



Configuration Guidance of 2nd generation of Face DeepinMind NVR

HIKVISION TECHNICAL SUPPORT TEAM

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How to setup face recognition system with 2nd generation of DeepinMind NVR

This quick guide shows you how to set up face recognition system with 2nd generation of DeepinMind NVR.

All operations in the quick guide are based on iDS-9632NXI-I8/8F(B), V4.1.40.

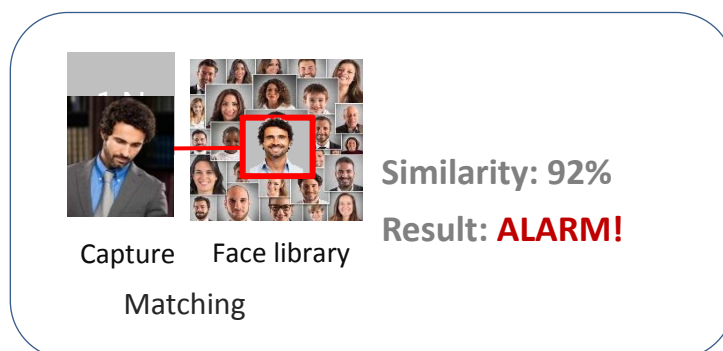
1. Basic introduction

iDS-9632NXI-I8/8F(B) is Hikvision's new generation AI NVR, with Hikvision deep learning algorithm, which can capture and recognize face.

iDS-9632NXI-I8/8F(B) have a build-in SSD for database and support up to 100,000 face pictures in face libraries.

iDS-9632NXI-I8/8F(B) support 8-ch real-time face capture and comparison.

iDS-9632NXI-I8/8F(B) support search by picture.



2. Operation

2.1 Create database

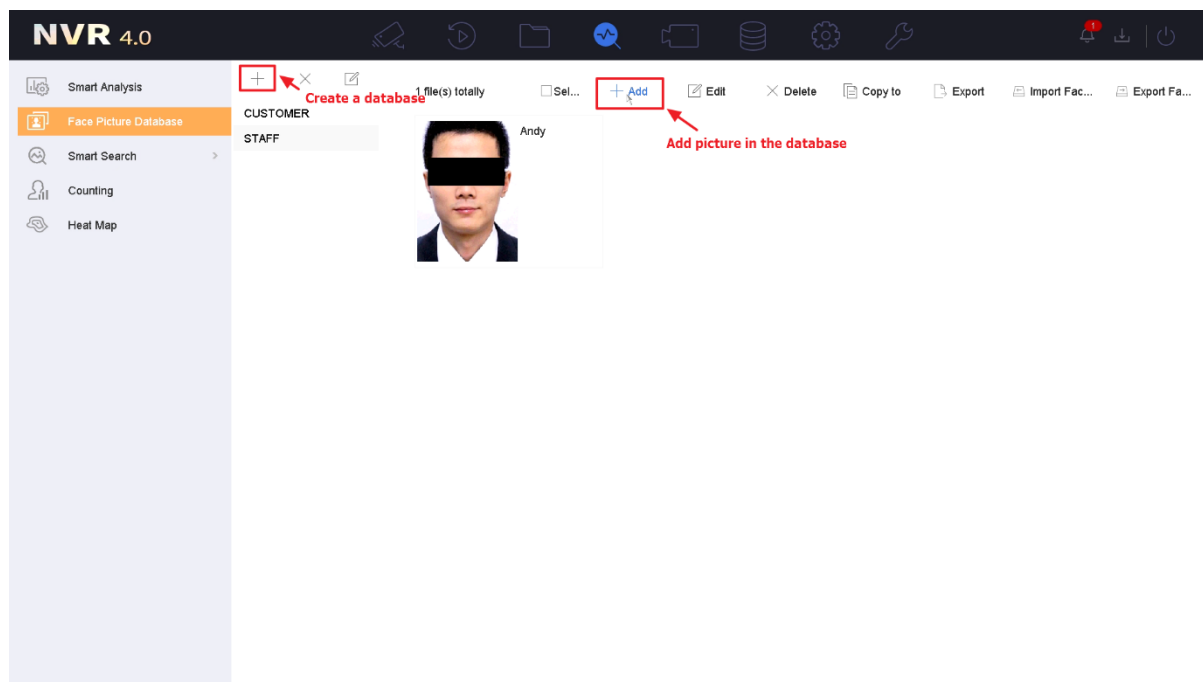
Go to NVR's local GUI, **Smart Analysis—Face Picture Database**, create database and add face pictures in the database(The database also can be created via web or iVMS). iDS-9632NXI-I8/8F(B) can support 16 face libraries in database and each library can support up to 100,000 pictures. Here are the requirements for face picture in database:

40 <Min. Pupil Distance <300 (recommend 60) pixels.

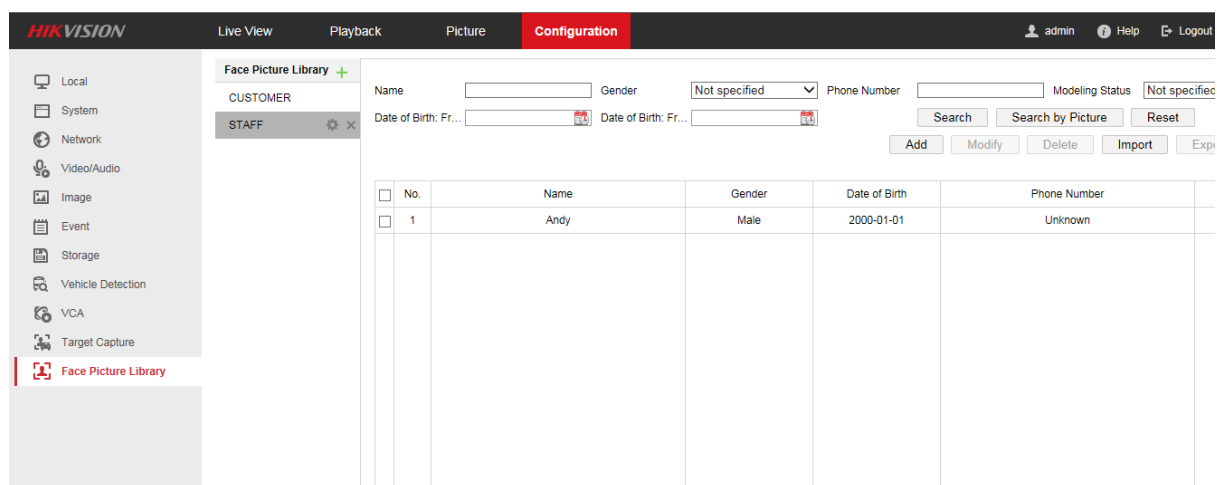
20KB <Photo Size<4MB



Format: JPG, JPEG



Create database via local GUI



Create database via web

Notes:

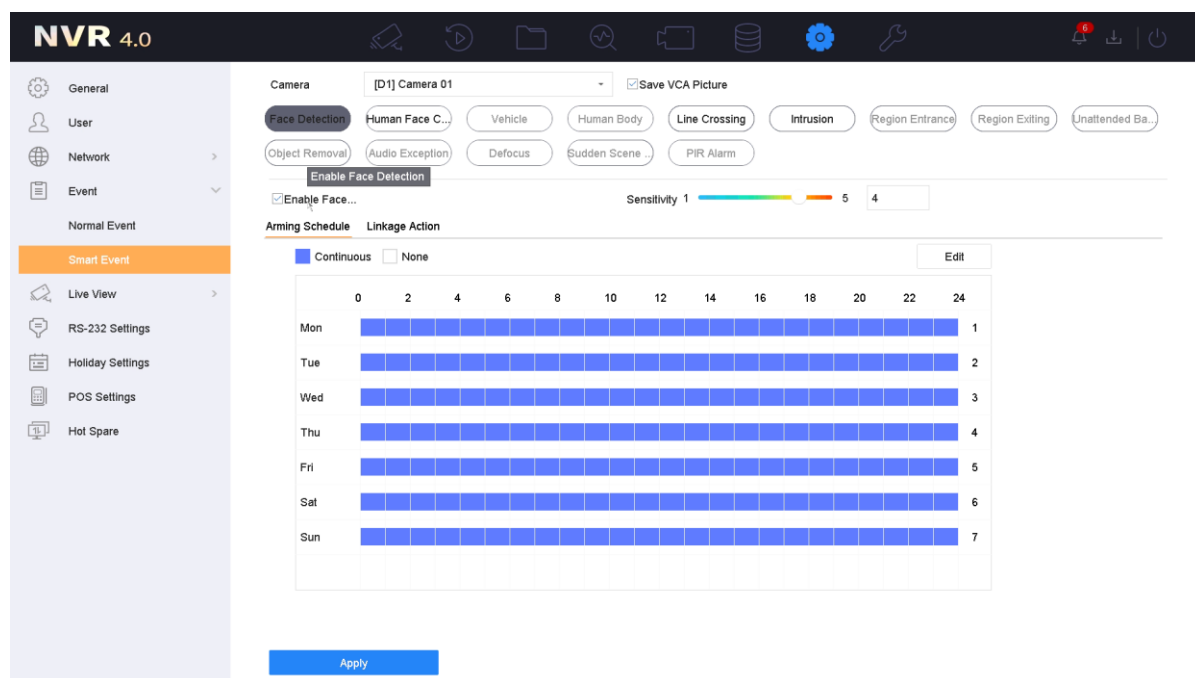
- 1) Insert the USB drive that contains the face pictures to create database via local GUI. You can select one picture in USB drive to add or a file that contains multiple pictures to import pictures in batch.



- 2) The local GUI don't support custom tags except name and phone number for database. You can add custom tags for database via web or iVMS.
- 3) The picture added to the database should has only one face.
- 4) There is a Batch Configuration Tool to import & modify face picture library for DeepinMind NVR. Please refer to the 'How to use Batch Configuration Tool to import & modify face picture library for DeepinMind NVR' document for details.

2.2 Configure face capture

Go to NVR's local GUI, **System—Event—Smart Event—Face detection**, tick '**Enable Face Detection**' and NVR will detect and capture face by itself.



Go to NVR's web page, **Configuration—VCA—Rule**, tick '**Rule**' and draw the detection area and min. pupil distance (there will be recommended range of the min. pupil distance below).

Rule

☒ Rule

12-18-2017 11:20:49

[D7] IPCamera 07

Shield Region

Rule

Face Capture

Target Capture

Face Picture Library

0 2 4 6 8 10 12 14 16 18 20 22 24

Mon

Tue

Wed

Thu

Fri

Sat

Sun

Capture Interval: 4

Capture Times: 1

Sensitivity: 2

Generation Speed: 3

Save

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Notes:

- 1) **Capture Interval:** Capture are taken every few frames, in which the captured images are the highest quality images in each of these frames.
- 2) **Capture Times:** To control the number of face capture during the people entering the detection area and leaving the detection area.
- 3) **Sensitivity:** The higher the sensitivity, the easier it is to detect faces.
- 4) **Generation Speed:** Target generation speed is used to control the speed of the target generated by the human face entering the detection area. The larger the value, the faster the target is generated.

- 5) For face capture camera, the face detection can't be enabled and the NVR will receive the face image captured by camera by default.
- 6) NVR can capture face for up to 4-ch IPC whose resolution is lower than 8MP.

2.3 Configure real-time face comparison

Go to NVR's web page, **Configuration—Event—Face Comparison**, tick '**Enable**' and select libraries that you want to compare with. Then set a value of similarity for each library. Now there are two alarm modes: **Face Comparison** and **Stranger Detection**. When the **Face Comparison** mode is selected, only when the similarity between capture face and face in library is higher than the **Similarity** you set, the **Face Comparison** alarm will be triggered. When the **Stranger Detection** mode is selected, only when the similarity between capture face and face in library is lower than the **Similarity** you set, the **Stranger Detection** alarm will be triggered.

Face Comparison alarm

Camera: [D1] Camera 01

☐ Enable Non-Real-Time Face Comparison

Face Comparison **Stranger Detection** Face Grading

☒ Enable

Prompt for Stranger: [Stranger]

☐ Enable Alarm Output Pulse

Arming Schedule > **Linkage Method** > Face Picture Library

Normal Linkage	Trigger Alarm Output	Trigger Recording	PTZ Linking [D1]
☐ Audible Warning	☐ A->1	☒ D1	☐ Preset No.
☐ Send Email	☐ A->2	☐ D2	[1] (dropdown)
☒ Notify Surveillance Center	☐ A->3		☐ Patrol No.
☐ Full Screen Monitoring	☐ A->4		[1] (dropdown)
	☐ D1->1		☐ Pattern No.
			[1] (dropdown)

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Stranger Detection alarm

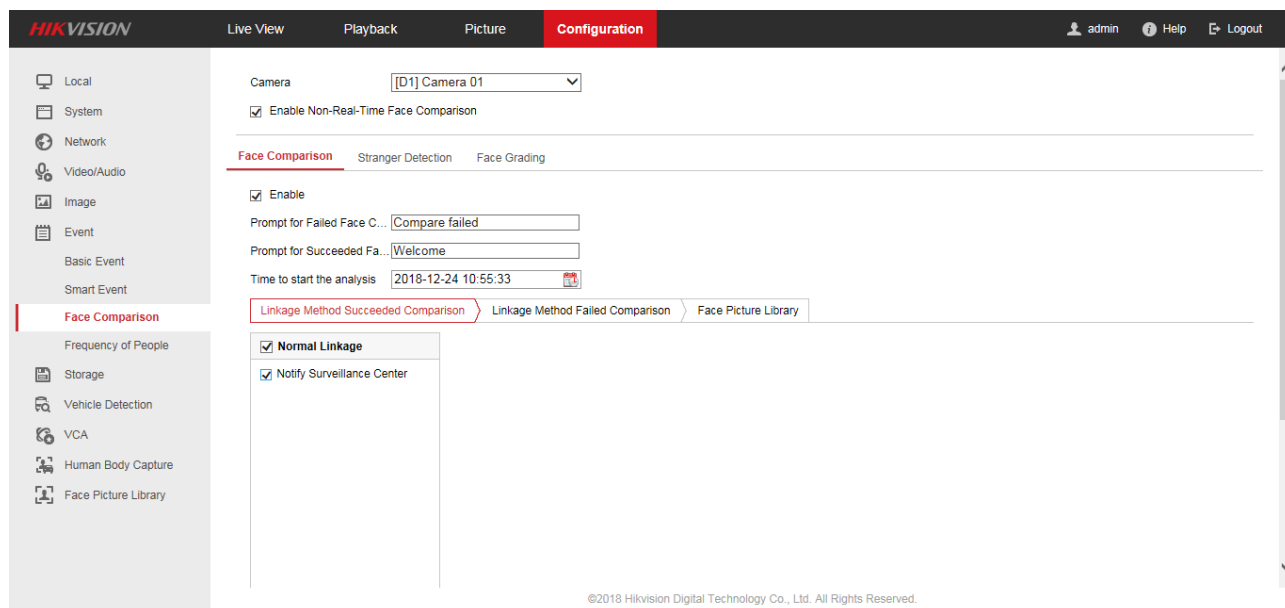
Notes:

- 1) **Enable Alarm Output Pulse:** The time of alarm output pulse can be configured to control the alarm device (like access control device) better.

2.4 Configure non-real time face comparison

Go to NVR's web page, **Configuration—Event—Face Comparison**, tick '**Enable Non-Real-Time Face Comparison**', '**Enable**' and select libraries that you want to compare with. Then set a value of similarity for each library. There are also two alarm modes: **Face Comparison** and **Stranger Detection**. When the **Face Comparison** mode is selected, only when the similarity between capture face and face in library is higher than the **Similarity** you set, the **Face Comparison** alarm will be triggered. When the **Stranger Detection** mode is selected, only when the similarity between capture face and face in library is lower than the **Similarity** you set, the **Stranger Detection** alarm will be triggered.





Notes:

- 1) When the non-real time face comparison is enabled, the face capture would be processed by GPU in its idle time.
- 2) The linkage action only have '**Notify Surveillance Center**'.
- 3) The NVR can support full-channel non-real time face comparison.

2.5 Configure high frequency people detection

Go to NVR's web page, **Configuration—Event—Frequency of people**, tick **Enable** and select channels. If someone came to your private property several times during a period of time, this guy may want to do some bad thing, then the frequently appeared person alarm will be very useful. But for commercial place, the staff should not trigger the alarm, then we can create a face library of staff and select this library as **Linked Face Picture Library** as shown below so that all the people in this library won't trigger this alarm. The high frequency people detection will occupy the resource of real-time face comparison, which means iDS-9632NXI-I8/8F(B) can support 8-ch high frequency people detection.



The screenshot shows the Hikvision NVR Configuration interface. The top navigation bar includes 'Live View', 'Playback', 'Picture', and 'Configuration' (highlighted in red). The left sidebar lists various settings categories: Local, System, Network, Video/Audio, Image, Event, Basic Event, Smart Event, Face Comparison, Frequency of People (highlighted in red), Storage, Vehicle Detection, VCA, Human Body Capture, and Face Picture Library. The main content area is titled 'Frequency of People' and contains the following settings:

- ☒ Enable
- Capture Interval: 5 minute(s)
- Frequency Threshold: 3
- Day(s): 3 Day(s)
- Similarity: 85

Below these settings are four tabs: 'Linked Channel' (selected), 'Linked Face Picture Library', 'Arming Schedule', and 'Linkage Method'. The 'Linked Channel' tab displays a list of channels with checkboxes:

- ☐ Select All
- ☒ 10.5.2.91-01
- ☐ 10.5.2.91-02
- ☒ Camera 01
- ☒ IPCamera 07

A red 'Save' button is located at the bottom of the configuration area.

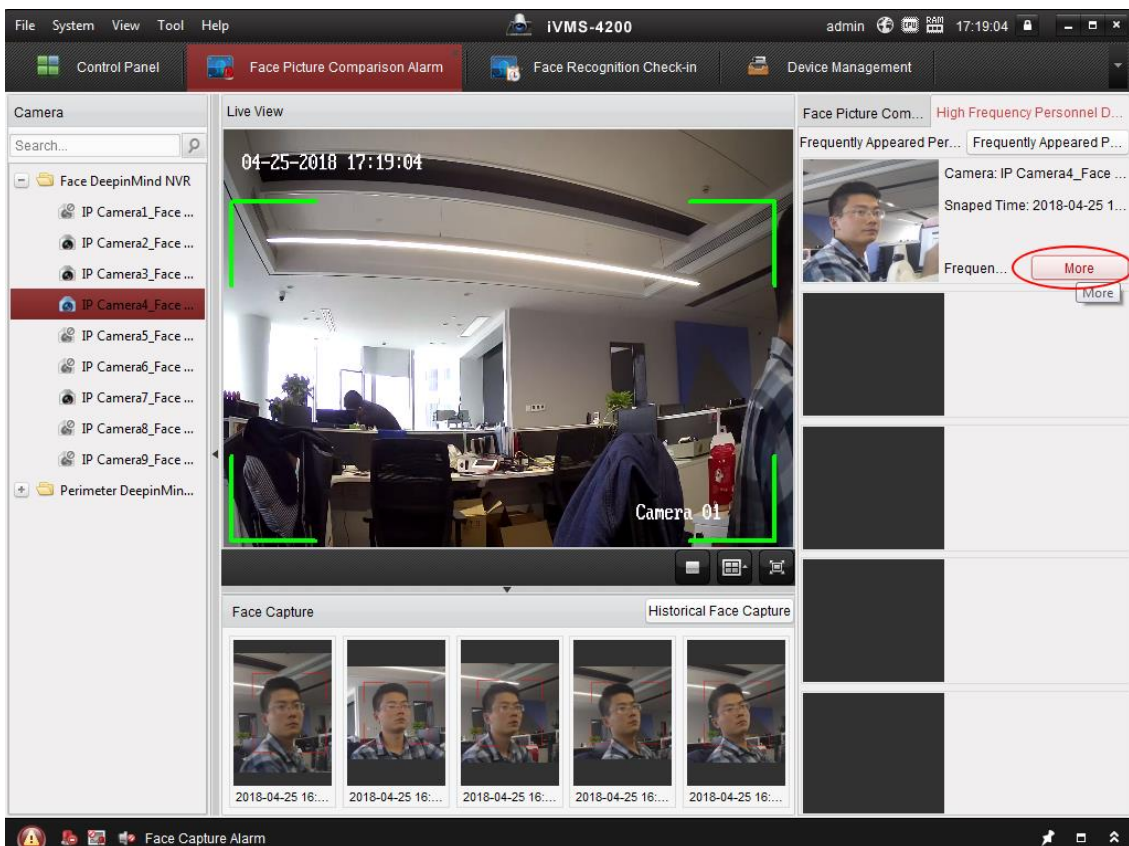
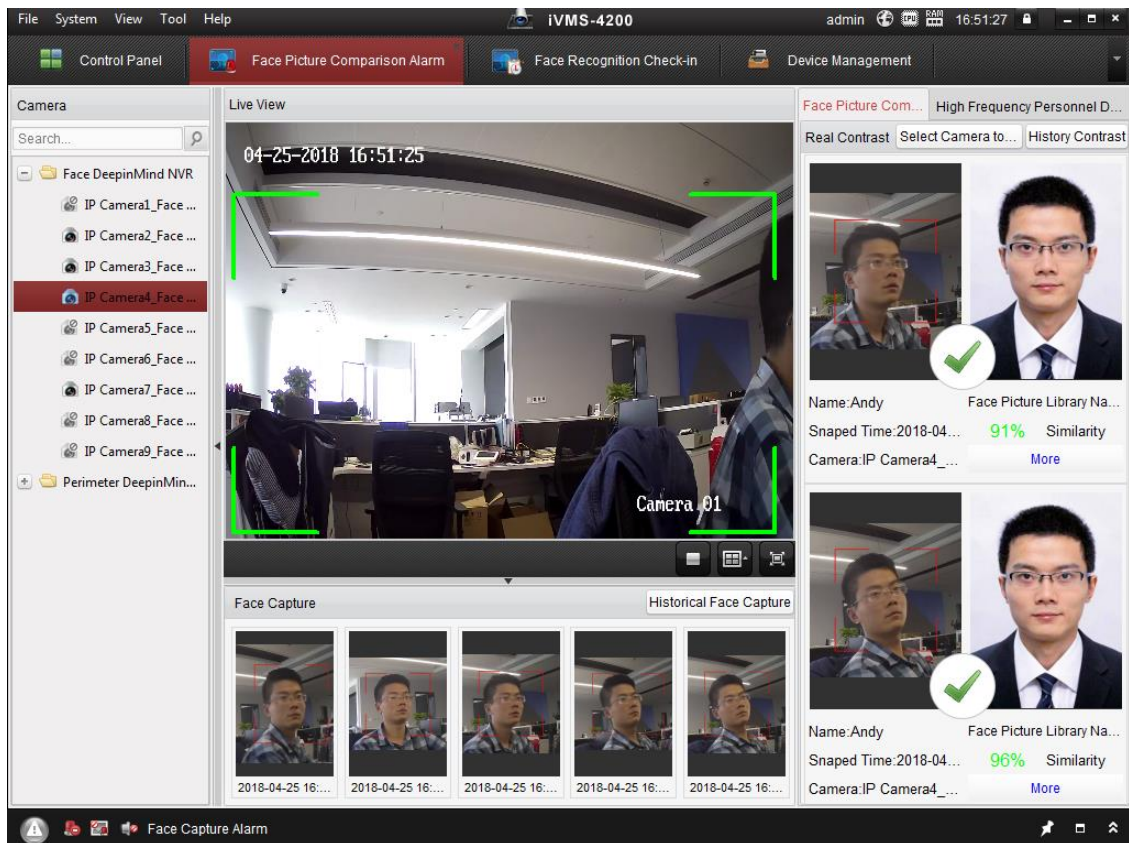
Notes:

- 1) **Capture Interval:** If someone appeared several times in the capture interval time, the NVR would only count that this person come once.
- 2) **Frequency Threshold & Days:** Frequency Threshold and Days trigger the alarm together. For example, if the same person appear 10 times during the latest 7 days, the alarm will be triggered.
- 3) **Similarity:** The similarity decide whether these two people are the same person.

2.6 Receive real-time and non-real time face comparison alarm

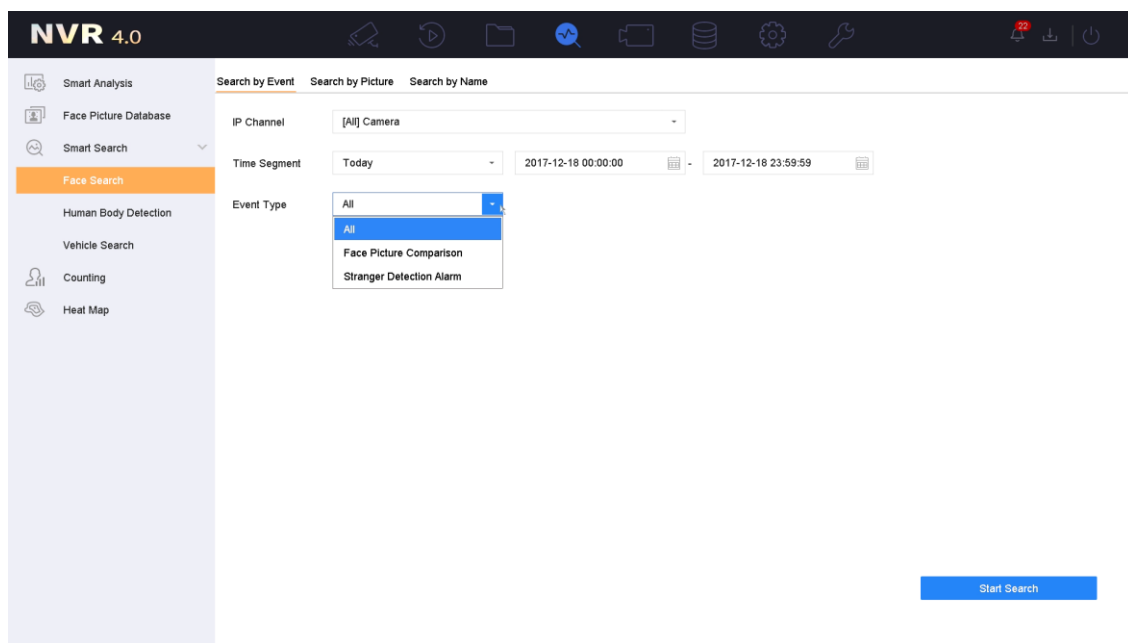
Install the customized iVMS-4200 dedicated for DeepinMind NVR and go to **Face Picture Comparison Alarm** tab, the real time and non-real time face capture will be show in the below while the real-time and non-real time **Face Comparison** and **High Frequency People Detection** will be show in the right. For **High Frequency People Detection**, you can click the **More** to check how many times the person appeared.





2.7 Search capture face

Go to NVR's local GUI, **Smart Analysis—Smart Search—Face Search**, there are three kinds of face search: **Search by Event**, **Search by Picture** and **Search by Name**. In **Search by Event**, you can search the capture face by the type of the alarm mode.



In **Search by Picture**, you can search the capture face by the pictures (When you upload several pictures, the search results are the combination of these several people) that you upload from local or **Face Picture Database**.

NVR 4.0

Smart Analysis
Face Picture Database
Smart Search
Face Search
Human Body Detection
Vehicle Search
Counting
Heat Map

Search by Event Search by Picture Search by Name

Upload Sample from Local
Upload Sample from Face Picture Database

Not more than 5 pictures for sample cache. 0/0

IP Channel [All] Camera

Time Segment Today 2017-12-18 00:00:00 - 2017-12-18 23:59:59

Similarity(0~100) ≥ 80

Start Search

In **Search by Name**, you can search the capture face by the name in **Face Picture Database**.

