Qu	uery							
A Search ra	ange 30 days							

<u>Step 2</u> Select the device you want to search.

<u>Step 3</u> Set non-motor vehicle properties and time period.

Click \checkmark or \checkmark to set the color. \checkmark means more than one color.

Step 4 Click Query.

The search result is displayed. See Figure 6-45.

Figure 6-45 Search result

) SearchDevice Name/IP	A.															Total 10055
	2019-04-01	Non-MotorVehicle	De		Non-MotorVehicle	De		Non-MotorVehici	e De		Non-MotorVehic	e De		Non-MotorVehicle	De	
Access	2019-04-02	IPC		17:37:47	IPC		17:37:59	IPC		17:38:00	IPC		17:38:02	IPC		17:38:04
	2019-04-03	da.	Type	Two-whe	N	Type	Two-whe	100	Туре	Two-whe	ALC: N	Турс	Two-whe	1.6.14	Турс	Two-whe
	2019-04-04	120	Color Helmet	UnKnown	1	Color Helmet	UnKnown	12	Color Heimet	UnKnown	ALC: NO.	Color Helmet	UnKnown			UnKnown
2019-04-05 2019-04-06	2019-04-05	110	Occupanc	1		Occupance	1	171	Occupano	1	311	Occupano	- 1		Occupance	
							1.0			10.00			1 46.0			
	2019-04-07	Non-MotorVehicle	00	_	Non-MotorVehicle	174		Non-MotorVehich	100	_	Non-MotorVehic	a De	_	Non-MotorVehicle	1.00	_
	2019-04-08	IPC		17:38:12	IPC	Colline .	17:38:24	IPC		17:38:37	IPC		17:38:49	IPC		17:38:52
	2019-04-09		Type	Two-whe		Туре	Two-whe		Type	Two-whe		Type	Two-whe	HEAR	Type	Two-whe
	2019-04-10	101	Color	•	19	Color	•	1411	Color		12	Color	•	and a	Color	-
	2019-04-11	1 97	Helmet	UnKnown 1	21	Helmet Occupanci			Helmot Occupanc	UnKnown	100	Helmet	UnKnown	Heines UnKnown Occupane: 1	UnKnown 1	
2019-04-12	2019-04-12	100	Occupant		1.1	Occupant			Coropan	5.5.	1.1	Coccopting	6 A.	1.5	Occupant	
	2019-04-13															
	2019-04-14 •	Non-MotorVehicle	Dq		Non-MotorVehicle	Da		Non-MotorVehick	De		Non-MotorVehic	ie De		Non-MotorVehicle		
	2019-04-15 •	IPC		17:39:01	IPC		17:39:14	IPC		17:39:16	IPC		17:39:24	IPC		17:39:26
	2019-04-16 *	0.01	Type Color	Two-whe	0.00	Type Color	Two-whe	- AND	Type Color	Two-whe	1 50	Type Color	Two-whe	100-	Type Color	Two-whe
	2019-04-17	1982		UnKnown	192		UnKnown	1	Heimet	UnKnown			UnKnown			UnKnown
		2.6	Occupanc	1	271	Occupanci	1	2.6	Occupano	1	17.2	Occupano	0 0		Occupanci	1
Motor Property																
e vii 🔺		Non-MotorVehicle	De		Non-MotorVehicle	De		Non-MotorVehici	De		Non-MotorVehic	ie De		Non-MotorVehicle	De	
or 🎽 🚬		IPC		17:39:38	IPC		17:39:41	IPC		17:39:55	IPC		17:40:03	IPC		17:40:14
- Al ·		100	Туре	Two-whe	100	Type	Two-whe	1.	Тура	Two-whe	and the	Type	Two-whe	- 3	Type	Two-whe
L. All		-92	Color Helmet	UnKnown	100	Color Helmet	UnKnown	1200	Color Helmet	UnKnown	199	Color Helmet	UnKnown			UnKnown
- All		170	Occupanc		311	Occupance	1	1 1	Occupanc	1	171	Occupano	1	\$1	Occupance	1
19 - 04 - 01 00 : 00 : 00 🖬		distriction of the			2000									10 C		
		Non-MotorVehicle	De		Non-MotorVehicle	De	_	Non-MotorVehici			Non-MotorVehici	a Da	_	Non-MotorVehicle		

Other Operations

Click on one displayed panel, and the icons are displayed. See Figure 6-46. For detailed operations, see "6.3.4.1 Search by Human."

```
Figure 6-46 Icons

IPC 17:38:24

Type Two-whe...

Color I

Helmet UnKnown

Occupance 1
```

6.4 IVS

IVS is to process and analyze the image, take the key information from the video, compare the key information with the preset detection rule and trigger an alarm once the detected behavior matches the detection rule.

