Safe City Solutions

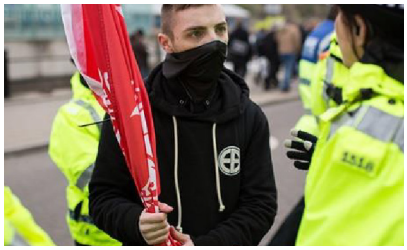
Helping Make Cities Safer and More Secure

UK & IRELAND

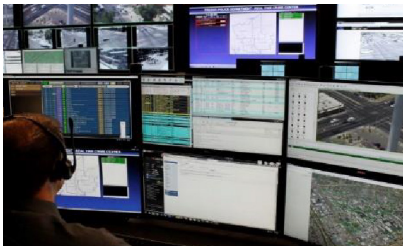
CONTENTS

REQUIREMENTS

DEVELOPMENT STAGES



1. Investigation After Incidents
The main work of public security officials is to quickly investigate after an incident has happened.



2. Control During an Incident
Utilise intelligent information to respond promptly when incidents occur, keeping the situation under control.

3. Prevention Before an Incident
With intelligent cloud-based systems and an efficient police force, intelligence helps prevent situations arising.

HD Products

High definition images and a clear view of objects helps gather evidence.

Intelligent Systems

The system will intelligently detect illegal behaviour to help police control it quickly.

Smart Policing

Combining integrated data and coordinating with police helps prevent criminal activity.

TRANSFORMATIONS

Passive	Only after an incident has occurred is it possible to go back through the video to check what happened as part of an investigation.	»	**Positive**
Blind	Cannot determine if the driver or a person has a criminal record in the event of an incident/accident on the road.	»	**Accurate**
Isolated	Data is not shared and cannot be mined across systems, departments, regions and cities.	»	**Unified**

SYSTEM ARCHITECTURE

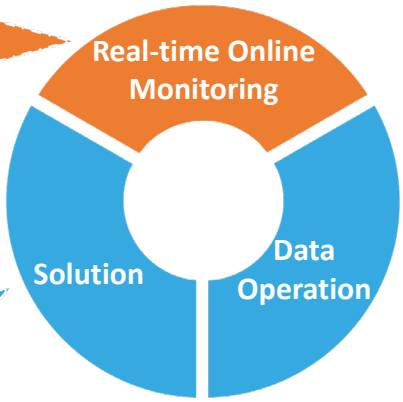
SYSTEM DESIGN PRINCIPALS

System Architecture	System Application	System Security
Incidents + Alerts + People Flow — Video Surveillance	Vehicle, Face	Device Security, Network Security, Data Security
Scientific	**Usable**	**Safer**
Work Procedure + Realising Value + Scalable Investment — Multi dimensional devices	Vehicle, Face; Data Governance; Multi-network Integration	Data Access Control, Server Access Control, Endpoint Access Control, User Behaviour Analysis & Alert

SOLUTIONS

SAFE CITY SOLUTIONS

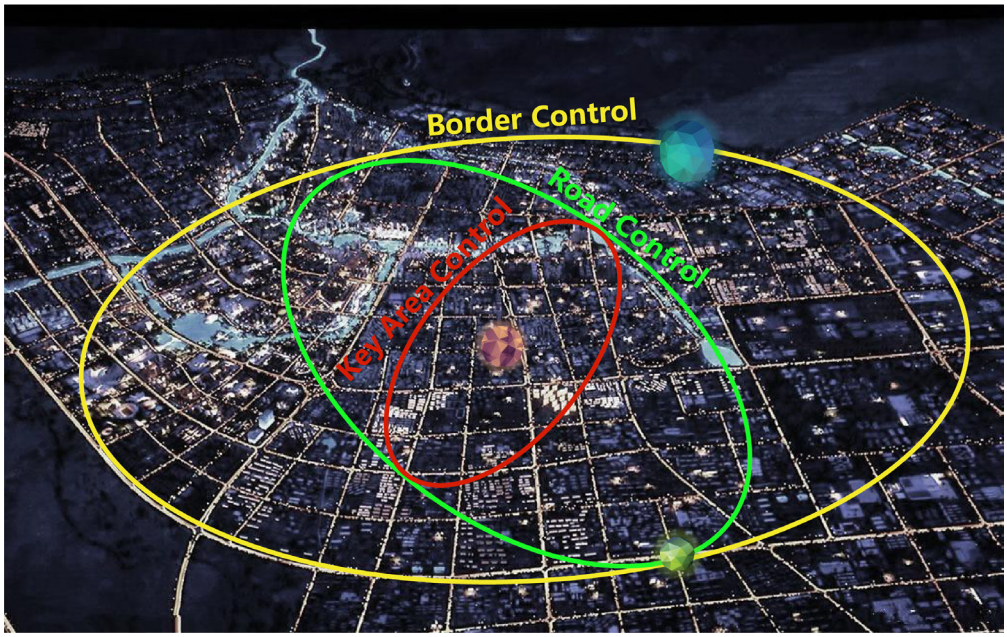
Integrate the Internet, video Internet and IoT to build a network that targets customer value and offers the most real-time data to help police using online resources.



Combine AI, big data, cloud computing and customer business scenarios to help obtain accurate intelligence to help police.

When integrating technology into organisations and mechanisms, it is recommended to set up a "video + intelligence“ team to help with online police work.

REAL-TIME ONLINE MONITORING



Level 1 Border Control

Target: To check if a suspect is entering or leaving the city.

Motorway **Airport** **Train Station**

Level 2 Road Control

Target: To record the activity of a target when travelling by road.

