HIKVISION

AI Products Introduction:

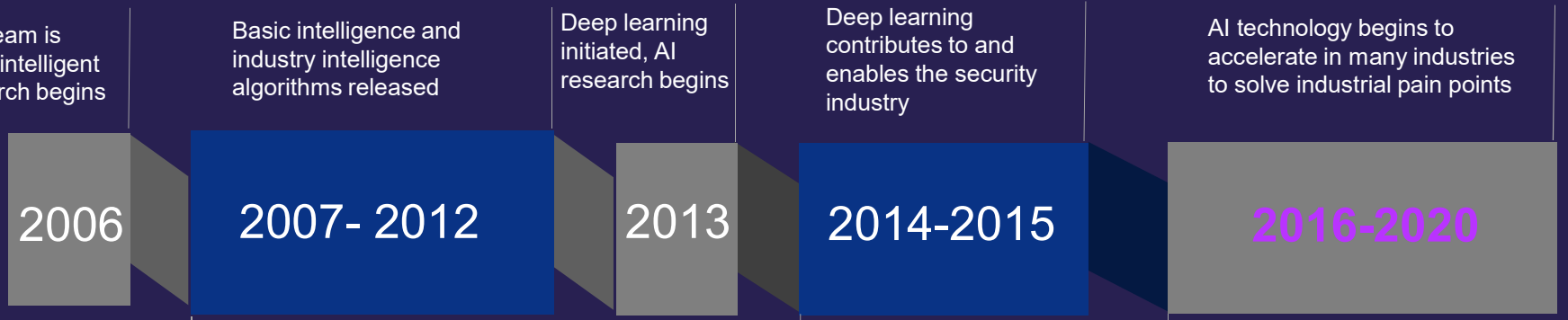
Facial Recognition Applications

Deep-in-AI Business

Accelerate Your Business with AI

Technical Development of the Hikvision Research Institute (HRI)

Deep-in-Business AI
Accelerate Your Business with AI



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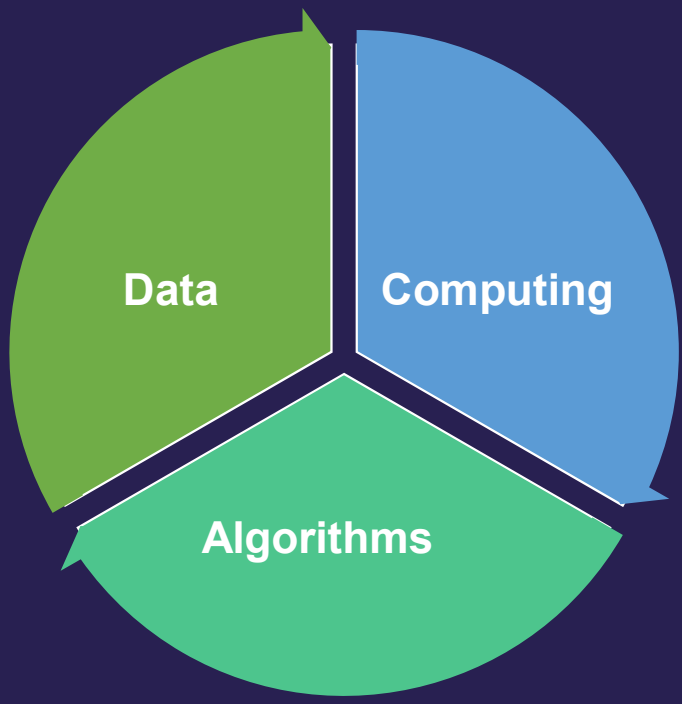
Three Key Factors for Artificial Intelligence

Deep-in-Business
Accelerate Your Business with AI



Basic Data

The volume and diversity of data are growing rapidly. Hikvision has accumulated abundant CCTV-based data.

Computing Ability

Computing abilities are growing along with the diversification of AI chips. Collaboration with the world's first-class GPU vendor.

Algorithms

Deep learning research continuously drives algorithm optimization. More than 1,000 engineers have now been working on AI algorithms for several years.

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AI Cloud Platform – First CCTV Company to Launch Its **AI CLOUD** in 2017

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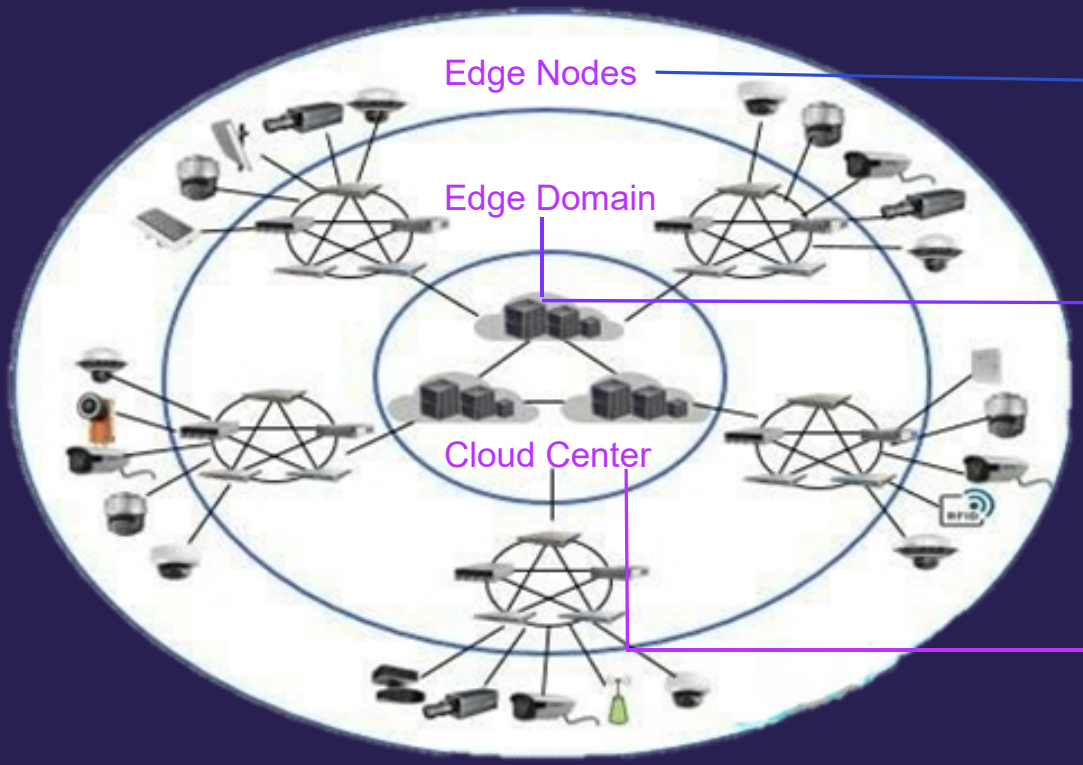