IVS type includes cross line detection and cross region detection.

IVS and face detection function of the same remote device cannot co-exist.

IVS scene requirement is as follows:

- Total area of the target does not exceed 10% of the image.
- Target size in the image shall not be less than 10 pixels × 10 pixels, and leftover target size shall not be less than 15 pixels × 15 pixels (CIF image). Target height and width

shall not exceed 1/3 height and width of the image. It is suggested that target height should be 10% of image height.

- Brightness difference of target and background shall not be less than 10 gray levels.
- Ensure that the target appears in the field of view for over 2s, movement distance exceeds target width and shall not be less than 15 pixels (CIF image).
- When conditions allow, try to reduce complexity of surveillance analysis scene. It is not recommended to use IVS in the scene with gathered targets and frequent changes of light.
- Try to avoid glass, reflection of light on the ground and water; try to avoid tree branches, shadows and areas with mosquito; try to avoid backlight and direct light.

6.4.1 Setting

Set IVS. See Figure 6-47.

\square

Enable AI plan when AI by camera is used.



6.4.2 IVS

Set alarm rule of IVS.

 \square

- The system supports AI by camera and AI by device. When both are enabled, the system selects AI by device first.
- For example, set AI by device.

Step 1 Click 🔯, or click 🛨 on Setting interface, and then select **Event**.

The **Event** interface is displayed.

- Step 2 Select remote device in the device tree in the left.
- <u>Step 3</u> Select Al Plan > IVS Rule.

The IVS Rule interface is displayed.

Step 4 Click Al by device.

The Al by device interface is displayed. See Figure 6-48.

Video Detect AI By C XV Tampe IPC Offline Rule Type RuleName IPC Offline 规则1 Al Plan T Face Det R Face Reco Over Schedule
 Add Schedule Default Schedule » Record | IPC » Snap | IPC

Figure 6-48 AI by device

<u>Step 5</u> Set cross line detection and cross region detection rule.

 Click Add Rule, and select Cross Line Detection or Cross Region Detection. The rule information is displayed. See Figure 6-49 or Figure 6-50.

Figure 6-49 Configuring cross line detection rules	
--	--

+ Add Rule			
No.	RuleName	Rule Type	Operate
1	Rule1	CrossLineDetection	a

Figure 6-50 Configuring cross region detection rules

+ Add Rule			
No.	RuleName	Rule Type	Operate
1	Rule1	CrossRegionDetection	ă â

2) Click to enable detection rule.

Click to delete detection rule.

3) Click \Leftrightarrow to edit cross line. See Figure 6-51. Click to edit cross region.

See Figure 6-52.

- Hold on 🕅 and drag it to adjust position or length of the line and region.
- Click ⊢ or ∈ on cross line direction to set the direction. An alarm will be triggered only when the target crosses the line in the designated direction.
- Click white dot on the line or region frame to add a turning point. Hold on S
 on the turning point and drag it to adjust position or length of the line and
 region.
- Select a line and then click 💼 to delete.

Figure 6-51 Configuring cross line

	 ↔ Click the mouse to draw the area. ∴ Al Recognition . ∴ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔ ↔
IRC:	立

Figure 6-52 Configuring cross region

Image: Second state of the second
<u></u>

4) Set cross region action and direction.

Go to this step only when you set cross region.

5) Click \blacksquare or \blacksquare to set minimum size or maximum size of detection target.

System triggers an alarm once the detected target size is not larger than the maximum size or smaller than the minimum size.

Step 6 Al Recognition

 \square

After setting AI recognition, when the system detects a person or vehicle, a rule box will appear beside the person and vehicle in the surveillance image.

1) Click to enable AI recognition function.

The recognition type option displayed. See Figure 6-53.

Figure 6-53 Type

Al Rec	cogniti	on	
	ŤŤ	<u>~</u>	

- 2) Select a recognition type.
 - If is to recognize person, and a is to recognize vehicle.
 - After enabling AI recognition function, at least one recognition type shall be selected.
- <u>Step 7</u> Click **Deployment Time** to select schedule from the drop-down list.

After setting deployment period, system triggers corresponding operations when there is a motion detection alarm in the specified period.

- Click View Schedule to view detailed schedule settings.
- If the schedule is not added or the added schedule does not meet actual needs, click **Add Schedule**.
- Step 8 Click Actions to set alarm action. Refer to user's manual for detailed information.

Repeat Step 5-Step 8 to add multiple detection rules. Support to add max. 10 detection rules at the same time.

Step 9 Click Save.

6.4.3 Real-time View

On the Live interface, view real-time IVS results.

6.4.3.1 Live

Go to the Live interface, enable view, device displays view video. See Figure 6-54.