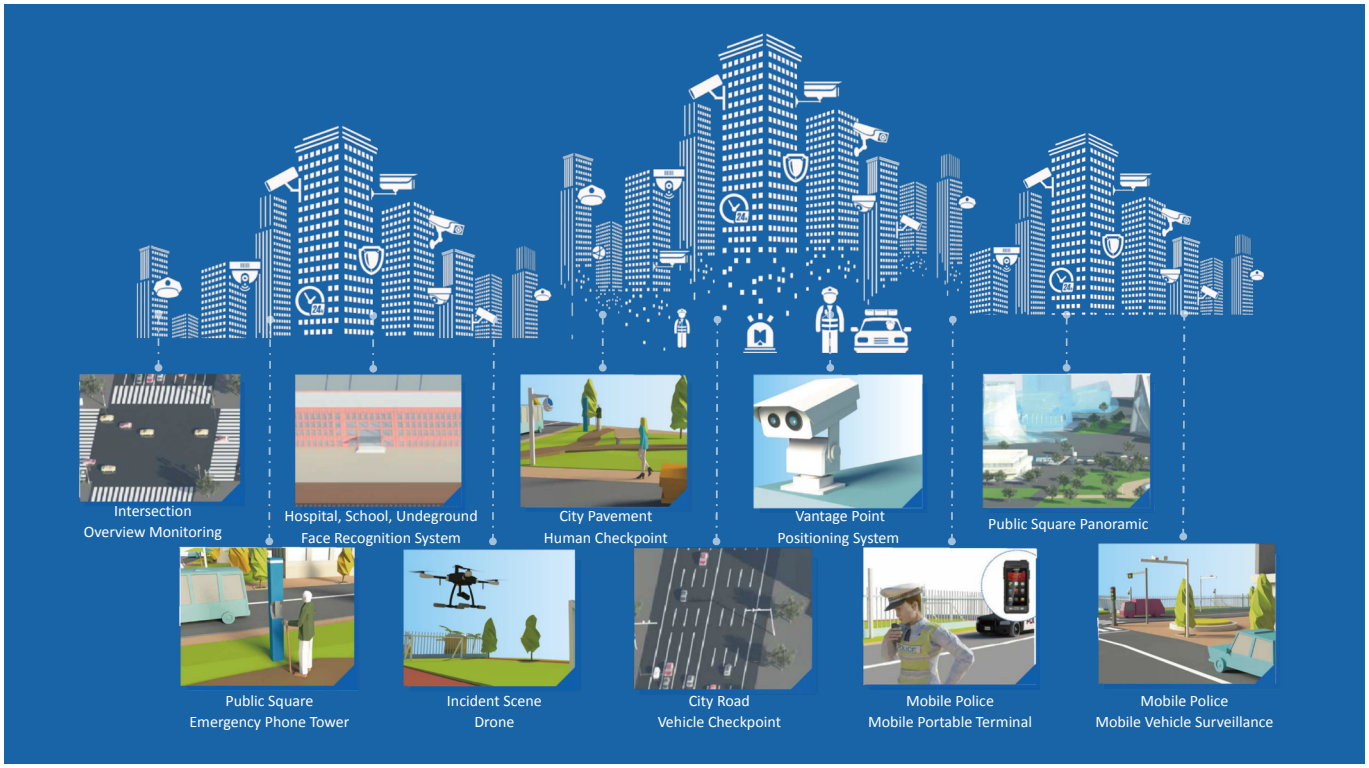
Main Road **Airport** **Train Station**

Level 3 Key Area Control

Target: To make sure key areas are kept safe, such as public squares, residential areas, and city centres.

Community **Public Square** **City Centre**

REAL-TIME ONLINE MONITORING I TEN SCENES



REAL-TIME ONLINE MONITORING I INTERSECTION

Scene Features

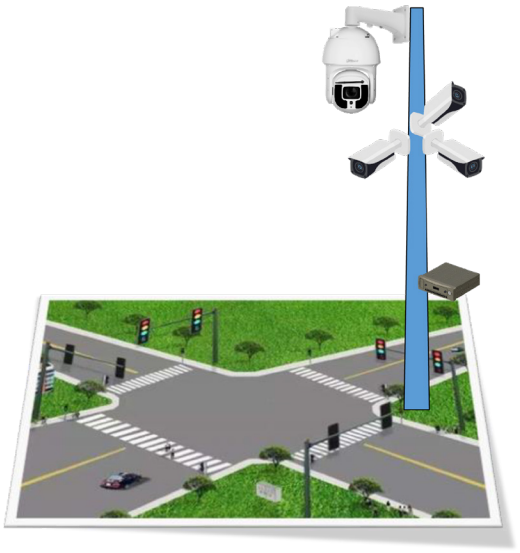
Wide range

Frequent accidents

Traffic congestion resulting from accidents

Solution

To monitor a traffic intersection, a speed dome and three bullet IR cameras can be designed into the system. The bullet IR cameras will be used to monitor the surrounding area. With a 40x (or higher) optical zoom, the speed dome is used to see remote objects clearly when an incident is detected from one of the bullet IR cameras. A mobile-NVR can be positioned in the event of a network outage to make sure no video is lost. The CCTV mast/pole can be either 6m or 15m high according to the surrounding area. The wireless antenna will be installed on the top of the mast. A wired solution is also a recommendation if required.



REAL-TIME ONLINE MONITORING I VANTAGE POINT

Scene Features	Solution
 Wide range  Long distance  Difficult to understand the situation	A network positioning camera can be installed on the top of a building to recognise objects 250m or 500m away. A mobile-NVR can be positioned in the event of a network outage to make sure no video is lost. A wired solution is also a recommendation, if required.

REAL-TIME ONLINE MONITORING I HOSPITAL, SCHOOL, UNDERGROUND STATION

Scene Features	Solution
 Heavy flow of people  Frequent accidents  Criminals fleeing	Dahua's Face Recognition is based on deep learning algorithms. It automatically captures face images in real-time, compares or adds face images to a pre-defined list, and then takes appropriate action such as generating an alert once the captured face image matches a pre-defined face image list in the database – this can be applied to many applications. It is beneficial mostly for applications requiring higher security, streamlined business operations and improved marketing services.

