

Face Recognition Promotion

Dahua Technology,
Make Your Life Safer

EMI SYSTEMS
EMI Systems Ltd.
Protecting Your World

Origin of Face recognition

Origin 1：Who is he? If an unknown person appears.
Origin 2：Is he “Mr. X”? If a business partner comes.







How human do face recognition



Forehead
Eyebrows
Eyes
Nose
Mouth Cheeks
Ears
....

Size
Location,
Shape
...



Combination --> Differentiation --> Recognition

Face recognition algorithm works as human





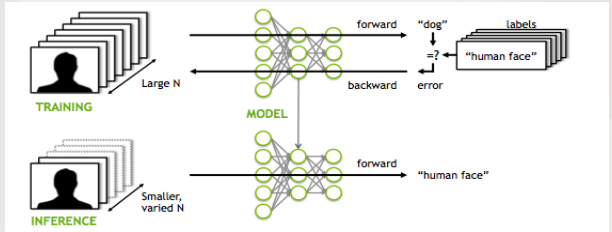


Human eyes

Face recognition algorithm

Face detection
(Find & capture face)

Face recognition
(Model and Compare)

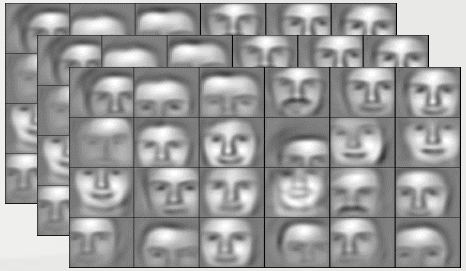


Deep learning algorithm

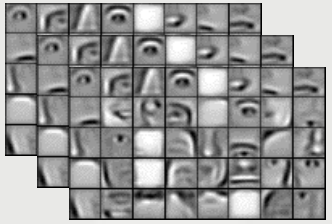
Face image