- When a target triggers cross line or cross region rule, the line or region frame in the view flickers in red.
- After setting AI recognition, when the system detects a person or vehicle, a rule frame will appear beside the person and vehicle in the view.
- There is a feature panel on the right side of the video window.



6.4.3.2 Detection Statistics

On the Live interface, click III. Person detection panel is displayed. See Figure 6-55. Click

E. The vehicle detection panel is displayed. See Figure 6-56.

Figure 6-55 People total

PC	2018-11-20 10:00:26	IPC	2018-11-20 10:00:24	IPC	2018-11-20 09:59:12	IPC	2018-11-20 09:58:06
	Record Typ e Human	1 X	Record Typ e Human	Ż.	Record Typ e Human		Record Typ e Human

Figure 6-56 Vehicle total



On this interface, you can view IVS detection image, play back recorded videos and export them.

6.4.4 Search Interface

After query of AI detection information, export the results to designated storage path. The exported detection result can include image, record and feature attribute.

 \square

- Connect USB device to the system if you are on the local menu to operate.
- Take exporting human detection information for example.
- After setting alarm linkage snapshot, during exporting images, the system exports detected images and panoramic images at the time of snapshot.

<u>Step 1</u> On the Live interface, click \blacksquare and then select Al Search > IVS.

<u>Step 2</u> Select the remote device, and set event type, effective target and time.

Step 3 Click Query.

The search results are displayed in the panel. See Figure 6-57.

Figure 6-57 Search result



<u>Step 4</u> Select multiple panels.

 \square

Check All to select all panels on this page.

Step 5 Click dr and select file format. See Figure 6-58.

Figure 6-58 File format

Export Excel
Export Video
Export Picture
ОК



The **Export** interface is displayed. See Figure 6-59.

Export	×
Total: 11.90MB Save Path: Browser	
OK Cance	əl

Step 7 Click Browser to select save path.

Step 8 Click OK.

The system exports files to designated path and displays **Export Progress** interface. <u>Step 9</u> Click **OK** to complete the settings.

6.5 Vehicle Comparison

IVSS compares the detected vehicle properties with plate pictures of linked plate database, and then triggers alarm when the matched similarity reaches or exceeds the defined similarity.

6.5.1 Procedure

The procedures of setting vehicle comparison are shown in Figure 6-60 and Figure 6-61. Figure 6-60 Vehicle comparison procedure (AI by camera)



6.5.2 Enabling AI Plan

Before using AI by camera, AI plan needs to be enabled first. For details, see "6.1 Enabling AI Plan."

6.5.3 Setting Vehicle Database

Set vehicle database, and then IVSS can analyze and compare vehicle plates with information in the database.

6.5.3.1 Creating Vehicle Database

You can create vehicle database, and then classify and manage the database. Database of trusted vehicle list and blocked vehicle list can be created. Alarm will be triggered when vehicle in the blocked list is detected.

Step 10 On the LIVE interface, click +, and then select FILE > Vehicle Management >

Vehicle Database.

The Vehicle Database interface is displayed. See Figure 6-62.

Figure 6-62 Vehicle database

iVSS		LIVE	FILE	+		:=	🎙 ‡ ‡ ≛-
🔅 Face Management	~	+ Create V	ehicle DB	💼 Delete	Usage 0%		
Face Database							
🔅 Vehicle Management	>						A 78
Vehicle Database							_

Step 11 Click Create Vehicle DB.

The Create Vehicle DB interface is displayed. See Figure 6-63.

Create Vehicle DB				×
1 Vehicl	e DB Name	2 Register	er Vehicle	
Vehicle DB Name				
Туре	Black List		•	
	Regist	ter Vehicle 🔺	Save and close	Cancel

Figure 6-63 Create vehicle database

 $\underline{Step \ 12}$ Set Vehicle DB Name, and select Type of vehicle database.

Step 13 Click Register Vehicle or Save and close.

• Click **Register Vehicle**, and add the vehicle information to the database. See Figure 6-64. For details, see "6.5.3.2 Registering Vehicle Information."

Create Vehicle DB	Usage 0%
	Vehicle DB Name 2 Register Vehicle
Add mode	Manual Add
Country or Region	▼ Plate
Name	Logo 👻
Driver ID	Color 🕅 . Plate Color 🐎 .
Cell Phone	
Email	Select 🗞
Address	
	Back Save and continue to add OK Cancel

Figure 6-64 Register vehicle plate

• Click **Save and close** to create a database without editing its information. The newly-created database can be viewed on the **Vehicle Database** interface. See Figure 6-65.