REAL-TIME ONLINE MONITORING I CITY PAVEMENT

Scene Features

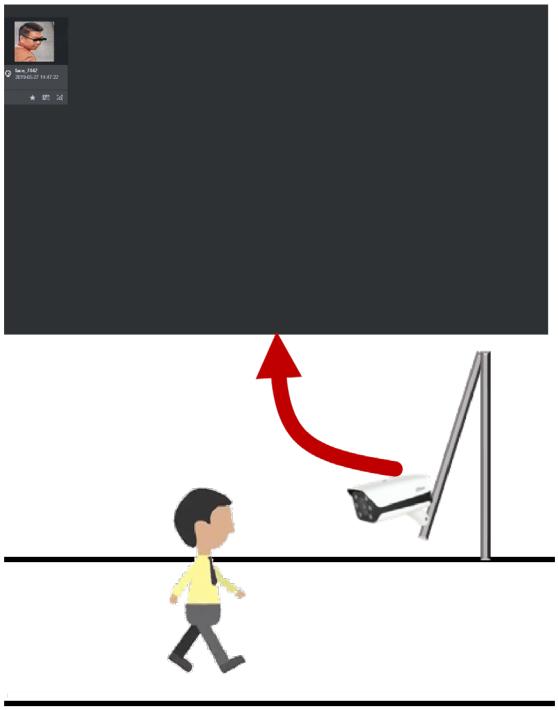
Heavy flow of people

Frequent accidents

Criminals fleeing

Solution

Face Checkpoints are located on pavements in the city. They are constantly taking photos when people pass by. The captured pictures are sent to the central monitoring platform for analysis.

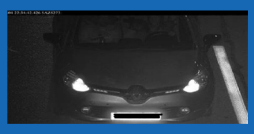


REAL-TIME ONLINE MONITORING I CITY ROAD

Scene Features

Cannot tell who is driving passed

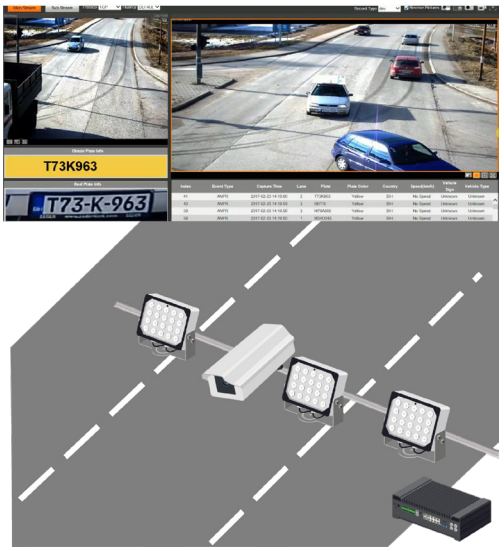
Hard to catch suspects



Cannot get clear image of driver

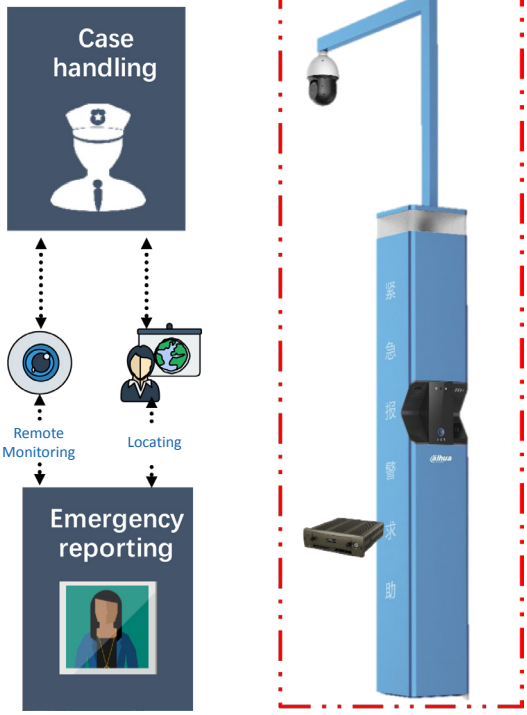
Solution

Vehicle Checkpoints are located on the main roads in a city. They are capturing images all the time when vehicles pass by. The camera will recognise the number plate, make and colour of a vehicle. The captured images will be sent to the central monitoring platform for further analysis.



REAL-TIME ONLINE MONITORING I PUBLIC SQUARE

Scene Features	Solution
 To call the police	**High-crime area** Deters people from attempting illegal activity
 Hard to locate	**Traffic intersection** Deters people/drivers from attempting illegal activity
 To monitor	**As checkpoint** Checkpoint helps guide patrolling police force



REAL-TIME ONLINE MONITORING I SQUARE

Scene Features	Solution
 Super wide range	With the adoption of panoramic monitoring systems using multi-sensor technologies, a panoramic camera covers an entire area by integrating several images from multiple sensors into one image, enabling a 360° view.
 Complex scene	
 Difficult to understand the situation	

REAL-TIME ONLINE MONITORING I SCENE OF INCIDENT

Scene Features	Solution
 Hard to reach traffic jam spot  Dangerous in terror attacks  Cannot rescue quickly	Drones have the ability to fly at low altitudes, for long distances, on autopilot – all with highly precise observations and images of the ground below. They can be used in all kinds of harsh environments such as mountains, rivers, cities, wilderness, oceans and highlands and have been widely applied in all of these various fields.

REAL-TIME ONLINE MONITORING I MOBILE POLICE

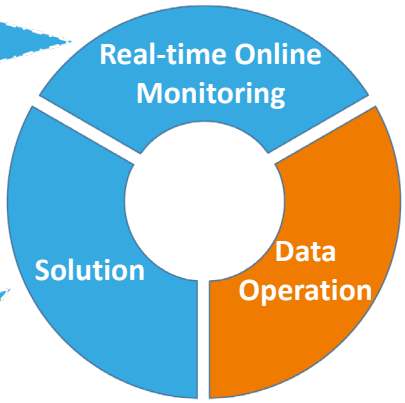
Scene Features	Solution
 Slow response  Lack of evidence  Inefficient	On the top of a police car, a mobile PTZ can be installed. Using the system's keyboard it is possible to control the PTZ to pan and tilt with the image being displayed on the small monitor. It is also possible to talk with the control centre using a microphone. In addition to this, every policeman is equipped with MPT to record evidence and communicate with the control centre.