NVR 4.0

Smart Analysis
Face Picture Database
Smart Search
Face Search
Human Body Detection
Vehicle Search
Counting
Heat Map

Search by Event Search by Picture Search by Name

IP Channel [All] Camera

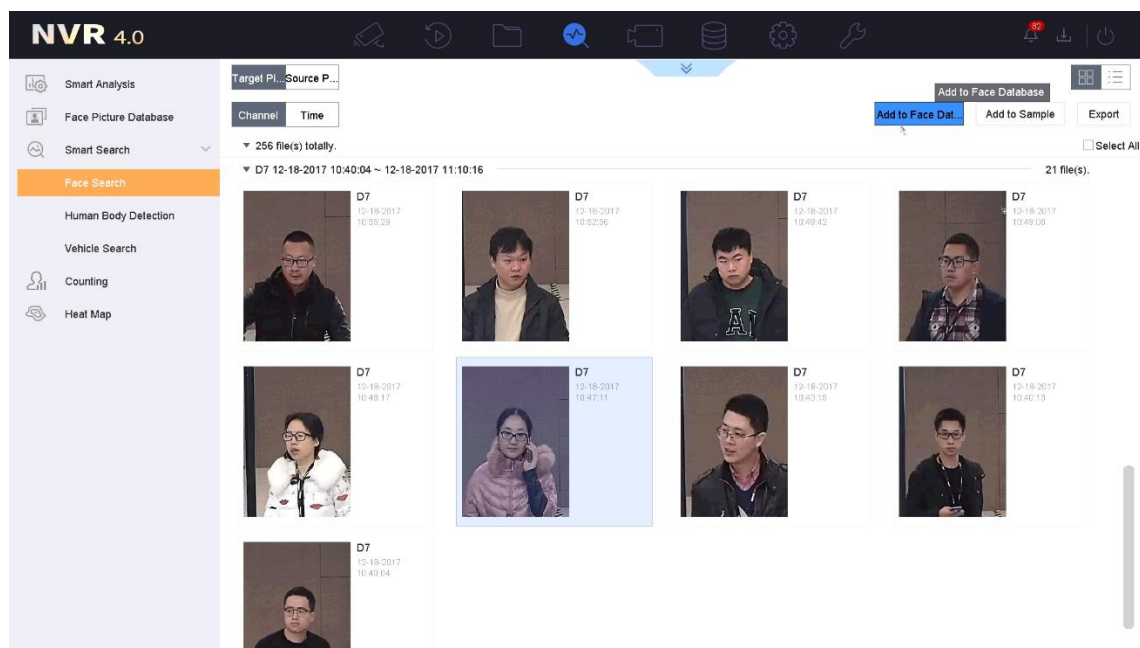
Time Segment Today 2017-12-18 00:00:00 - 2017-12-18 23:59:59

Name Andy

Start Search

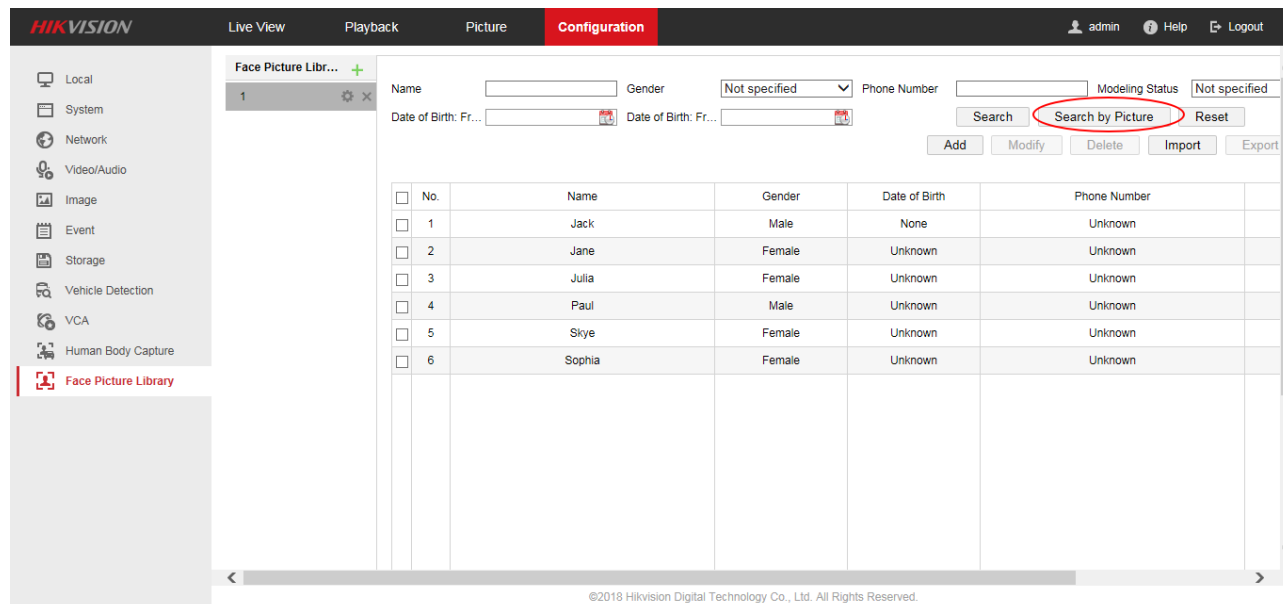
You can select face picture in the **Face Search** result and add the selected face picture to **Face Picture Database** directly.