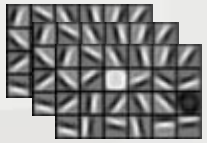
Advanced features



Intermediate features



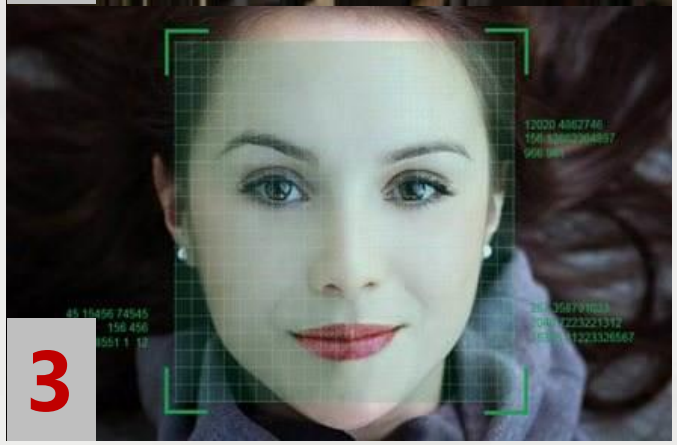
Elementary features



Advantages of Face recognition









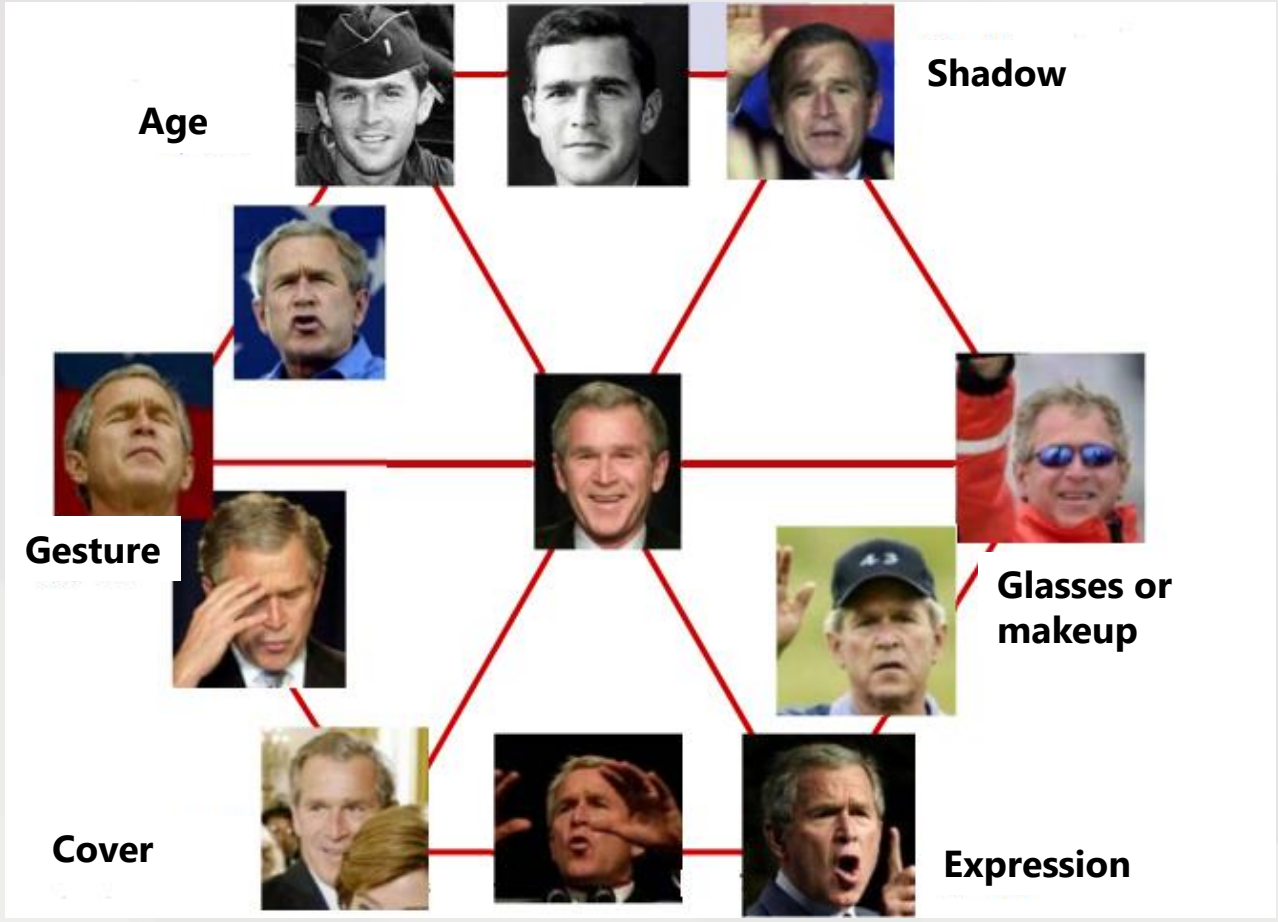
1：No contact, sanitary and acceptable

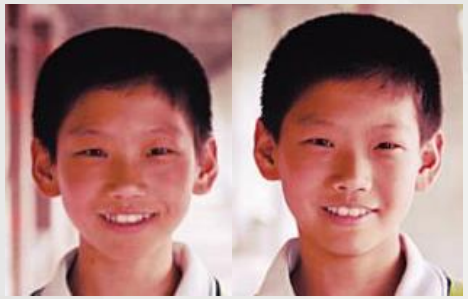
2：Hidden collection

3：Rich information

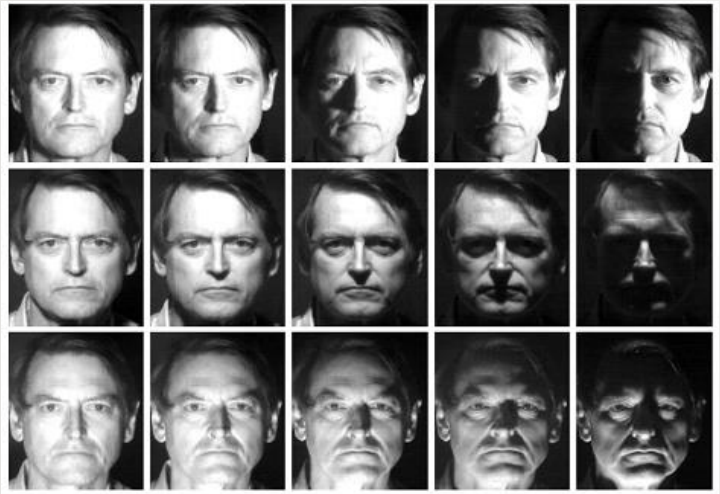
4：Abundant image resource

Weakness of Face recognition





Twins



illumination

Solution:

1. standardize the face collection, 2. no decisive but assistant , 3. upgrade the algorithm

Dahua Face Recognition Products



DHI-IVS-F7200-P-S2

- 30 images/s，300 thousands blacklist control
- 15 images/s，500 thousands blacklist control
- 10 millions face library