EPIDEMIC DEFENCE I BODY TEMPERATURE MONITORING

Scene						Pain Point	Requirement
Epidemic	Transportation Hub		Official Checkpoints		CBD and Community	Low efficiency comparing huge amounts of people	Fast
	Airport	Station	Government	Check Point	Hospital	School		
							Risk of infection	Contactless for people
Normal	Common Inspection Checkpoints						Low accuracy of normal thermal imaging equipment	High accuracy
	Entry Exit Inspection		Restaurant Kitchen		Nursery	Public Transport	Multiple entrances and exits	Trigger alarms
							Non-human targets cause false alerts	Face recognition + temperature testing

SAFE CITY SOLUTIONS

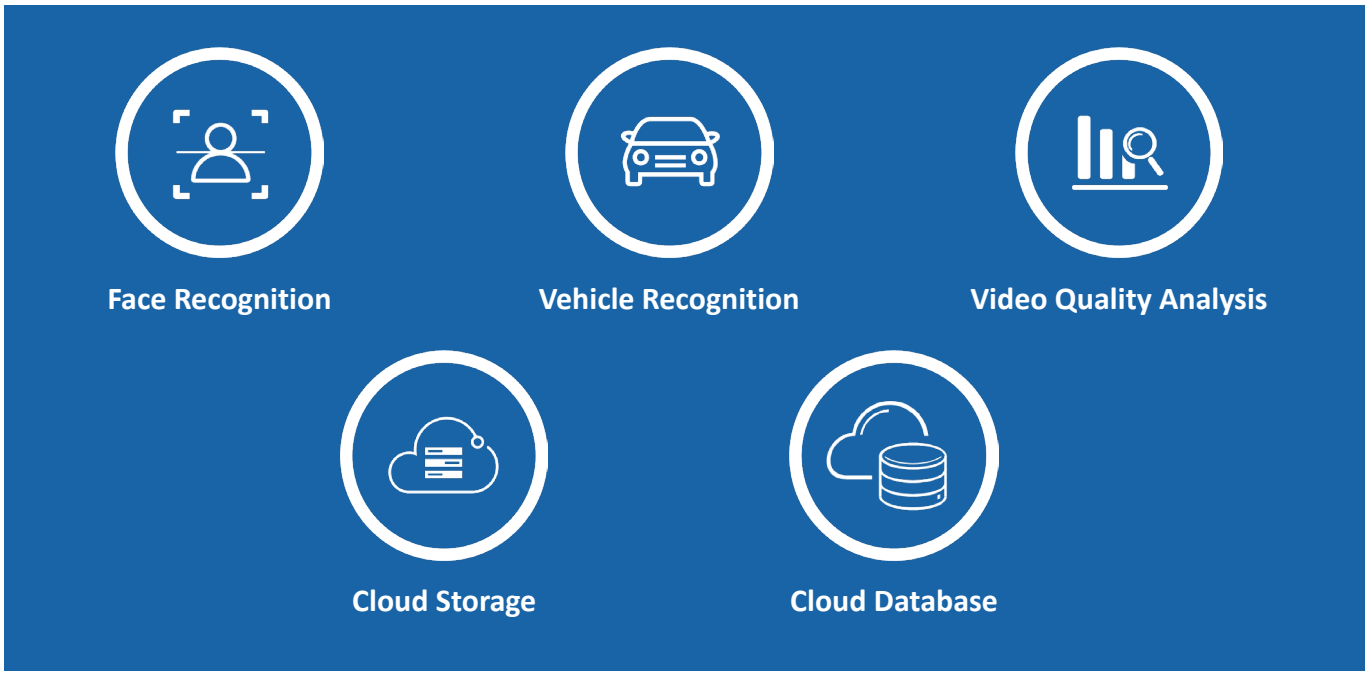
Integrate the Internet, video Internet and IoT to build a network that targets customer value and offers the most real-time data to help police using online resources.



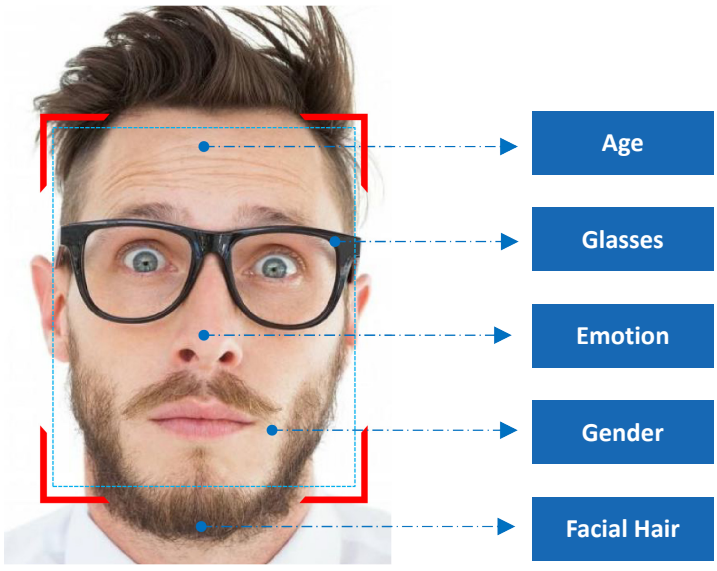
Combine AI, big data, cloud computing and customer business scenarios to help obtain accurate intelligence to help police.

When integrating technology into organisations and mechanisms, it is recommended to set up a "video + intelligence" team to help with online police work.

DATA OPERATION I TECHNOLOGY

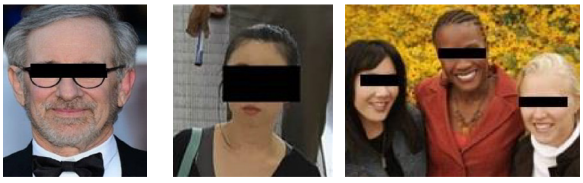


DATA OPERATION I FACE RECOGNITION



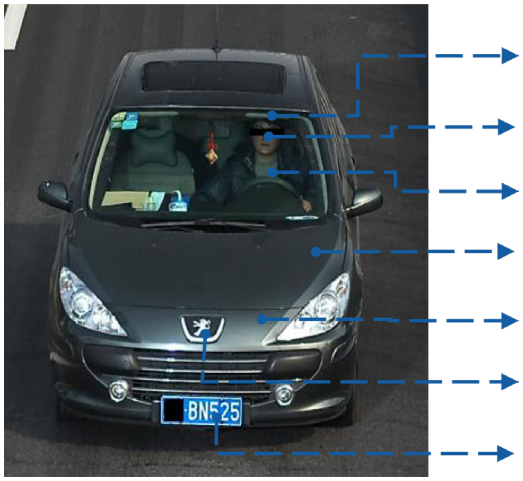
Multiple High Index Features

- Modelling success rate higher than 99%
- Maximum 20 million faces eigenvalue
- Supports the retrieval up to 10 million faces
- Blacklist library capacity up to 2 million faces