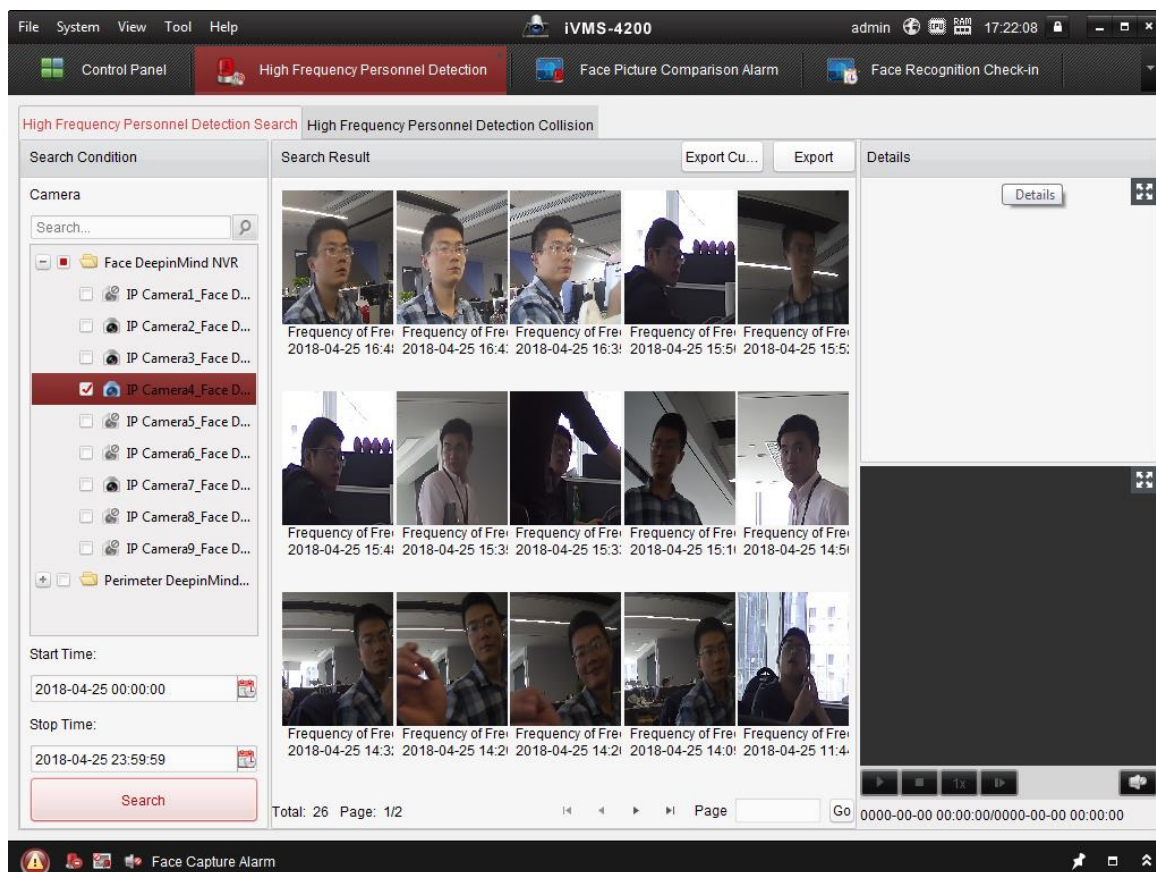
2.8 Face identification

Go to NVR's web page, **Configuration—Face Picture Library**, select a library and click **Search by Picture**, then upload a picture from your PC and set similarity to search the similar face picture in face library.

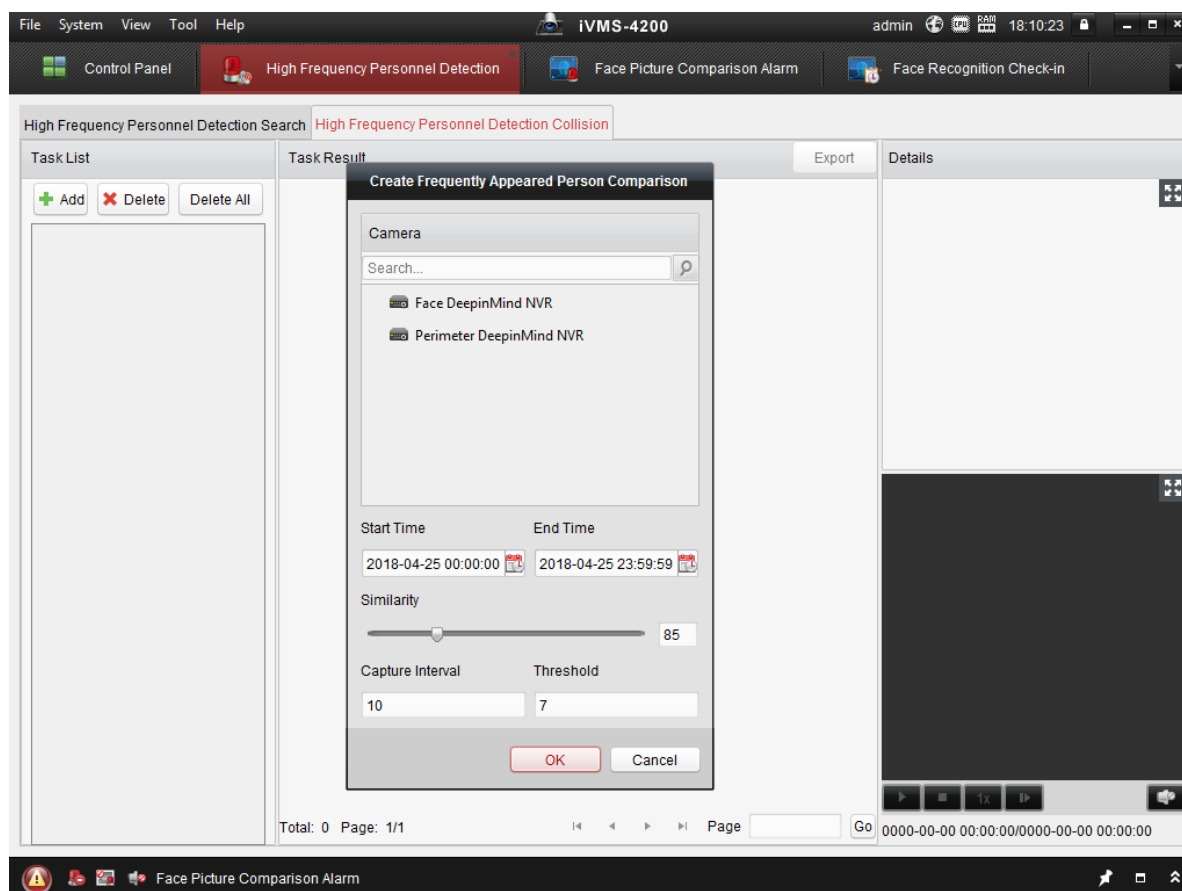


2.9 Search high frequency people detection

Go to customized iVMS-4200's **High Frequency Personnel Detection- High Frequency Personnel Detection Search** tab, select channels and time to search the **high frequency people detection** alarm record.



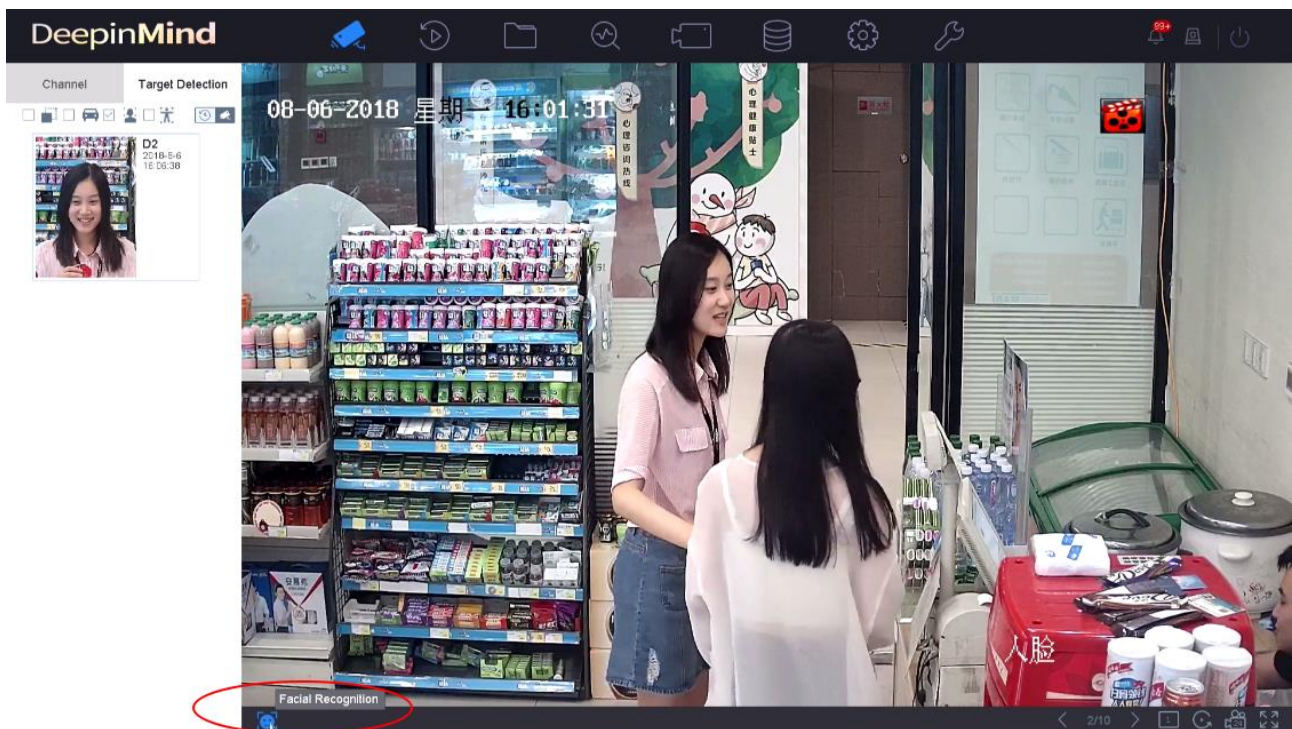
If you want to search the high frequency people using different parameters, there is another search mode: High Frequency Personnel Detection Collision. Go to customized iVMS-4200's **High Frequency Personnel Detection- High Frequency Personnel Detection Collision** tab, click **Add** and select device, time, capture interval and threshold to search the high frequency people. To realize this function, the real-time **High Frequency Personnel Detection** should be enabled.