Edge Nodes focus on multi-dimensional data perception acquisition and front-end intelligent processing.

Edge Domain focuses on data convergence, storage, processing, and intelligent applications.

Cloud Center focuses on the convergence of multidimensional data, including IoT data, and multidimensional analytics applications based on big data.

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Hikvision AI Training Platform — Enabling Personal AI Applications

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Workflow:

Continually increasing imaging in actual use, forming a closed data loop

Collect and annotate images

Import

Built-in algorithm network, semi-auto training

Generate algorithm

Algorithm warehouse

NVRs

IP Cameras

User | **Images** | **Training** | **Implementation**

Applications:

Banks

Mines

Intelligent Manufacturing

Healthcare

Military

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Abundant AI Products

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AI Products

Front End

- Intelligent PTZs
- Fusion Intelligent IPCs
- Intelligent IPCs
- Special IPCs
- AcuSense IPCs

Back End

- Behavior Analysis NVRs
- DeepinMind NVRs

Servers

- Big Data Servers
- Full Analysis Servers
- Intelligent Fusion Servers
- Behavior Analysis Servers

VMS

- HikCentral Master
- HikCentral Enterprise
- HikCentral Professional

Facial Recognition Workflow

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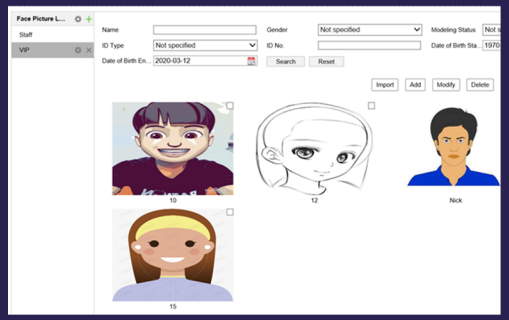
1. Face Picture Library



2. Face Capture

Best shot / Quick shot

3. Face Comparison

4. Result

Comparing the captured face image with face images in face picture libraries to get the comparison result.

Video → Face Detection → Face Tracking → Face Grading → Face Capture → Face Output

Face Capture

Attribute Extraction, Face Modeling → Face Comparison → Result Output

Facial Recognition

Face Capture

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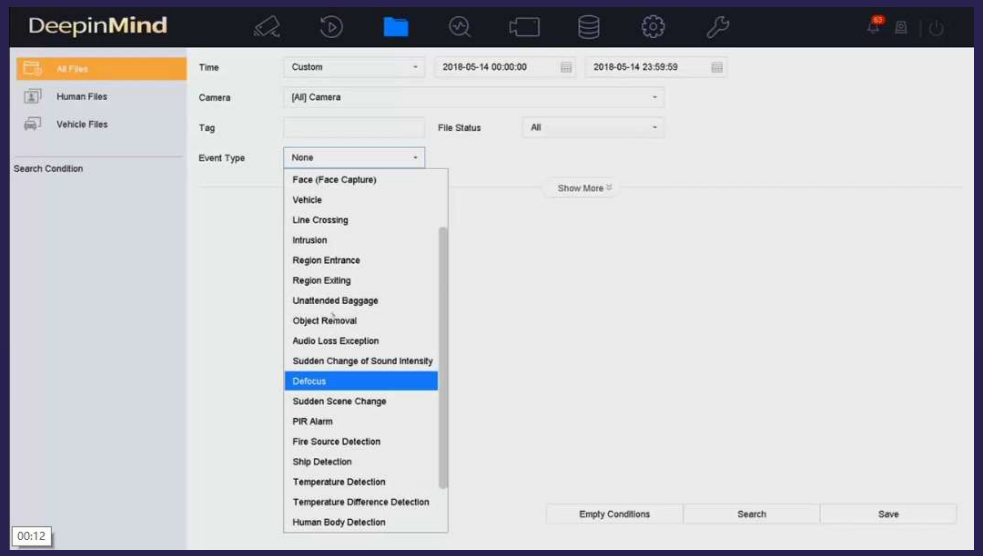
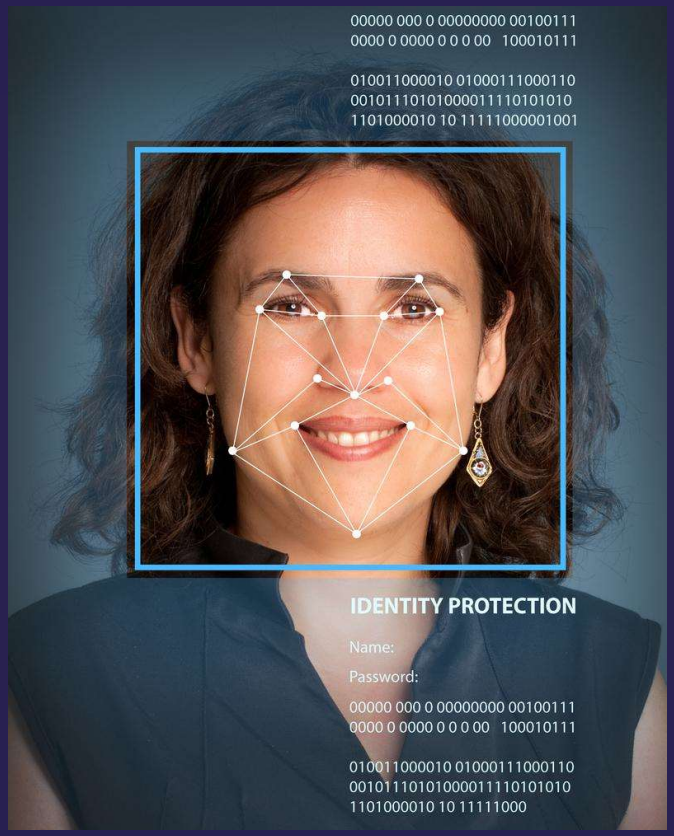
Face capture performance:

Up to **30** faces that appear in the screen can be detected and captured.



Facial Recognition Applications

HIKVISION



- List alarm
- Stranger alarm
- High frequency alarm
- Face attendance
- 1 V 1 comparison
- Identity verification
- Search by face picture
- Face attribute analysis and search by face attribute
- Personal archive
- Privacy protection

Deep-in-Business

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List Alarm

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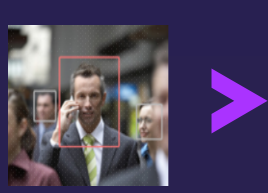
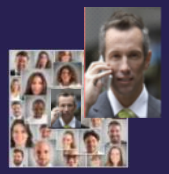
- Recognizing faces in real time and giving alarms on people in face libraries, such as VIPs and blacklists
- Blacklist alarm: preventing potential criminals
- VIP detection: recognizing potential customers to help boost the sale
- Scenarios: retail stores, banks, stations, office buildings, hotels, etc.



Captured face

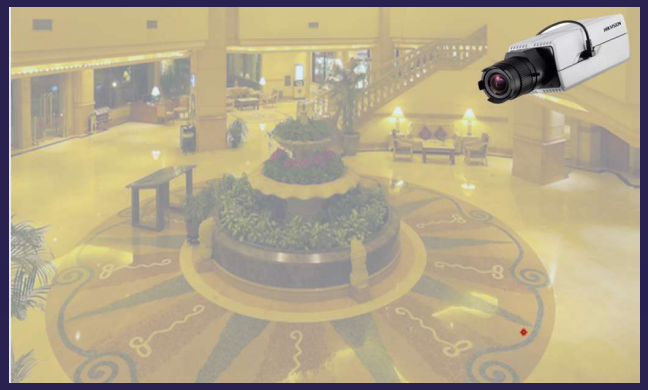


Compared with blacklist/VIP list

Alarm Linkage

Matched! Alarm!

Blacklist Alarm



VIP Detection

Retail

Bank

Station

Office Building

Stranger Detection

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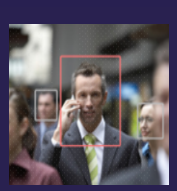
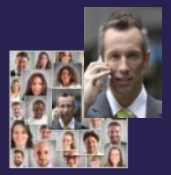
- Recognizing faces in real time, gives alarms on strangers (people that are not in the face library)
- Keeping strangers away from open but sensitive areas.
- Scenarios: important places where only insiders are allowed to enter, such as office buildings, residences, laboratories, warehouses, vaults, etc.



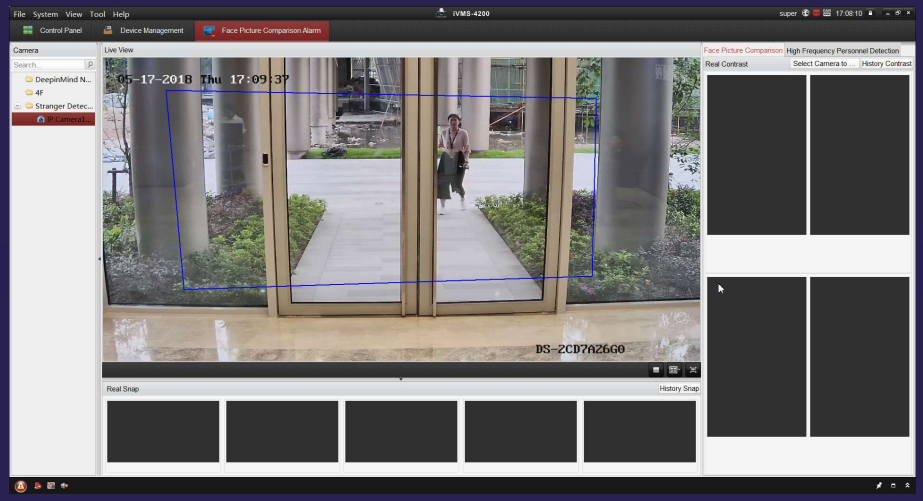
Captured face



Compared with blacklist/VIP list

Alarm Linkage

Not Matched! Alarm!