Figure 6-65 Vehicle database

iVSS	LIVE FILE	+		:= *	¢ ⊥ -
🔅 Face Management 🗸 🗸	+ Create Vehicle DB	💼 Delete Us	sage 0%		
Face Database	All				
Vehicle Management >	Database 1 🔀		Database 2 🔀		A 89
Vehicle Database	⊨ 0	Black List	a 1	Black List	
	 Disarmed 		Disarm	ed	

Other Operations

Operations after a database is created include modifying the database name, registering plate information, arming the database, and deleting the database. See Table 6-10.

Table 6-10 Other operations

Operation Description	Operation	Description
	oporation	

Operation	Description							
	• Database 2 : Database name.							
View database	 Image: Number of vehicle plate in the database. 							
information and status	Black List / White List : The database is in the blocked/trusted list.							
	• Disarmed : The database is not linked to channel for vehicle plate							
	comparison. If armed, the linked device channel will be displayed.							
Modify database name	lick I next the database name to modify its name.							
	Double-click the database, and you can manage the vehicle plate							
Manage database	information in the database. For details, see "6.5.3.3 Managing Vehicle Information."							
Arm database	Link the database to camera channel for vehicle plate comparison. For details, see "6.5.4 Setting Plate Comparison."							
	• Delete one by one: Move the cursor to the database, and click at the upper right corner to delete it.							
	• Delete in batch: Move the cursor to a database, and check \Box to							
Delete database	select the database. Select multiple databases in this way, and then							
	click Delete to delete the selected databases.							
	• Delete all: Select All, and then click to delete all							
	databases.							

6.5.3.2 Registering Vehicle Information

Add vehicle information in the created databases. Supports manual add, batch import, and add by searching.

This section takes batch add for example. Batch add allows you to import vehicle information to the database in batches.

Step 1 On the LIVE interface, click +, and then select FILE > Vehicle Management >

Vehicle Database.

The Vehicle Database interface is displayed.

<u>Step 2</u> Double-click the database. The database interface is displayed. <u>Step 3</u> Click **Batch Import**.

The **Batch Import** interface is displayed. See Figure 6-66.

Batch Import	×
Choose File	Browse
Download Template Replace Data	
Template Value Query	
Logo: Audi → Value: 1	
Type : Sedan	
Color : 👲 🗸 Value : FF0000	
Plate Color : 👲 🗸 Value : 0000FF	
	OK Cancel

<u>Step 4</u> Acquire and fill in the template file.

1) Click **Download Template** to download the template to PC or USB storage device.

The save path may vary when operating on client or local interface, and the actual interface shall prevail.

to view the save path of template file.

• On local interface: Select the save path of template file.

Make sure USB storage device is connected during local operation.

- On web interface: Template file is saved in the default download path of browser.
- Fill in the template fill according to your actual needs. See Figure 6-67.
 Fill in the vehicle information according to the instructions. For logo, type, color, and plate color, fill in the corresponding code or value. Search the code or value on the **Batch Import** interface (See Figure 6-66).

Figure 6-67 Template file

Serial 1	No *Plate No	Country	Logo	Type	Color	Plate Col	Owner	License	Tel	Email	Address			
	1 BD51SMR	GB	1	2	FFFFFF	FFFFFF	Peter	L-PETER12	T-0712345	123@gmail	Birmingha	m		
&&Expla:	in:													
	* is require	əd												
2. Count:	ry: Conform	to IS0316	36 specifi	cation. 2	bytes upp	percase fo	rmat. Exam	mple Great	Britain (GB Chinese	CN.			
3. Logo:	Please inpu	ut code nu	umber of v	ehicle lo	go. Exampl	le Bentley	54. The c	code numbe	r can be d	uerying d	n the page	e of downl	oaded thi	s.
4. Type:	Please inpu	it code ni	umber of v	ehicle typ	pe. Exampl	le SaloonC	ar 4. The	code numb	er can be	querying	on the pag	ge of down	loaded th	is.
5. Vehic	le Color: Pi	lease inpu	it RGB col	or. Examp	le Red FF(0000. The	code numbe	er can be	querying d	on the pag	e of down	loaded thi	s.	
3. Plate	Color: Plea	ase input	RGB color	. Example	Red FF000	0. The co	de number	can be qu	erying on	the page	of downloa	aded this.		
7. Licen	se: Please a	add prefix	α'L-'.											
B.Tel: I	Please add p	orefix 'T-	-'.											

3) Save template file.

<u>Step 5</u> On the **Batch Import** interface, click **Browse** to import template file.
If the plate number in the template is the same as the number in the database, select **Replace Data** to overlap the information in the database.

Step 6 Click OK.

The batch import result is displayed. See Figure 6-68.