2.10 Export face recognition check-in & attendance statistics

Go to NVR's local GUI, **Live View—Facial Recognition—Search Record**, select channels, face libraries and time to search the face recognition check-in and attendance record. Click the **Search** button to show the face recognition check-in & attendance record. Then click the **Export** button to export the check-in & attendance statistics to the USB drive.





Search Record

Channel: [All] Camera Face Picture Lib... Staff Start Date: 23-07-2018 End Date: 25-07-2018

Attendance Time: 10:30:00 Leave Time: 14:30:00 Attendance Period: Mon

Check-in Start Time: 09:30:00 Check-in End Time: 17:30:00 Search

00:55

Search Record

Export Attendance Record

Export Attendance Record Export Check-in Record

No.	Name	Library	Tag	Normal (Day)	Late (Day)	Leave Early (Day)	Absence (Day)	Checked in	Unchecked in
1	Jack	Staff		0	0	0	3	0	3
2	Devin	Staff		0	0	0	3	0	3
3	Hank	Staff		0	2	0	1	2	1
4	Tom	Staff		0	1	0	2	0	3
5	Kelo	Staff		3	0	0	0	3	0
6	Lella	Staff		1	1	1	0	3	0
7	Eric	Staff		0	2	0	1	1	2
8	Zhang	Staff		2	1	0	0	3	0
9	Jadon	Staff		1	0	0	2	1	2
10	Alan	Staff		2	0	0	1	2	1
11	Juana	Staff		1	1	1	0	3	0
12	Oven	Staff		3	0	0	0	3	0
13	Rachel	Staff		1	2	0	0	3	0
14	Eric	Staff		1	0	1	1	2	1
15	Cathy	Staff		1	1	0	1	2	1
16	Klay	Staff		1	2	0	0	3	0
17	...	...	...	...	...	...	...	...	...

Total: 20 P: 1/1

Go

Jack

Check... Unchec...

0 3

Normal Leave ... Late Absence

0 0 0 3

< 2018 Jul >

S M T W T F S

1 2 3 4 5 6 7

8 9 10 11 12 13 14

15 16 17 18 19 20 21

22 23 24 25 26 27 28

29 30 31

The following excel shows us the exported attendance statistics. There are four status in the attendance statistics: **Absenteeism, Late, Early and Normal.**



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Index	Name	Lib Name	Sex	Label 1	Label 2	Label 3	Label 4	07-23	07-23	07-24	07-24	07-25	07-25
2	1	Jack	Staff	Unrecognized					Absenteeism	-	Absenteeism	-	Absenteeism	-
3	2	Devin	Staff	Unrecognized					Absenteeism	-	Absenteeism	-	Absenteeism	-
4	3	Hank	Staff	Unrecognized					Absenteeism	-	Late	16:08~20:04	Late	12:39~15:08
5	4	Tom	Staff	Unrecognized					Absenteeism	-	Late	17:55~17:55	Absenteeism	-
6	5	Kelo	Staff	Unrecognized					Late	09:33~18:07	Late	09:30~17:34	Late	09:34~12:08
7	6	Jimmy	Staff	Unrecognized					Normal	09:14~17:58	Absenteeism	-	Late	09:47~12:11
8	7	Leila	Staff	Unrecognized					Early	08:44~10:56	Normal	09:10~18:11	Late	16:52~16:52
9	8	Eric	Staff	Unrecognized					Late	17:06~17:06	Late	17:32~18:21	Absenteeism	-
10	9	Zhang	Staff	Unrecognized					Late	17:23~18:14	Normal	09:03~17:52	Early	09:00~15:44
11	10	Jadon	Staff	Unrecognized					Absenteeism	-	Normal	09:01~18:09	Absenteeism	-
12	11	Alan	Staff	Unrecognized					Late	09:56~20:03	Normal	09:28~21:58	Absenteeism	-
13	12	Juana	Staff	Unrecognized					Late	11:50~12:47	Early	09:21~16:40	Early	09:23~10:20
14	13	Oven	Staff	Unrecognized					Late	09:44~19:07	Normal	09:15~22:20	Late	09:31~16:25
15	14	Rachel	Staff	Unrecognized					Late	12:48~19:01	Late	16:06~19:16	Late	09:31~09:31
16	15	Eric	Staff	Unrecognized					Late	09:43~19:11	Absenteeism	-	Late	09:31~09:31
17	16	Cathy	Staff	Unrecognized					Late	09:53~17:54	Absenteeism	-	Late	15:35~16:35
18	17	Klay	Staff	Unrecognized					Late	14:22~18:13	Late	11:04~11:04	Early	09:06~15:47

The face recognition check-in record

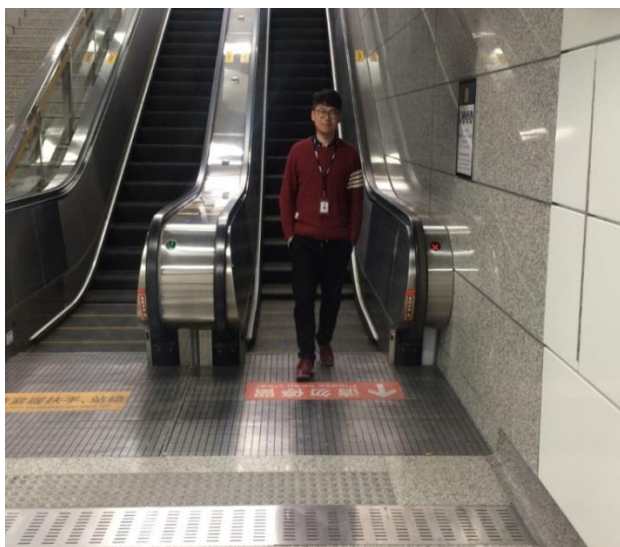
3. Installation specification

3.1 Installation

The accuracy rate of face recognition is great involved with installation location, ambient light (such as too dark, too bright) and so on. In order to ensure the better effect, it raises some installation suggestions as follows:

- 1) Installation position should be the standard passageways or the Entrances/ Exits, which insures the direction of traffic is particular and capture the Enter/Leave personnel' faces in the direction.
- 2) Choose the stable lighting condition with adequate illumination. Light compensation is necessary to ensure the facial features are visible under the condition of insufficient light or backlight.