Warehouse

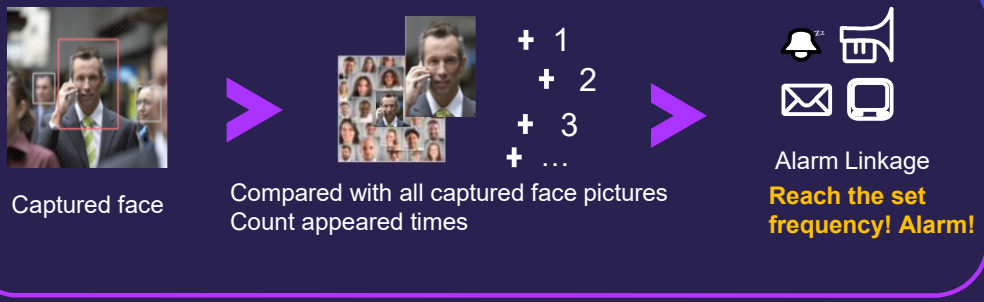
Vault

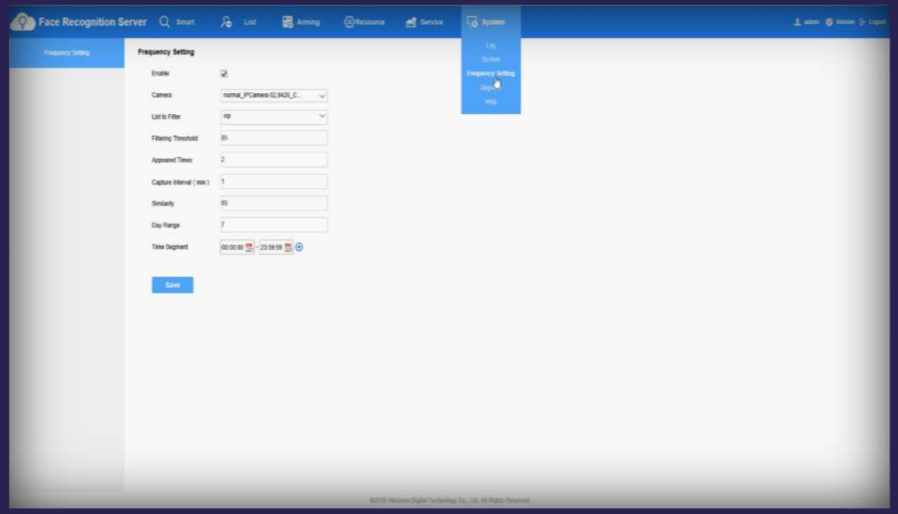
Laboratory

Office Building

High Frequency Alarm

- Compares captured faces and triggers alarm for frequently appeared people
- Public security scenario: finds potential criminal, pre-alert
- Commercial scenario: finds potential consumers to increase the sale
- Scenarios: retail, 4S shops, luxury stores





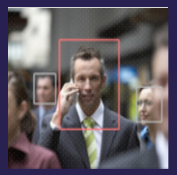
Retail

4S Shop

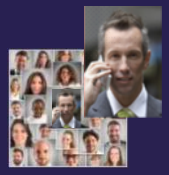
Non-sensing Face Attendance

HIKVISION

- Realizes non-sensing attendance check efficiently
- Able to filter internal staff
- Able to associate with multiple channels and face libraries
- Scenarios: entrances of office buildings, meeting rooms, classrooms, etc.



Captured face



Compared with face library

Matched, have attendance records

Friendly UI

Attendance Report

Index	Name	Lib Name	Sex	07-01	
1	Guiying	Staff	Female	Attendance	08:35~18:02
2	Charlie	Staff	Female	Attendance	08:40~19:15
3	Sansan	Staff	Female	Attendance	08:35~18:03
4	Dean	Staff	Male	Attendance	08:43~19:16
5	Cloud Song	Staff	Male	Absenteeism	00:00~00:00
6	Jasmine Zhai	Staff	Female	Attendance	08:50~19:17

Office Building

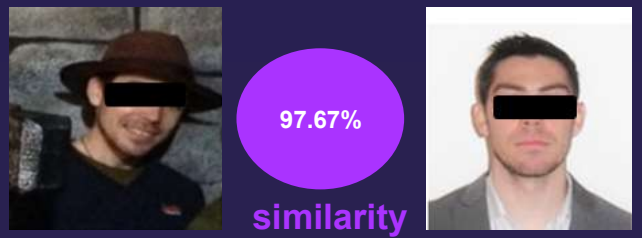
Classroom

Meeting room

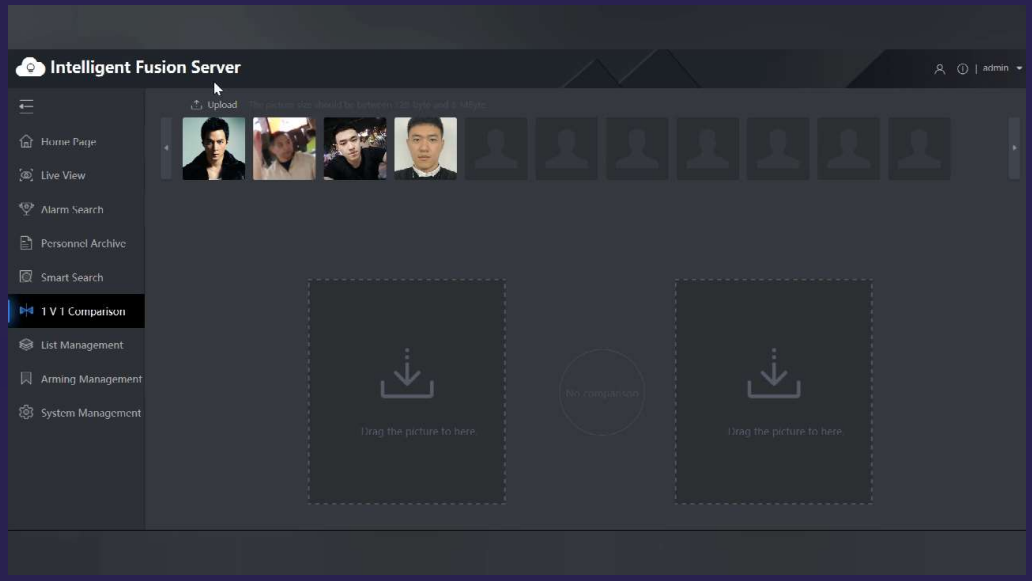
1 V 1 Comparison

HIKVISION

- Choosing two pictures (captured or uploaded picture), comparing them, and getting the similarity
- Quickly confirming if it is the same person
- Scenarios: airport customs, subway stations, police stations, etc.