Figure 6-68 Batch import result

Batch Import	×
1 successfully imported. O failed imported.	
Add More OK Cance	el

Step 7 Click Add More or OK.

- Click Add More: Import vehicle information, and continue to add vehicle information.
- Click **OK**: Import vehicle information.

The added vehicle information can be viewed on the **Vehicle Database** interface. See Figure 6-69.

Figure 6-69	Vehicle information
-------------	---------------------

iVSS	LIVE FILE +	:≝⁰ � � ⊥ -
🔅 Face Management 🗸 🗸	Back Disarmed	
Face Database	+ Manual Add 🗣 Batch Import + Copy to 💼 Delete	Q.
Vehicle Management >		A 75
Vehicle Database	Country or Region : Name : Driver ID : Logo : UnKnown Color : Plate Color : Type : Large Bus Address :	
	Country or Region : United Kingdom Name : Peter Driver ID : PETER123456D12EC Logo : Audi Color : Plate Color : Type : Heavy Truck Address : Birmingham	
	2 in total. Show up to 40 💌	> » Jump To

6.5.3.3 Managing Vehicle Information

After adding the vehicle information, such as plate, vehicle type, vehicle color, plate color, logo, to the database, the information needs to be properly managed and maintained to keep it accurate and complete.

On the LIVE interface, click , and then select FILE > Vehicle Management > Vehicle Database. The database interface is displayed. See Figure 6-70.

Move the cursor to the database, and then \mathbf{Z} , \Box , or \mathbf{D} to edit, copy/cut, or delete the vehicle information.

Figure 6-70 Database

iVSS	LIVE FILE +	:= ⁸ 🚸 🏟 💵
🔅 Face Management 🗸 🗸	Back Database 1 2	Disarmed
Face Database	+ Manual Add 👎 Batch Import + Copy to 💼 Del	ete Q -
Vehicle Management >		A 90
Vehicle Database	Country or Region : Name : Driver ID : Logo : UnKnown Color : Plate Color : Type : Large Bus Address :	
	Country or Region : United Kingdom Name : Peter Driver ID : PETER123456D12EC Logo : Audi Color : Plate Color : Type : Heavy Truck Address : Birmingham	
	2 in total. Show up to 40 👻	≪ < 1/1 > ≫ Jump To

6.5.4 Setting Plate Comparison

IVSS compares detected plate with plate information in the database, and trigger alarms when plate in the vehicle blacklist is detected.

Ш

The section takes AI by device for example, and the actual interface shall prevail.

Step 1 Click or + on the setting interface, then select EVENT.

The **EVENT** interface is displayed.

- <u>Step 2</u> Select device from the device tree on the left side.
- <u>Step 3</u> Select Al Plan > Plate Comparison.

The Plate Comparison interface is displayed. See Figure 6-71.

Figure 6-71	Plate comparison

Video Detect Video Motion Tampering Video Motion Pi PC Offline Pi PC Offline Video Motion Video Structuring Video Structuring Video Motion Video Motion<	EVENT +	:≝⁰ ♣ ऴ ▲-
Begloyment Time IPC Offline * Al Plan * Associate Vehicle Without Database * Associate Vehicle Database	∀ Video Detect	Al By Device Enabled
 IPC Offline Al Plan Foce Detection Foce Detection Foce Recognition Video Structuring Ivis Vehicle Recognition Plate Comparison 		
 A I Plan Face Detection Video Structuring Video Structuring Video Structuring Video Structuring Plate Comparison 		
 Al Plan Face Detection Face Recognition Video Structuring IVS Vehicle Recognition Plate Comparison 	IPC Offline 🗸	
Face Detection Image: Comparison Image: Plate Comparison		+ Associate Vehicle Database
Refresh Save Cancel	☆ Face Detection ☆ Face Recognition ③ Video Structuring □ IVS □ Vehicle Recognition	
and Called		Refresh Save Cancel

Step 4 Click **I** to enable plate comparison. The icon changes to **I**.

- <u>Step 5</u> Click **Deployment Time** dropdown list to select schedule. IVSS links alarm event when an alarm is triggered within the schedule configured.
 - Click Add Schedule to add new schedule if no schedule is added or the existing schedule does not meet requirements.
 - Click View Schedule to view details of schedule.
- <u>Step 6</u> Link vehicle without database.

Enable linkage of vehicle without database. Alarm is triggered when vehicle not in the database is detected.

1) Click >> .

The **Associate Vehicle Without Database** interface is displayed. See Figure 6-72.



℅ Associate Vehicle Without Database	
Record IPC	×
Log Enable	×
+ Actions	
Accorite Vahiele Database	

2) Click Actions to set alarm linkage event.

Step 7 Link database.	
-----------------------	--

Repeat the following steps to link multiple databases.