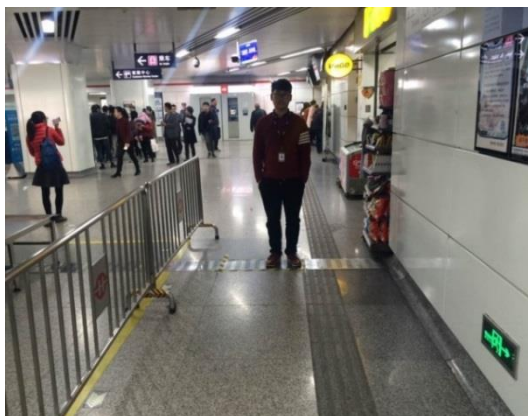
Example of standard scenario:



Example of unsuitable scenario:

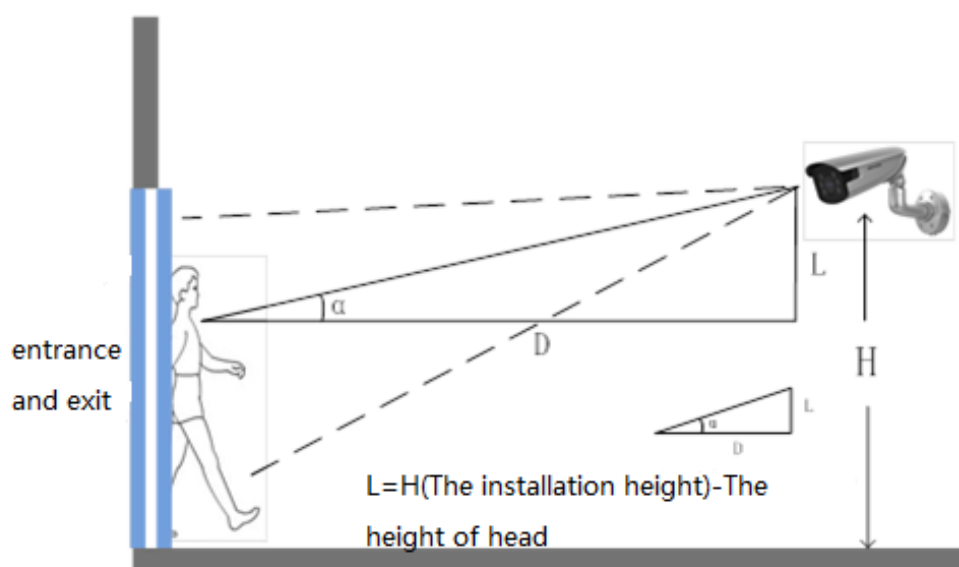


Backlight



Lack of light

3.2 The Installation Requirement of Camera



The installation diagram

The installation position selection specification of face capture camera is as follows:

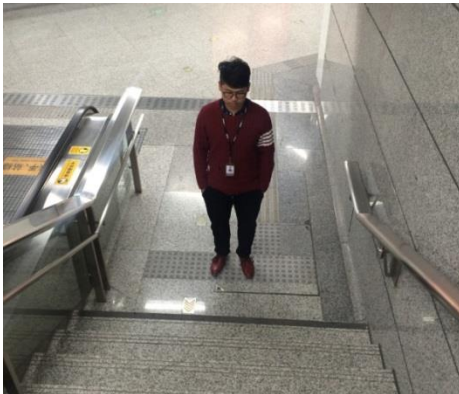
- 1) The camera should be installed in the front of passageway and capture the positive face. The horizontal angle of deflection had better be less than 25° .
- 2) The installation of camera needs an elevation angle, which avoids the situation that the rear face is obscured when the tandem persons go through the passageway. The vertically elevation angle should meet the below requirement: $\alpha=15\pm 5^{\circ}$.
- 3) It requires that the covered PD (Pupil Distance) pixels needs to be larger than 40 pixels to distinguish the face details from the captured image. The practical width of face detection should be less than or equal to 3 meters with 2MP camera.
- 4) Make sure that there is no shelter between the camera lens and the passageway.

Example of standard scenario:

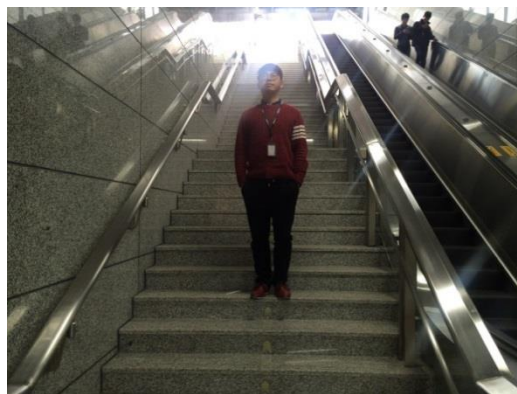




Example of unsuitable scenario:



Dip Angle is too large



Elevation Capture



The scenario is too wide



Incline installation, with shelter



The scenario is too large and the face recognition rate is low

3.3 The Selection of Camera Lens

Different cameras, lens focal lengths and monitoring widths are key points for the different monitoring distance and installation. The conversion relation between them is as follows:

1) The selection of lens focal length: $f = 1.8D$ 8426 (1)

2) The height of camera: $H = \tan(\alpha^\circ) \times D + 1.5$ (2)

3) D : The monitoring distance

4) The height below the head sets as average value 1.5 m

5) α is the elevation angle

6) Elevation angle is recommended as 10° , $\tan(10^\circ) \approx 0.18$, $\tan(15^\circ) \approx 0.27$, $\tan(20^\circ) \approx 0.36$

3.4 Installation Position and Lens Query Table

Camera Model	Monitoring Width W	Lens Focal Length	Monitoring Distance	Installation of Camera	Height	Elevation angle α°
200W	3.0m	4mm	2.2m	1.9m-2.3m		$15^\circ \pm 5^\circ$
200W	3.0m	8mm	4.4m	2.3m-3.1m		$15^\circ \pm 5^\circ$
200W	3.0m	16mm	8.9m	3.1m-4.7m		$15^\circ \pm 5^\circ$

Here're several modes we recommend for outdoor/indoor use, customer can also select by themselves according to actual scenario.

IP camera	indoor	outdoor
6 & 7 series	iDS-2CD6026FWD-A/F DS-2CD7126G0-IS DS-2CD7026G0-IS	DS-2CD7A26G0-IS(H)(Y)
8 & 9 series	iDS-2CD8426G0/F-I	iDS-2PT9122IX-D/F



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