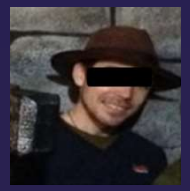
captured picture passport picture



Airport customs

Confirm Identification

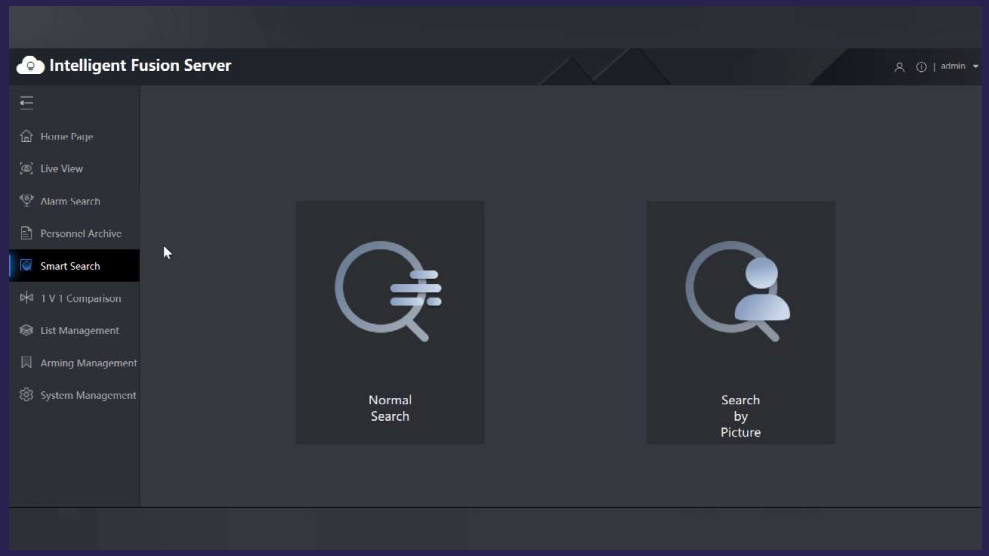
- Choosing one picture (captured or uploaded picture), comparing it with all the pictures in the face library
- Usually compared with face library of criminals or population database
- Quickly confirm the identity of someone
- Scenarios: airport customs, subway stations, police stations, etc.



Choose one picture

Compared with face library

Get the picture with highest similarity, Confirm identification



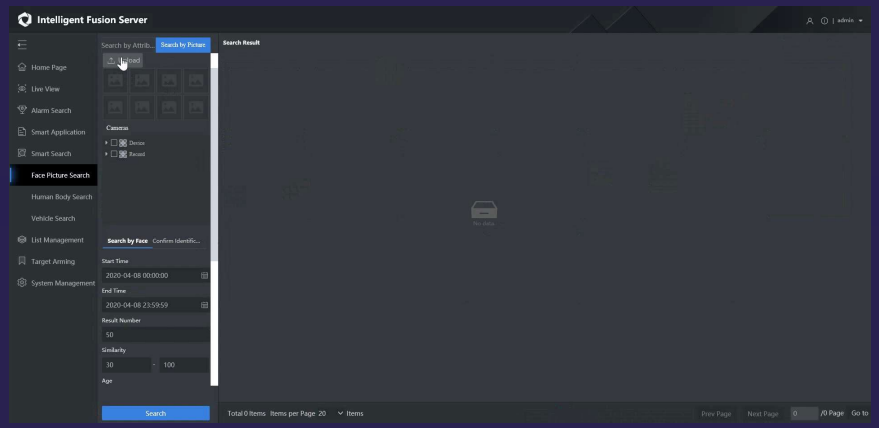
Station

Main road

Search by Face Picture

HIKVISION

- Searching by a face picture, and getting all the similar captured pictures with similarity, time, location, etc.
- Able to generate the face track on a map according to the search results (server)
- Quickly finds a target
- Scenarios: shopping malls, stations, residences, business parks, key streets, etc.



Shopping mall

Residence

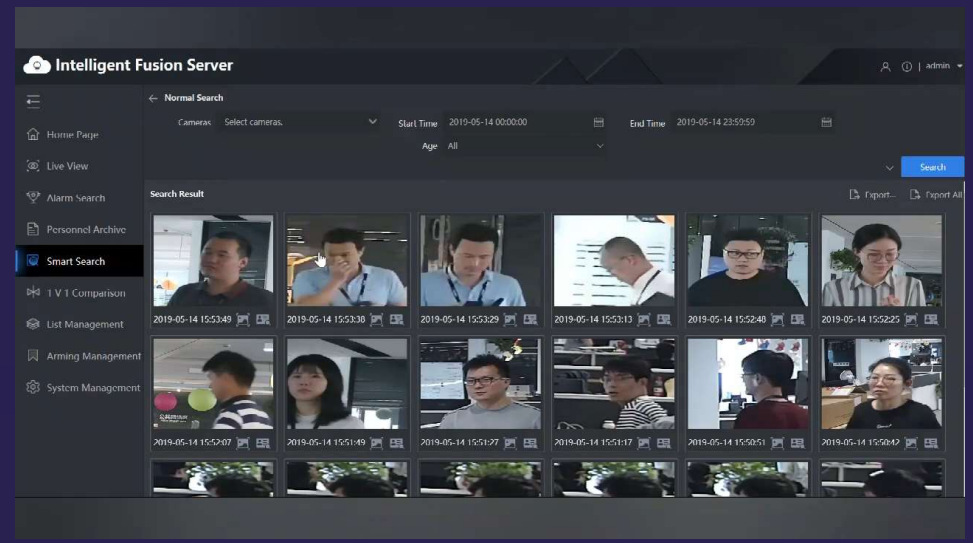
Station

Business park

Search by Face Attribute

HIKVISION

- Searching by attributes of faces, and getting all the matching captured pictures.
- Face attributes (optional): gender, age, glasses, smiling, wearing mask
- Quickly finds a target