1) Click **Associate Vehicle Database**, and select the database to be linked.

The database linkage interface is displayed. See Figure 6-73.

Figure 6-73 Database linkage

+ Associate Vehicle Database		
Database 1		亩
Al Alarm Rule 🔄 🖓	Show Feature Panel	
Record IPC		×
Log Enable		×
+ Actions		

2) Set the parameters. See Table 6-11.

Table 6-11 Database linkage parameters

Parameter	Description
Al Alarm Rule	Click 🖄 🕞 to set the color of alarm rule box.
Show Feature Panel	Click , and when alarm is triggered, the plate comparison information is displayed in the feature panel of video image.

3) Click Actions to set alarm linkage event.

Step 8 Click Save.

6.5.5 Real-time View

View vehicle comparison results on the LIVE interface.

You can view real-time vehicle comparison results on the **LIVE** interface. If vehicle in the database is detected, properties of the vehicle, such as plate, type, color, and logo, are displayed on the right side of the real-time video image.

6.5.5.1 Setting AI Display

You can set the vehicle properties that you want to display on the real-time video image.

Before setting the features and properties, you need to create a view by adding cameras to the view so you can check video and pictures captured by the cameras.

<u>Step 1</u> Select a view from LIVE > View > View Group.

Step 2 Click 1, and then select Vehicle tab.

The Vehicle interface is displayed. SeeFigure 6-74.

Figure 6-74 Vehicle

View 3	Face Human Vehicle Non-MotorVehicle
 camera1 camera1 camera1 camera1 camera1 	Show Tracking Box :
	Image: Safe Belt Driver Call Image: Safe Belt Driver Call
	Features Panel :
	Transparence : 7 Plate No. Plate Color Color Logo Driver Calling Safe Belt Place
	Sync from AI-Dis. Apply to all win OK Cancel
1 0 ii	11903 🚘 103798 💑 5378 🍞

Step 3 Click **Content** next to **Show Tracking Box** to enable tracking box function.

A tracking box is displayed in the video image when target meeting detection rule is detected.

- <u>Step 4</u> Set features panel.
 - 1) Click met to Features Panel to enable features panel function.

Features panel will be displayed at the right side of video image when target with selected features is detected.

- 2) Select a vehicle information panel. \checkmark means the panel is selected.
- (Optional) Drag ^(O) to adjust the transparency of panel. The higher the value, the more transparent the panel.
- 4) (Optional) Select the features to be displayed in the panel.
 - Up to 4 features can be displayed.
 - 4 features are selected by default. To select another feature, click the selected feature to cancel it, and then click the feature to be displayed.

Step 5 Click OK.

6.5.5.2 Live

On the **LIVE** interface, select a view, and the video image of the view is displayed. See Figure 6-75.

- Tracking box is displayed in the video image.
- Features panel is displayed at the right side of the video image.

Figure 6-75 Live Rule box Features panel

Move the cursor to the features panel, and the operation icons are displayed. See Figure 6-76.

Figure 6-76 Icons



- Click
 to add license plate information to the plate database.
- Click O or double-click the vehicle image to play back the video image (10 s before and after the time of taking the snapshot).

6.5.5.3 Detection Statistics

You can view the vehicle comparison results. For example, you can view whether a vehicle is in the blacklist database or whitelist database.

On the **LIVE** interface, select a view and then click **E**. The **VEHICLE TOTAL** interface is displayed.

Click $\overline{\ }$, and then select Vehicle Comparison (Black List) and Vehicle Comparison

(White List). The vehicle comparison result is displayed. See Figure 6-77.

C	2019-04	4-04 16:54:12	ITC	2019-04	4-04 16:54:12	ITC	2019-04	4-04 16:54:11	ITC	2019-04	4-04 16:54:10
	A Bla	ck list		A Bla	ck list		✓ Wh	ite list	1 I.M. 2	A Bla	ck list
	Plate	_}A6839N	1.1	Plate	_!A081PY	1.20	Plate	A2C781		Plate	AVW9
	Туре	Unknown	1. AV	Туре	Unknown	Be and	Туре	Unknown		Туре	Unknown
-74X	Color	•	1 1 N	Color		Here's A	Color		A STAN	Color	
	Logo	Unknown	2.5 D-5 1 %	Logo	Unknown		Logo	Unknown		Logo	Unknown

Move the cursor to the information panel, and the following icons are displayed:

- E: Click it to add license plate information to plate database.
- Click it or double-click the picture to play back the video image (10 s before and after the time of taking the snapshot).
- Click it to export the video to specified save path (PC or USB storage device).

 \square

Make sure USB storage device is connected if you want to store the file to such storage device.