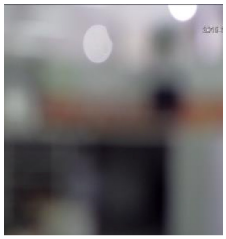
Standard Photo | Captured Image | Different Complexions

DATA OPERATION I VEHICLE RECOGNITION



No Sunvisor	»	Sunvisor	Sunvisor down or not
Face of Driver	»	Face of Driver	Clear Image of Face
Without Seat Belt	»	Seat Belt	Seat Belt
Grey	»	Colour of Vehicle	> 11 Colours, Accuracy >95%
Small Car	»	Vehicle Type	> 11 Vehicle Types, Accuracy >95%
Peugeot	»	Vehicle Make	> 120 Makes
XXBN525	»	Number Plate	Number Plate

DATA OPERATION I VIDEO QUALITY ANALYSIS

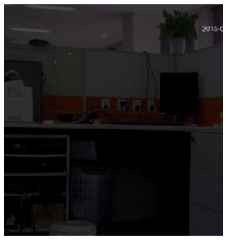


Defocus Detection

Response Time <1s

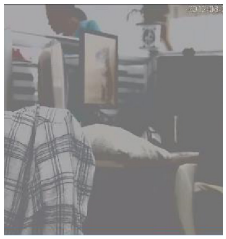
Overexposure Detection

Response Time <1s



Underexposure Detection

Response Time <1s

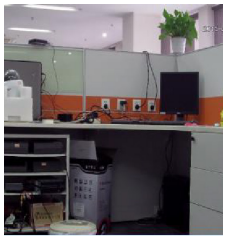


Low Contrast Detection

Response Time <1s

Colour Cast Detection

Response Time <1s



Jitter Detection

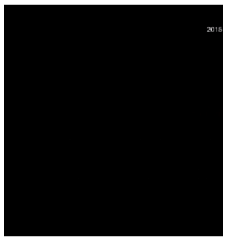
Response Time <1s

Noise Detection

Response Time <1s

Stripe Detection

Response Time <1s



Video Loss Detection

Response Time <1s

Video Freezing Detection

Response Time <3s

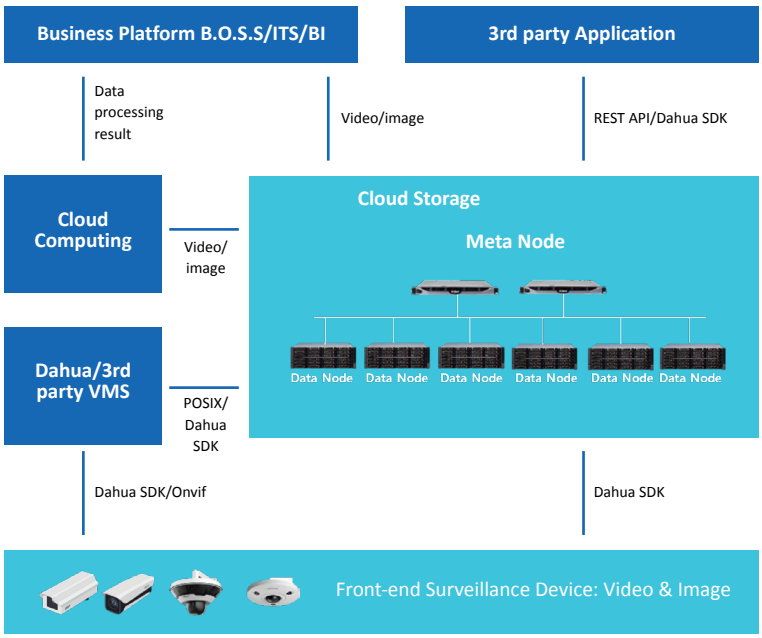
Tampering Detection

Response Time <3s

Scene Changing Detection

Response Time <3s

DATA OPERATION I CLOUD STORAGE



High Reliabilty

Erasure coding technology

File-level fault tolerance

High Performance

Efficient I/O

Dynamic load balancing

Scalable

Scale out technology

Liner performance scalability

Easy to use

User friendly operation and maintenance

Easy for Surveillance

Direct storage

Frame extraction

DATA OPERATION I CLOUD DATABASE

BI Data

Vehicle Data

Human Data

Data Warehouse

Data Import: >200M/s.
Precise Query: 150B traffic data.
Number Plate Query: <1s.
Capture Location Query: <1s.
Body Colour Query: <1s.
Vehicle Type Query: <1s.

SAFE CITY SOLUTION

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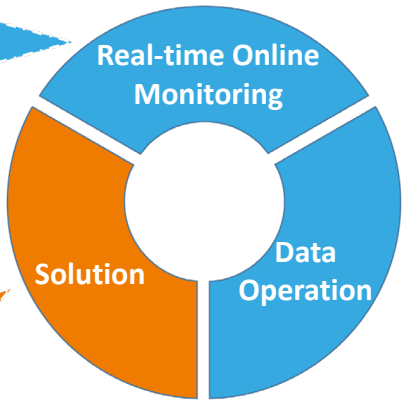


Combine AI, big data, cloud computing and customer business scenarios to help obtain accurate intelligence to help police.

When integrating technology into organisations and mechanisms, it is recommended to set up a "video + intelligence" team to help with online police work.