Shopping mall

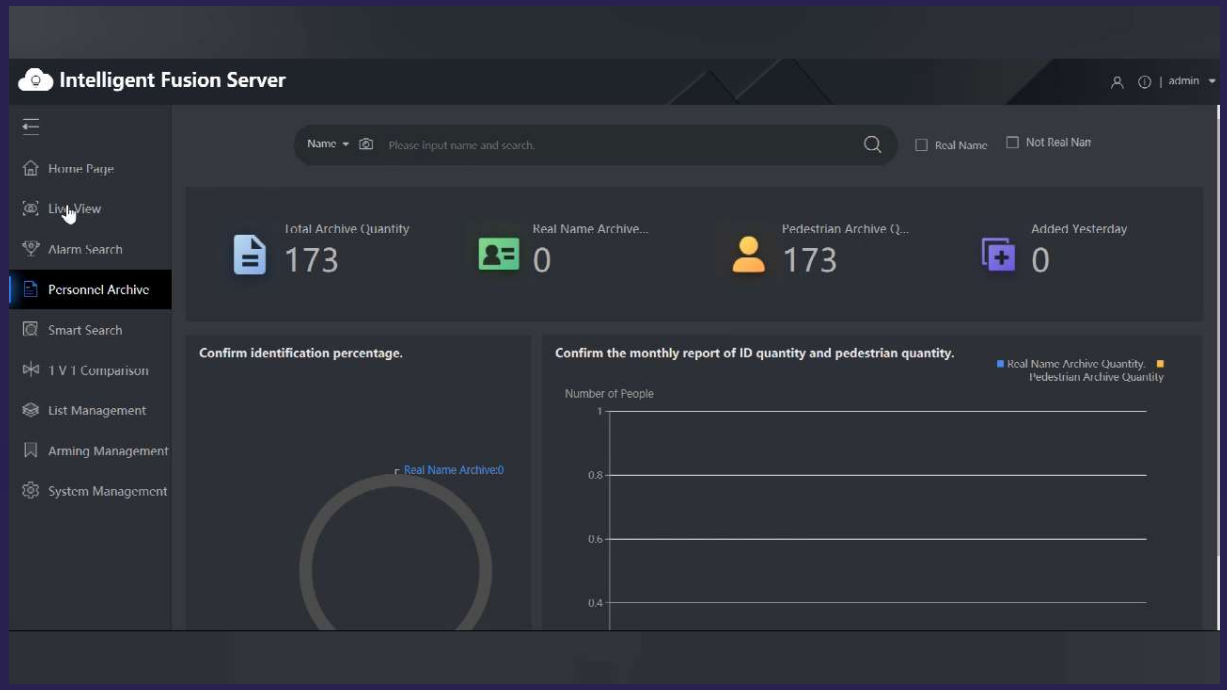
Residence

Station

Business park

Personnel Archive

- Creating files for everyone and putting all the captured face pictures of one person in one file, which contains time and space information of the person.
- Facilitating people management



Real Name
Jack

Jack, 2019.1.1 00:08，Camera A
Jack, 2019.1.1 00:09，Camera B
Jack, 2019.1.1 00:13，Camera C

Not Real Name
Pedestrian A

Pedestrian A, 2019.1.1 00:08，Camera A

Pedestrian A, 2019.1.1 00:09，Camera F

Not Real Name
Pedestrian B

Pedestrian B, 2019.1.1 00:15，Camera B

Pedestrian A, 2019.1.1 00:18，Camera F

Privacy Protection

HIKVISION

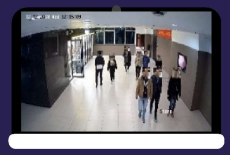
Video stream

DeepinMind NVR
(Customization)

+

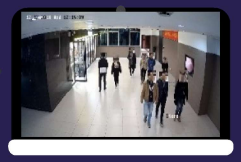
HikCentral
(Customization)

- Enable mosaic channels
- Enable fixed area mosaic
- Overlay coordinate area info.



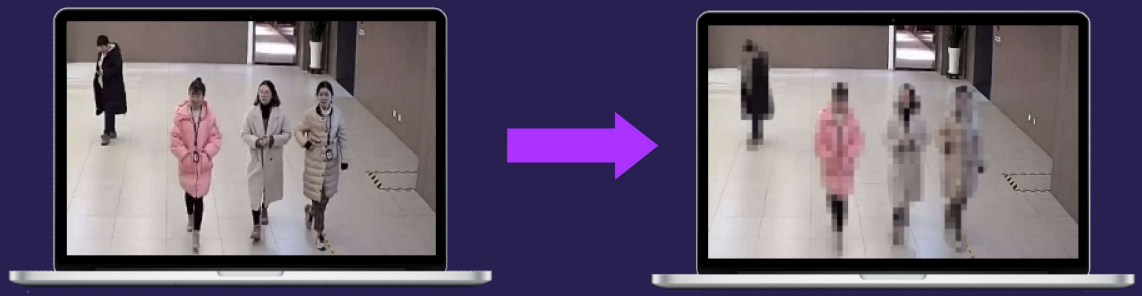
Live View

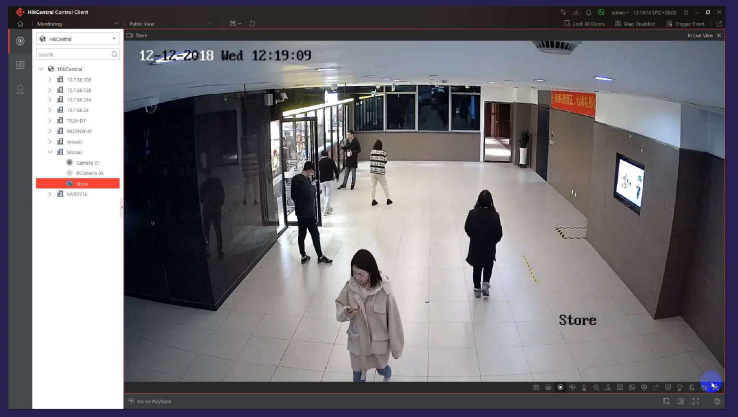
- Human face/body region info. and marker info.
- Realize the function of mosaic live view through inherent play library