Lightweight product



DHI-IVS-F7500-P-S2

- 100 images/s，2 millions blacklist control
- 20 millions face library



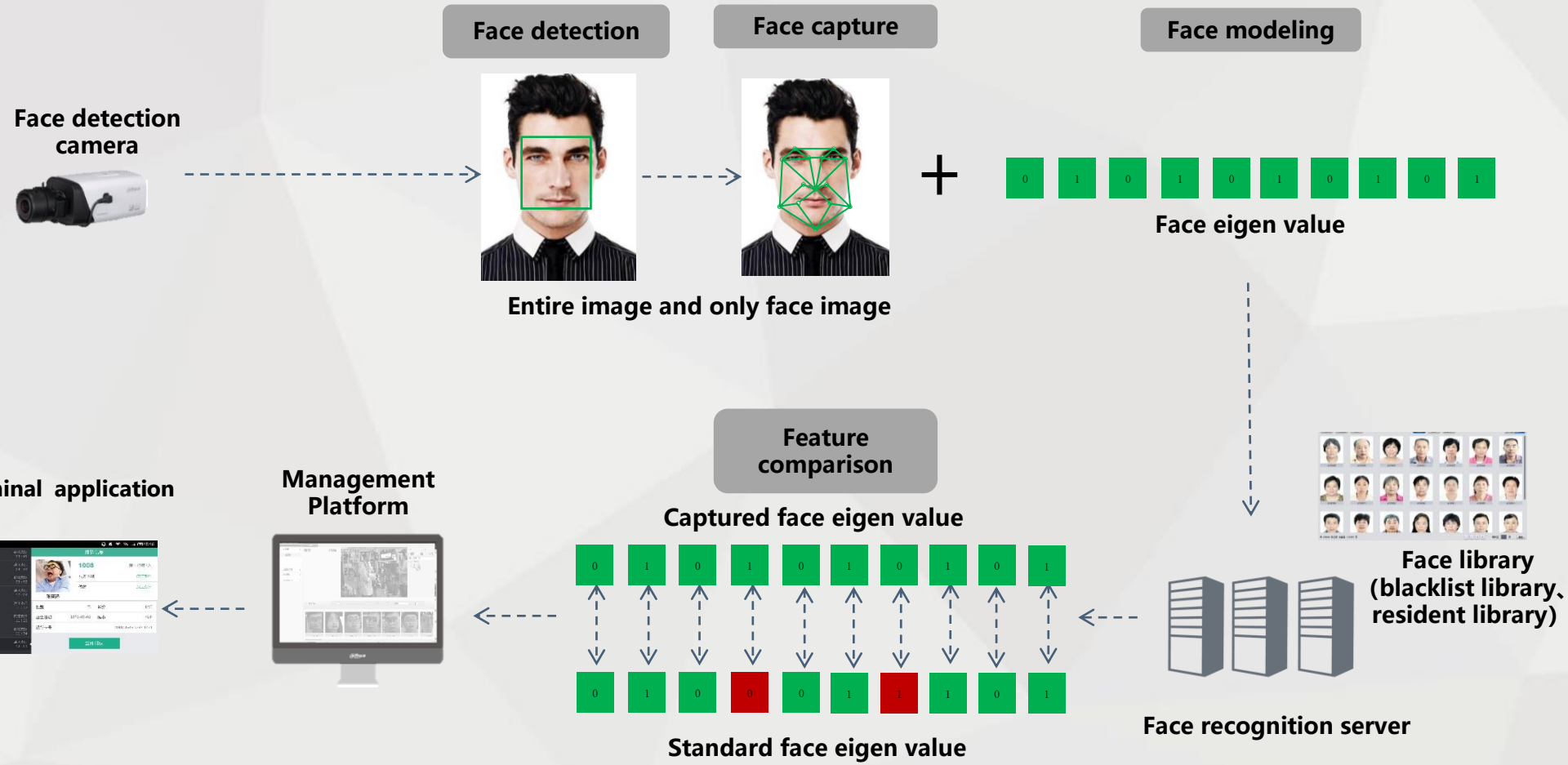
DHI-IVS-F7500-2P-S2

- 200 images/s，2 millions blacklist control
- 50 millions face library

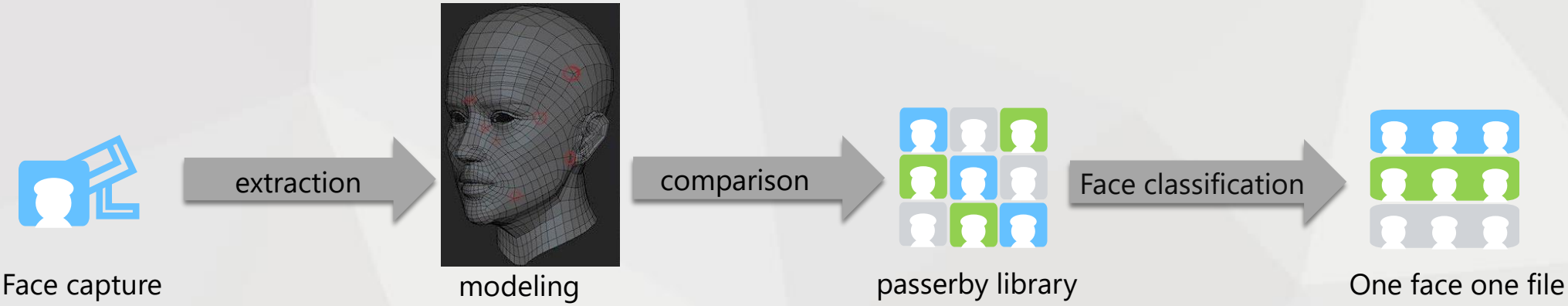
The main product

Core technologies: Advanced Algorithm, Face Classification and Accelerated comparison

Core Technology： Advanced Algorithm



Core Technology： Face Classification

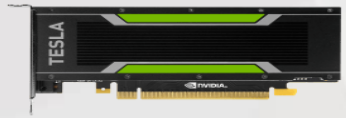


Compare the face image with the passerby library.

if the similarity to someone in a library is higher than the threshold, it thinks that they are the same person and file them with the same ID.

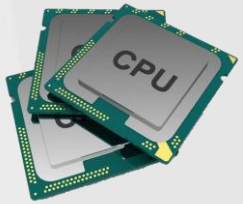
If no one in the library is similar with the captured face, it will classify the person as a new one and archive it with a new ID.