SOLUTION I TECHNOLOGY

- Dashboard
- Face Big Data
- Vehicle Big Data
- Structured Query
- Emap
- Augmented Reality
- Command and Control
- Unified OAM

SOLUTION I DASHBOARD

SOLUTION I FACE BIG DATA I ARMING

People

Time

Location

Behaviour

Point

Area

Type

Point Arming	Area Arming	Type Arming
		
National criminals	Gangs congregating	Person of interest present around schools
		
Local criminals	Drug-related criminals congregating	People with criminal records leave the area

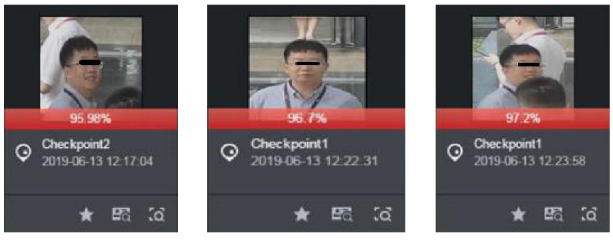
SOLUTION I FACE BIG DATA I PRE-WARNING

SOLUTION I FACE BIG DATA I FACE SEARCH

Face Search by Image

Upload a face image

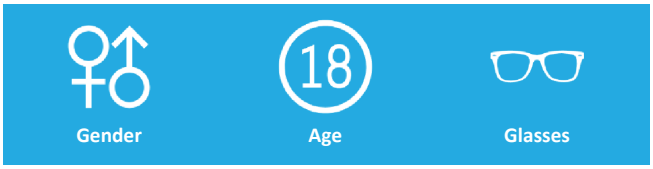
Show all the similar faces



Show the route

Face Search by Features

Input face features



Show all the faces

Show the route

SOLUTION I VEHICLE BIG DATA I PRE-WARNING

SOLUTION I FACE BIG DATA I FACE SEARCH

Vehicle Search by Image

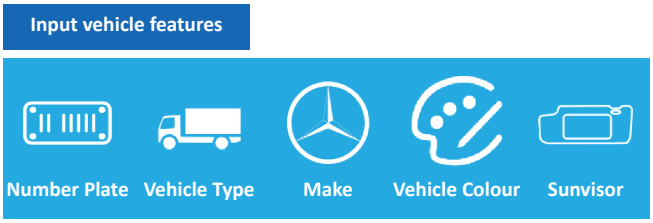
Upload a vehicle image

Show all the similar vehicle

Show the route

Vehicle Search by Features

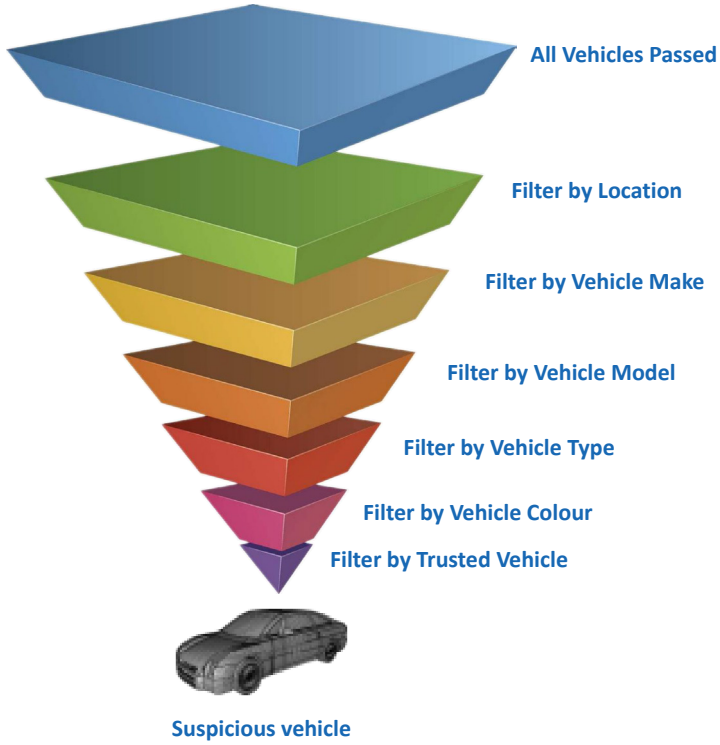
Input vehicle features



Show all the vehicles

Show the route

SOLUTION I VEHICLE BIG DATA I VEHICLE TACTICS



Layer-by-layer filtering technology to find suspicious vehicles by time

Vehicle big data systems can not only enable the analysis and filtering of vehicles and personnel, but they also carry out in-depth data mining and collision analysis of a large amount of data to find valuable clues.

SOLUTION I VEHICLE BIG DATA I VEHICLE TACTICS

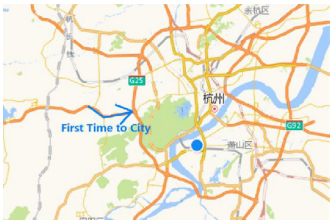
Frequent Pass Analysis

Some criminals often repeatedly appear in a certain area before they commit a crime, which is a clue for police to trace and locate the target vehicle. Using this tactic, it is possible to narrow down a search range by filtering settings such as times of appearance, number plate and vehicle type.

Space & Time Analysis

When we only know the locations and time a vehicle has passed by, the system will find all the possible vehicles that matches the location and time information. It will narrow down the search range by locations and time information.

First Appearance Analysis



Select flexible date and time parameters to allow the system to retrospectively trace back and analyse video. View the vehicle pictures in the analysis results. Carry out analysis including, but not limited to, fixed vehicle makes, models, year of production, number plate and vehicle type.

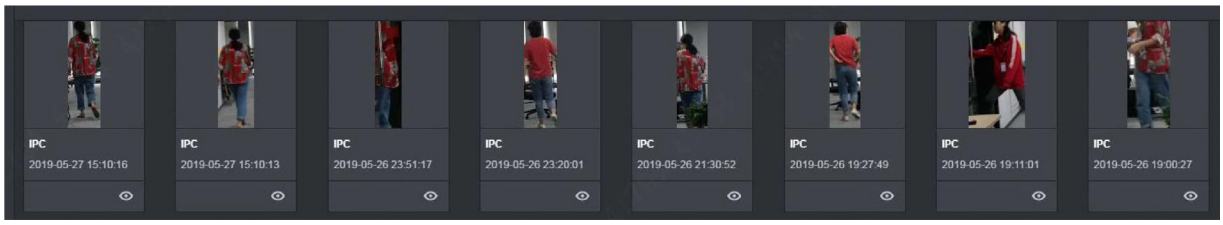
Nocturnal Activity Analysis

The system can automatically filter suspected vehicles that often come out only at night.