Export Video

- Select mosaic targets
- Drawing mosaic on face/body area





Facial Recognition Product Showcase

HIKVISION

Face Capture

3 Series AcuSense Cameras

DeepinView 7 Series

DeepinView 8 Series

DF Series PTZ Cameras

8 Series – Fusion Intelligent

iDS-2PT9A144MXS-D/T2

Face Recognition

DeepinView 7 Series

DeepinView 8 Series

8 Series – Fusion Intelligent

iDS-2PT9A144MXS-D/T2

DeepinMind NVR

Intelligent Fusion Server

Full Analysis Server

Solution 1: Facial Recognition by Camera

Client

------ iVMS 4200 Baseline

- Device management
- Real-time alarm

Switch

------**Facial Recognition Camera**

- Real time face capture
- Face comparison

Highlights:

- Easy to deploy
- Cost-effective

Functions

- Face capture
- List alarm
- Face attribute analysis

Facial Recognition Cameras

HIKVISION

7 Series

- DarkFighter & LightFighter
- Multiple network security methods
- Switchable to support multiple intelligent functions
- 5 defined streams + 5 custom streams
- Supports providing metadata based on ONVIF & ISAPI

8 Series

- DarkFighter & LightFighter
- Multiple network security methods
- 5 defined streams + 5 custom streams
- Supports providing metadata based on ONVIF & ISAPI

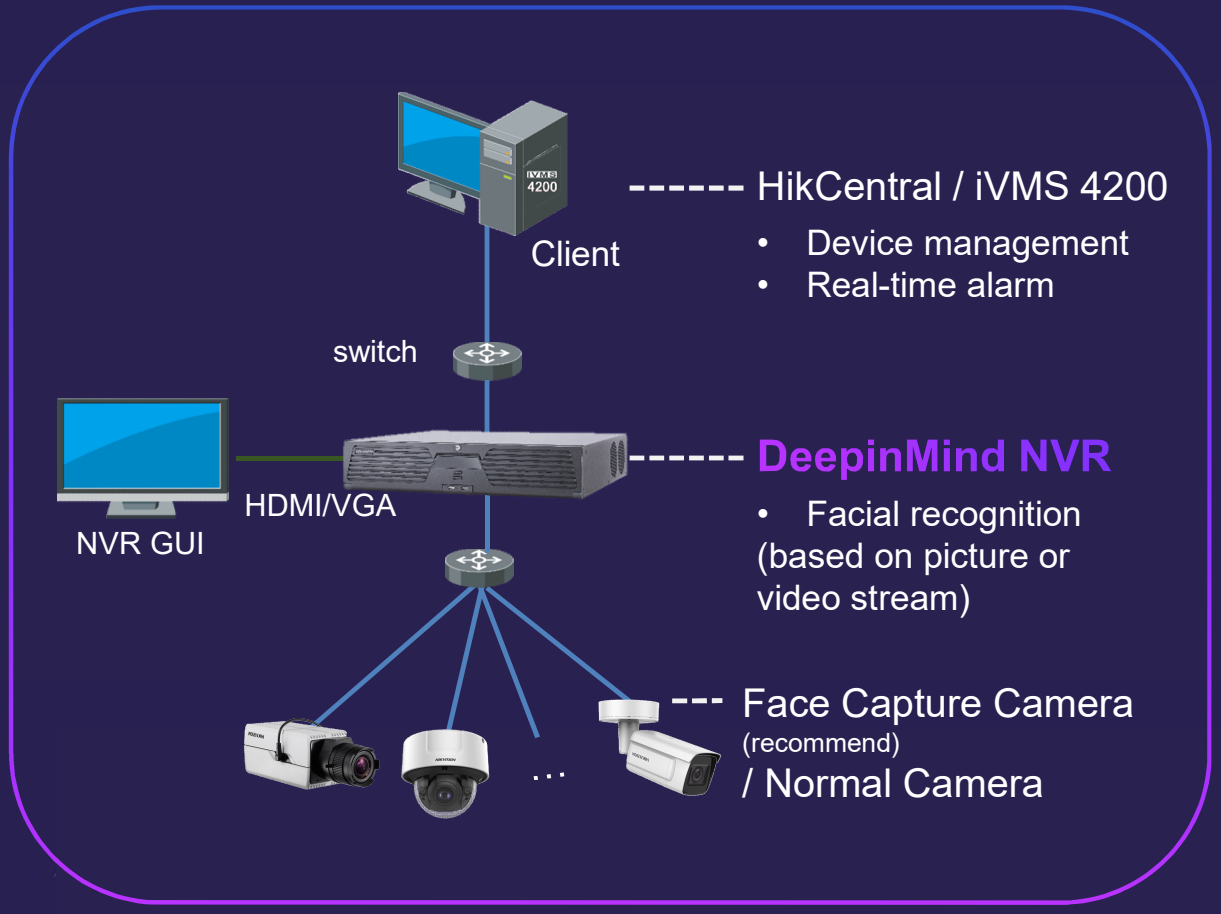
8 Series – Fusion Intelligent

- Supports multiple intelligent functions at the same time
- Integrates multiple lenses to see the details while monitoring the large view

iDS-2PT9A144MXS-D/T2

- Supports multiple intelligent functions at the same time
- PanoVu PT camera is able to get both panoramic views and close-ups with the integration design of a PanoVu camera and a PTZ camera