6.5.6 Al Search

Set search conditions such as device and properties, and then search information that meets the conditions. IVSS supports search by property and search by database.

6.5.6.1 Search by Property

Set search conditions such as device and properties, and then search vehicle recognition information that meets the conditions.

Step 1 On the LIVE interface, click **+**, and then select **AI Search > Search by Vehicle**.

The Search by Vehicle interface is displayed.

Step 2 Select device, and then click Property tab.

The search by property interface is displayed. See Figure 6-78.





Step 3 Select Plate Comparison as the Event Type.

Step 4 Set vehicle properties and time period.

Click do r to set the color. do reans more than one color.

Step 5 Click Query.

The search result is displayed. See Figure 6-79.

If license plate is detected, both the scenario and the license plate will be displayed. Figure 6-79 Search result

iVSS		LIVE	AI SEARCH +								:= 45	🕸
iearch by Face	Search by Human	Search by Vehicle	Search by NonMotor	IVS				a la				
) SearchDevic	e Name/IP	All									1	Total 64200
V Device		2019-04-17	7 • camera1	camera1		00:00:10 camera1		camera1	00:00:13	camera1	00.00:13	00:00:13
Access	lia		1	Plate Color		Jan 7 0	late	ine .	Plate Color	Plate Color		
				Type Logo	UnKnown		ogo Unknown Unknow		Type UnKnown Logo Unknow	Type Logo		
			International Statement Statement	Vehicle Detection		Vehicle Detection		Vehicle Detection		Vehicle Detection		
			camera1	Plate	00:00:13	camera1	00:00:14	camera1	00:00:16 Plate	camera1	00:00:16	
Property	Vehicle DB			Color			Color 🚺		Color 🚺	Color		
vent Type			1000	Type Logo	UnKnown Unknow		ype UnKnown ogo Unknow		Type UnKnown Logo Unknow	Type Logo	UnKnown Unknow	
Plate Comparison	•											
ehicle Property		Vehicle Detecti	Vehicle Detection		Vehicle Detection		Vehicle Detection		Vehicle Detection			
Type All	Color		camera1		00:00:17	camera1	00:00:17	camera1	00:00:17	camera1	00:00:17	
Logo All	▼ Plate			Plate Color		Carlo C	Nate Color	(FR)	Plate Color	Plate Color		
Plate Enter Plate	Number 🛛 🕹			Type Logo	UnKnown		ype UnKnown ogo Unknow		Type UnKnown Logo Unknow	Type Logo		
2019 - 04 - 17	00 : 00 : 00		Vehicle Detecti	on		Vehicle Detection		Vehicle Detection		Vehicle Detection		
2019 - 04 - 17	23:59:59 🗐		camera1		00:00:17	camera1	00:00:18	camera1	00:00:18	camera1	00:00:18	
	uery			Plate Color Type	UnKnown		Nate Color N Vype UnKnown		Plate Color N Type UnKnown	Plate Color Type		
	ange 30 days	L		Logo	Unknow	and the second se	ogo Unknow	and the second se	Logo Unknow	Logo	Unknow	

Other Operations

Click on one displayed panel, and the icons are displayed. See Figure 6-80. For operation details of icons, refer to "6.5.5.3 Detection Statistics."

Figure 6-80 Icons



6.5.6.2 Search by Database

Search vehicle recognition information according to database.

<u>Step 1</u> On the LIVE interface, click +, and then select Al Search > Search by Vehicle.

The Search by Vehicle interface is displayed.

<u>Step 2</u> Select device from the device tree, and then click **Vehicle DB** tab.

The search by database interface is displayed. See Figure 6-81.

Figure 6-81 Search by vehicle database



Step 3 Select the database to be searched.

Step 4 Click Query.

The search result is displayed. If license plate is detected, both the scenario and the license plate will be displayed.

Other Operations

Click on one displayed panel, and the icons are displayed. For operation details of icons, refer to "6.5.5.3 Detection Statistics."



You can log out, reboot and shutdown the device. See Figure 7-1.

Figure 7-1 User operation

Hi, admin							
a	Change Password						
f	Lock						
Ð	Log Out						
-875	Reboot						
Ċ	Shut Down						

Log Out

Click , and then select Log Out.

Reboot

Click And then select **Reboot**. System pops up confirm dialogue box. Click **OK** to reboot.

Shut Down

To unplug the power cable may result in data (record, image) loss. We recommend Mode 1.

- Mode 1 (recommended): Click , and then select **Shut Down**. System pops up confirm dialogue box, and then click **OK** to shut down.
- Mode 2: Use power on/off button on the device.
 - ♦ 8-HDD series product: Press power on/off button on rear panel.
 - Other series products: Press the power on/off button on the device for at least 4 seconds.
- Mode 3: Unplug the power cable.