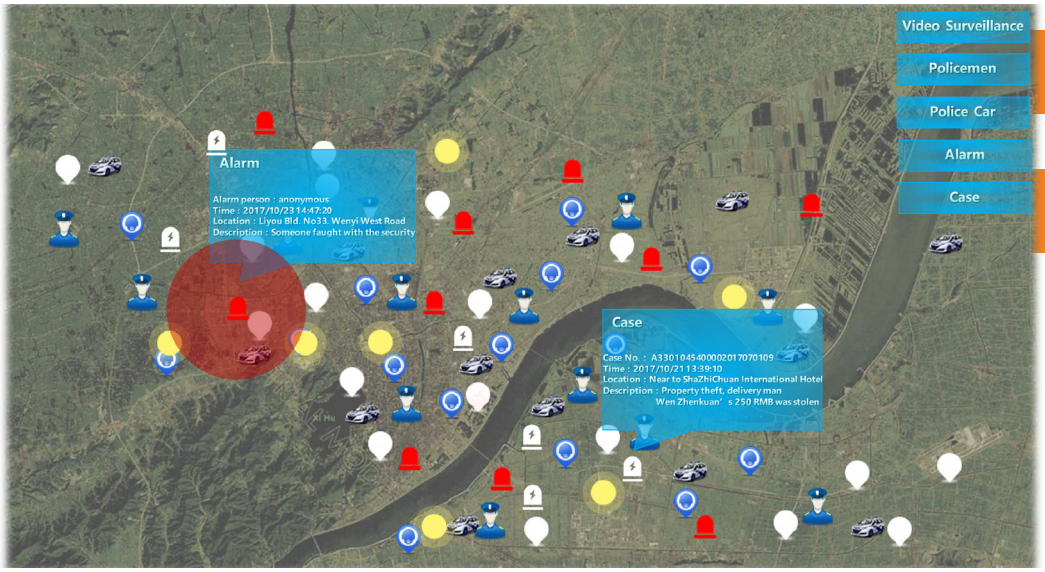
SOLUTION I A PERSON'S ATTRIBUTES

Unlimited	Male	Female							
Unlimited	Yes	No							
Unlimited	Long Trousers	Shorts							
Unlimited	Black	White	Red	Yellow	Green	Brown	Grey	Blue	
Unlimited	Black	White	Red	Yellow	Green	Brown	Grey	Blue	

Unlimited	Yes	No					
Unlimited	Long Sleeves	Short Sleeves					



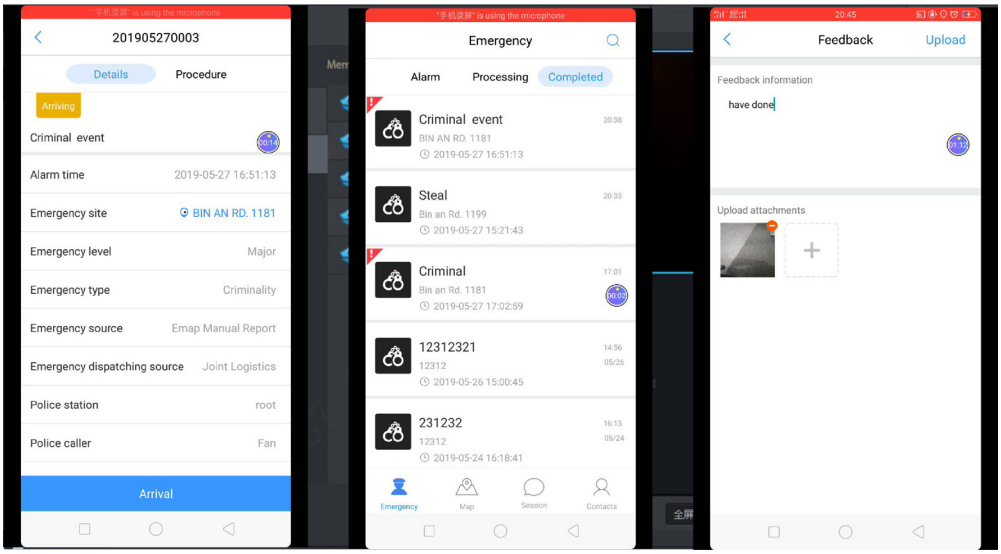
SOLUTION I EMAP



Resources Online

Objects Online

SOLUTION I COMMAND AND CONTROL



- Location
- Info. Sync.
- View Details
- Nearby Source
- **Work Online**
- Dispatching
- Police Arrival
- Dealing
- Feedback
- Finish

SOLUTION I AR PANORAMA SYSTEM

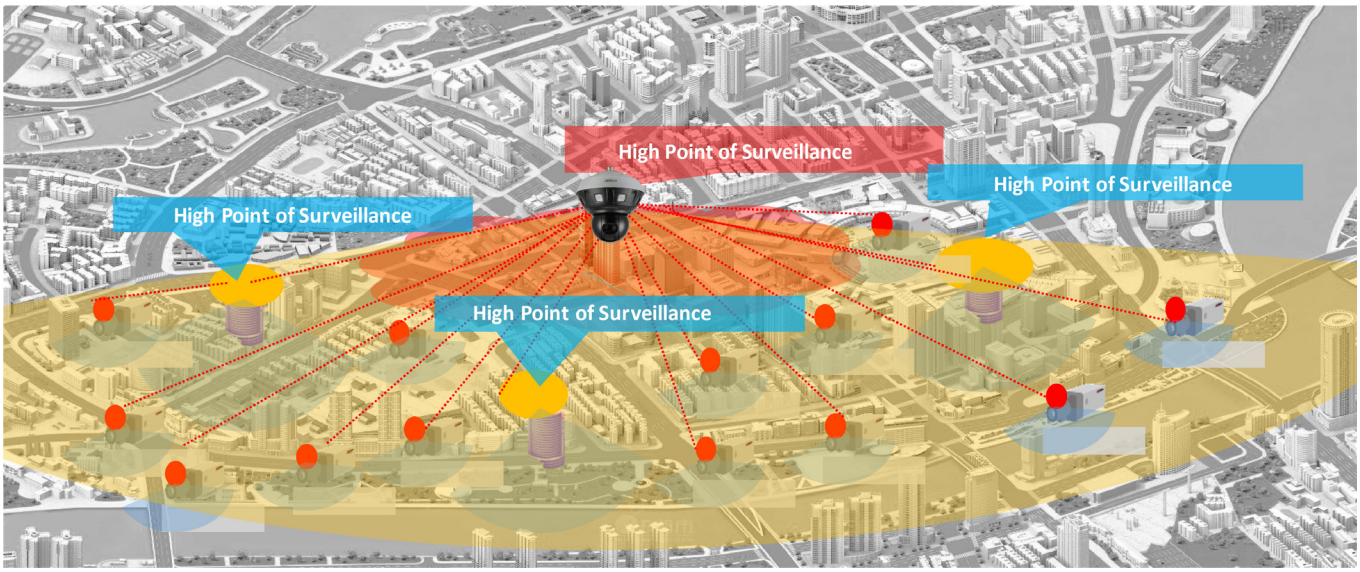
Controllable
- Quick display of pre-warning
- Overall view of event and risk