Solution 2:
Facial Recognition by DeepinMind NVR



Highlights:

- Analysis and storage in one device, easy to deploy
- Suitable for medium projects

Functions:

- Face capture
- List alarm
- Stranger alarm
- High frequency alarm
- Face attendance
- Identity verification
- Search by face picture
- Search by face attribute

DeepinMind NVR

HIKVISION

	DeepinMind NVS	DeepinMind NVR			DeepinMind Super NVR	
Model	iDS-67xxNXI-I8/8F (B)	iDS-76xxNXI-I2/8F	iDS-77xxNXI-I4/X (B)	iDS-96xxNXI-I8/X (B)	iDS-96064NXI-I16 (B)	iDS-96128NXI-I16 (B) iDS-96128NXI-I24 (B)
Face Library	32 libraries with 100,000 pictures in total	16 libraries with 100,000 pictures in total	32 libraries with 100,000 pictures in total	32 libraries with 100,000 pictures in total	64 libraries with 500,000 pictures in total	64 libraries with 500,000 pictures in total
Facial recognition (with face capture camera)	8-ch	8-ch	16-ch	16-ch	24-ch	48-ch
Facial recognition (with normal camera)	8-ch	4-ch	8-ch	8-ch	12-ch	24-ch
Storage Capacity	Built in 2TB HDD	2 HDD interfaces	4 HDD interfaces	8 HDD interfaces	16 HDD interfaces	16/24 HDD interfaces
AI function	facial recognition	facial recognition	facial recognition, video structualization, perimeter protection (three functions switchable)		facial recognition, video structualization, perimeter protection (three functions simultaneously)	

Normal Cameras vs. Face Capture Cameras

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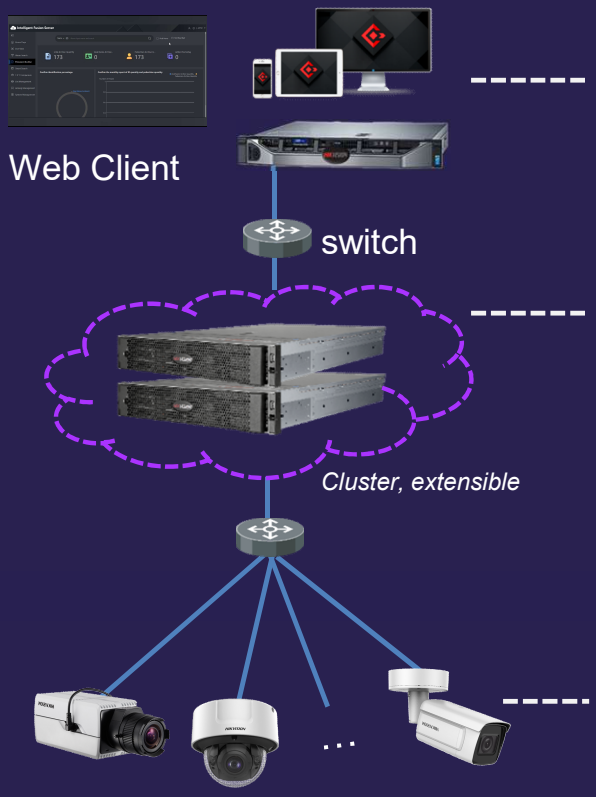
	Normal Cameras	3 Series AcuSense Cameras	7 Series DeepinView Cameras	DF Series PTZ Cameras
Differences	• Supporting less face recognition channels because the burden of back-end devices is increased.	• Reducing back-end burden to increase facial recognition channels. • Supporting only transmitting captured face images to save bandwidth when the network is poor.	• High facial recognition accuracy because of DarkFighter & LightFighter. • Reducing back-end burden to increase facial recognition channels. • Supporting only transmitting captured face images to save bandwidth when the network is poor.	• Remote face capture • High facial recognition accuracy because of DarkFighter & LightFighter. • Reducing back-end burden to increase facial recognition channels. • Supporting only transmitting captured face images to save bandwidth when the network is poor.

Solution 3:
Facial Recognition by Intelligent Fusion Server



Built-in Web/ HikCentral

- Central management

Intelligent Fusion Server

- One server supports up to 360 pics/s facial recognition with face capture cameras, up to 60-ch facial recognition with normal cameras
- Max.5 servers in a cluster to expand analysis capabilities

Face Capture Camera (recommend) / Normal Camera

Highlights:

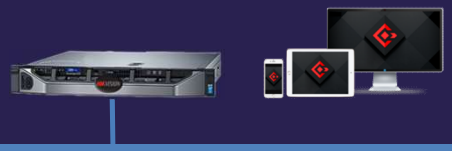
- Support clusters to expand analysis capabilities, max.5 servers in a cluster
- All in one: combining analysis, storage, computing and applications as one server
- Suitable for medium and large projects

Functions:

- Face capture
- List alarm
- Stranger alarm
- High frequency alarm
- Identity verification
- Search by face picture
- Search by face attribute
- Personnel archive

Solution 4:
Facial Recognition by Full Analysis Server

HIKVISION



HikCentral

- Central management

Full Analysis Server

- Facial recognition

Big Data Server

- Storage of big data

Cluster Storage

- Storage of picture and video

… …

Face Capture Camera
(recommend)
/ Normal Camera

Highlights:

- Support clusters to expand analysis capabilities, no limit on the number of servers
- Suitable for large projects, like safe city projects

Functions:

- Face capture
- List alarm
- Stranger alarm
- High frequency alarm
- Identity verification
- Search by face picture
- Search by face attribute

THANKS

Accelerate Your Business with AI

International Product and Solution Center