Appendix 1 Cybersecurity Recommendations

Cybersecurity is more than just a buzzword: it's something that pertains to every device that is connected to the internet. IP video surveillance is not immune to cyber risks, but taking basic steps toward protecting and strengthening networks and networked appliances will make them less susceptible to attacks. Below are some tips and recommendations on how to create a more secured security system.

Mandatory actions to be taken for basic equipment network security:

1. Use Strong Passwords

Please refer to the following suggestions to set passwords:

- The length should not be less than 8 characters;
- Include at least two types of characters; character types include upper and lower case letters, numbers and symbols;
- Do not contain the account name or the account name in reverse order;
- Do not use continuous characters, such as 123, abc, etc.;
- Do not use overlapped characters, such as 111, aaa, etc.;

2. Update Firmware and Client Software in Time

- According to the standard procedure in Tech-industry, we recommend to keep your equipment (such as NVR, DVR, IP camera, etc.) firmware up-to-date to ensure the system is equipped with the latest security patches and fixes. When the equipment is connected to the public network, it is recommended to enable the "auto-check for updates" function to obtain timely information of firmware updates released by the manufacturer.
- We suggest that you download and use the latest version of client software.

"Nice to have" recommendations to improve your equipment network security:

1. Physical Protection

We suggest that you perform physical protection to equipment, especially storage devices. For example, place the equipment in a special computer room and cabinet, and implement well-done access control permission and key management to prevent unauthorized personnel from carrying out physical contacts such as damaging hardware, unauthorized connection of removable equipment (such as USB flash disk, serial port), etc.

2. Change Passwords Regularly

We suggest that you change passwords regularly to reduce the risk of being guessed or cracked.

3. Set and Update Passwords Reset Information Timely

The equipment supports password reset function. Please set up related information for password reset in time, including the end user's mailbox and password protection questions. If the information changes, please modify it in time. When setting password protection questions, it is suggested not to use those that can be easily guessed.

4. Enable Account Lock

The account lock feature is enabled by default, and we recommend you to keep it on to guarantee the account security. If an attacker attempts to log in with the wrong password several times, the corresponding account and the source IP address will be locked.

5. Change Default HTTP and Other Service Ports

We suggest you to change default HTTP and other service ports into any set of numbers between 1024~65535, reducing the risk of outsiders being able to guess which ports you are using.

6. Enable HTTPS

We suggest you to enable HTTPS, so that you visit Web service through a secure communication channel.

7. Enable Whitelist

We suggest you to enable whitelist function to prevent everyone, except those with specified IP addresses, from accessing the system. Therefore, please be sure to add your computer's IP address and the accompanying equipment's IP address to the whitelist.

8. MAC Address Binding

We recommend you to bind the IP and MAC address of the gateway to the equipment, thus reducing the risk of ARP spoofing.

9. Assign Accounts and Privileges Reasonably

According to business and management requirements, reasonably add users and assign a minimum set of permissions to them.

10. Disable Unnecessary Services and Choose Secure Modes

If not needed, it is recommended to turn off some services such as SNMP, SMTP, UPnP, etc., to reduce risks.

If necessary, it is highly recommended that you use safe modes, including but not limited to the following services:

- SNMP: Choose SNMP v3, and set up strong encryption passwords and authentication passwords.
- SMTP: Choose TLS to access mailbox server.
- FTP: Choose SFTP, and set up strong passwords.
- AP hotspot: Choose WPA2-PSK encryption mode, and set up strong passwords.

11. Audio and Video Encrypted Transmission

If your audio and video data contents are very important or sensitive, we recommend that you use encrypted transmission function, to reduce the risk of audio and video data being stolen during transmission.

Reminder: encrypted transmission will cause some loss in transmission efficiency.

12. Secure Auditing

- Check online users: we suggest that you check online users regularly to see if the device is logged in without authorization.
- Check equipment log: By viewing the logs, you can know the IP addresses that were used to log in to your devices and their key operations.

13. Network Log

Due to the limited storage capacity of the equipment, the stored log is limited. If you need to save the log for a long time, it is recommended that you enable the network log function to ensure that the critical logs are synchronized to the network log server for tracing.

14. Construct a Safe Network Environment

In order to better ensure the safety of equipment and reduce potential cyber risks, we recommend:

- Disable the port mapping function of the router to avoid direct access to the intranet devices from external network.
- The network should be partitioned and isolated according to the actual network needs. If there are no communication requirements between two sub networks, it is suggested to use VLAN, network GAP and other technologies to partition the network, so as to achieve the network isolation effect.
- Establish the 802.1x access authentication system to reduce the risk of unauthorized access to private networks.