Core Technology： Accelerated comparison chip



GPU
(NVIDIA P4/P40 card)

- **Library capacity**(low)：
  P4 10million / P40 30million
- **computing power**(moderate)：
  high response
- scene ：
  ten million level data comparison



CPU
(Intel)

- **Library capacity(high)**
  enlarge it by add memory
- **Computing power(**low)：
  low response
- scene ：
  ten million level data comparison



Super comparison card

- **Library capacity(high)**：
  one thousand billion
- **Computing power(high)**：
  the response time is 3 seconds for one thousand billion date comparison
- scene ：
  thousands billion data comparison

Products Positioning

Business application

Public security | Traffic management | Video surveillance | Smart Retail | Safe city

Central intelligent

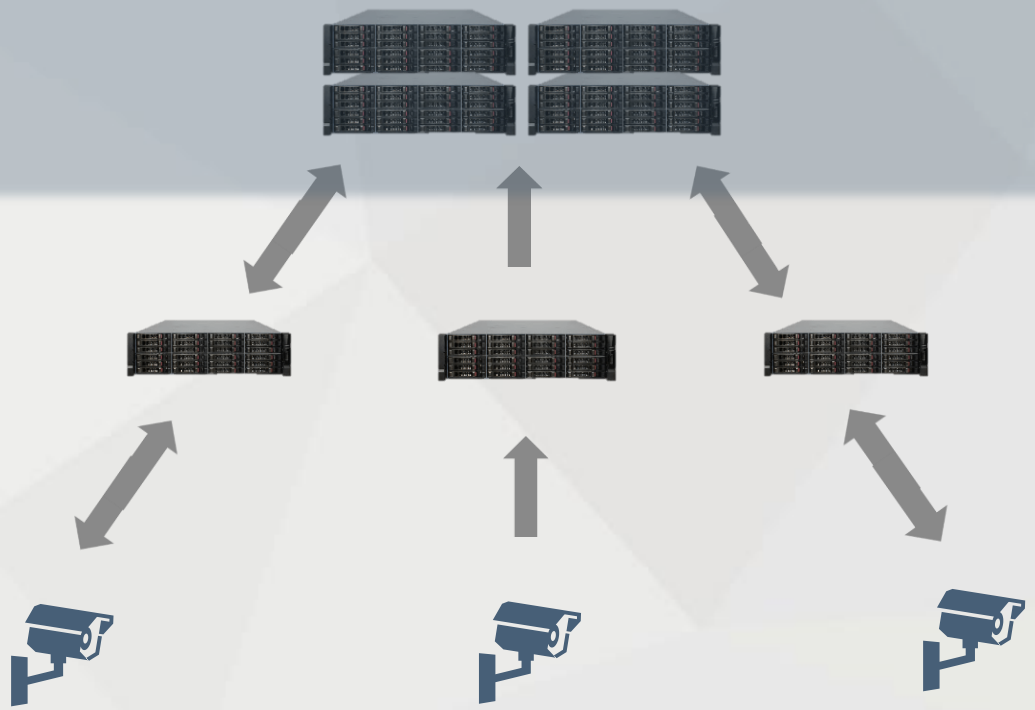
IVS series

marginal intelligent

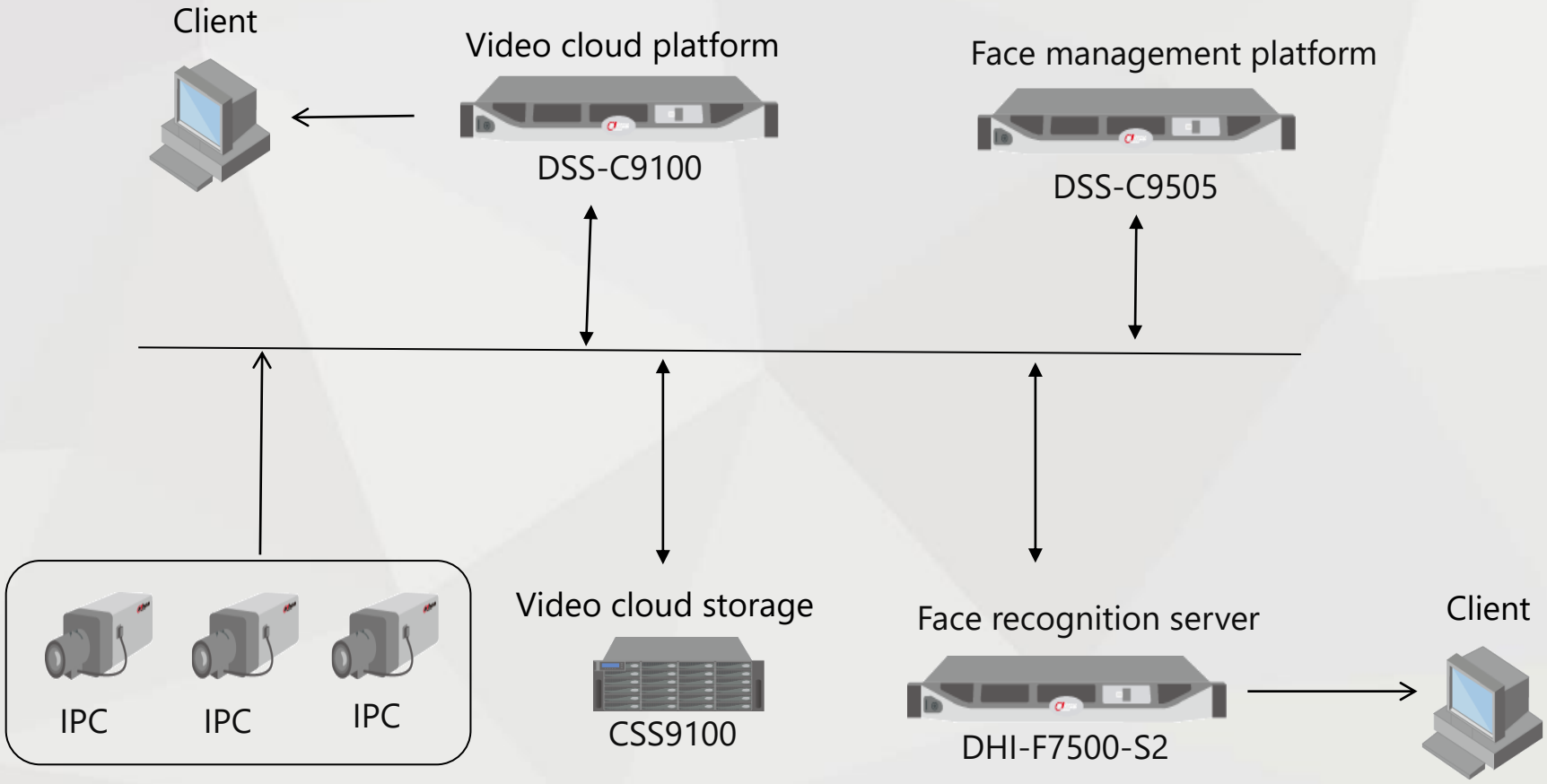
IVSS、NVR-5X-I

Front-end device

IPC、PTZ、intelligent camera



Dahua Face Recognition Overview



Face recognition application

- **Origin 1：Who is he? If an unknown person appears.**
- **Origin 2：Is he “Mr. X”? If a business partner comes.**

Verification:

Is he Albert Einstein?



Identification:

Who is he?



Future:

- **Same face counting**
- **Analytic of tailgating**
- **Loitering alarm**
- **Face Big Data**

Application example		
	Dynamic	**Static**
1:1	Face access control Face and ID/ticket verification	Two pictures compare with each other to find the similarity
1:N	Wanted person alarm Face trajectory on the map	Find someone’s information via face photo
N:M	N （numbers of face images captured ） to compare M （numbers of face images in database ）	The two face databases compare each other, like criminal face database compares suspected database to find recidivism



Technical Feature: Search by Image

Before

- **slow**: the response time is 1 minute seconds for one thousand billion date comparison
- **many**: more than one server cluster

Now

- **fast**: the response time is 3 seconds for one thousand billion date comparison
- **few**: one server can support 1billion data retrieve



identity verification（ static ）

Compare the captured image with the face library and get the real identity



passerby library retrieve（dynamic）

Checkpoint capture and real time comparison，real time alarm

value

Significantly shorten retrieval time

Application Scenarios

identity verification



Lost Children ID verification



Lost elderly ID verification



criminal suspect ID verification

value

Based on the face accelerated comparison, it can compare the stranger face with the resident library and floating population library，get the stranger real ID and track in short time and sharply increase the police efficiency.

Target personnel track check



Search for lost children



Search for lost Senile dementia



Criminal suspect location check

Technical Feature: One Person One File

One person one file

Set up the only archives for each face

- Static library :

  Personnel identity information,

  picture information,

  criminal information,

  travel information,

  vehicle information,

  communication information

- Dynamic library （the captured face that be given a temporary ID)

  track

  space-time information

  real time captured image

  label



value

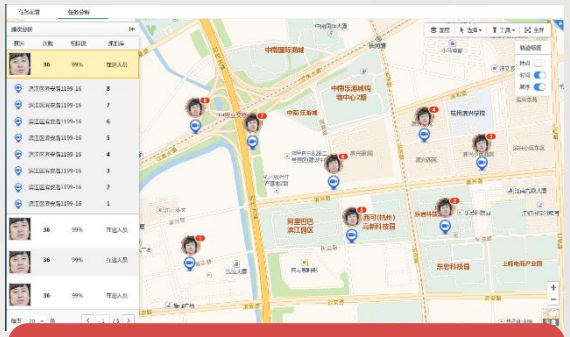
It can realize the valuable application such as the association between people and cars that can judge the Stolen vehicle， Parent-child relation that can judge human trafficking.

The one person one file can increase the practical application value

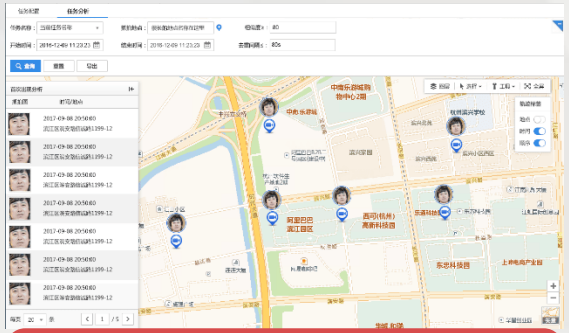
Application Scenarios: early warning for high-risk person



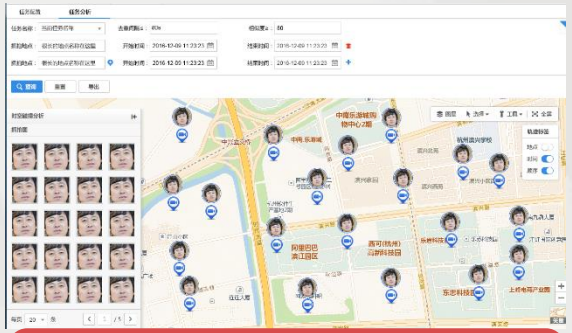
Track analysis



first appearance analysis



Companion analysis



Floating population analysis

value

- Identify potential high-risk person, To eliminate the case in advance
- Fast digging valuable clues, Improve the efficiency of solving a case
- Automatic checking according to the floating population model, to reduce the difficulty of floating population management

Dahua successful cases of face recognition



Face recognition cases in China:

- Hangzhou G20 face recognition and alert
- Inner Mongolia Hedong safe city in Baotou City
- Foxccon attendance and face verificaition
- Beijing Xicheng face information collection
- Hubei Wuhan exhibition center face recognition and alert
- Shandong Weifang face recognition
- Sichuan Qianwei face recognition
- Hainan Lingao staff face recognition
- Zhejiang Jiashan intelligent community face recognition
- Hainan traffic police detachment face recognition
- Jiangxi Ruijin City Skynet project



Face recognition cases abroad:

- Japan
- Italy
- Thailand
- Tunisia
- Indonesia
- United Arab Emirates
- Mongolia
- Australia

Thank you !

EMI Systems Limited
Lagos: 22A, Da-Silva Street, Lekki Phase 1
M/L: 0809 222 2627/ 0706 664 0663
Abuja: 58, Lobito Crescent, Wuse II.
M/L: 0809 222 2624/ 0809 222 2449
E-mail: info@emi-systemsltd.com