Schedulable
- Rational deployment of police force
- Rapid interaction command

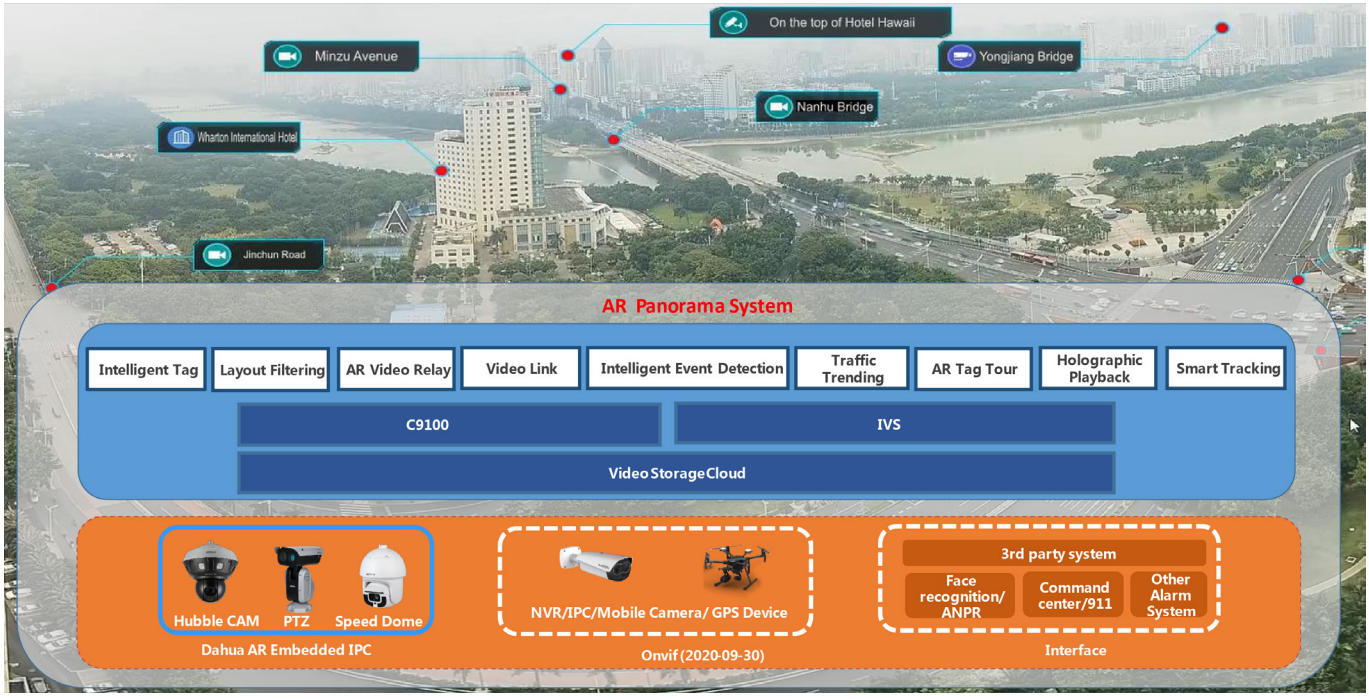
Visible
- The map is real-time video
- Labels indicate the locations
- Integrated stereoscopic monitoring

Integrated
- Breaking through system barriers
- Business integration

SOLUTION I AR PANORAMA SYSTEM LOGIC

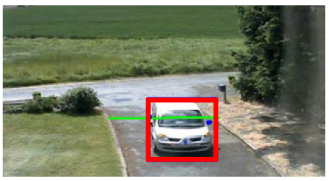


SOLUTION I AR ARCHITECTURE



SOLUTION I AR INTELLIGENT EVENT DETECTION

Intrusion Detection

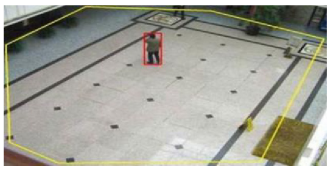


Tripwire Detection

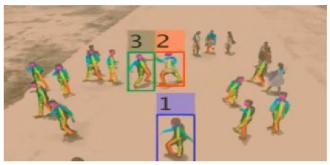
Abandoned Object Detection

Flame Detection

Intrusion Detection



Tripwire Detection



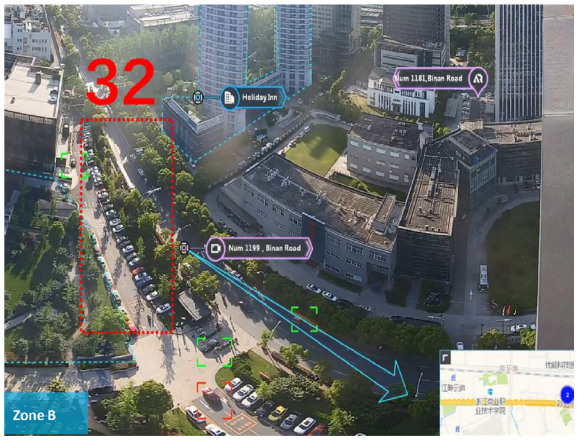
Abandoned Object Detection

Flame Detection

The system supports both Dahua and third-party equipment and will receive notifications from front end devices that pop-up on the screen in a picture-in-picture format.

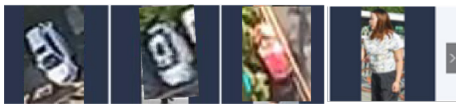
SOLUTION I AR TRAFFIC TRENDS

Check your real-time trends by heat map or number.

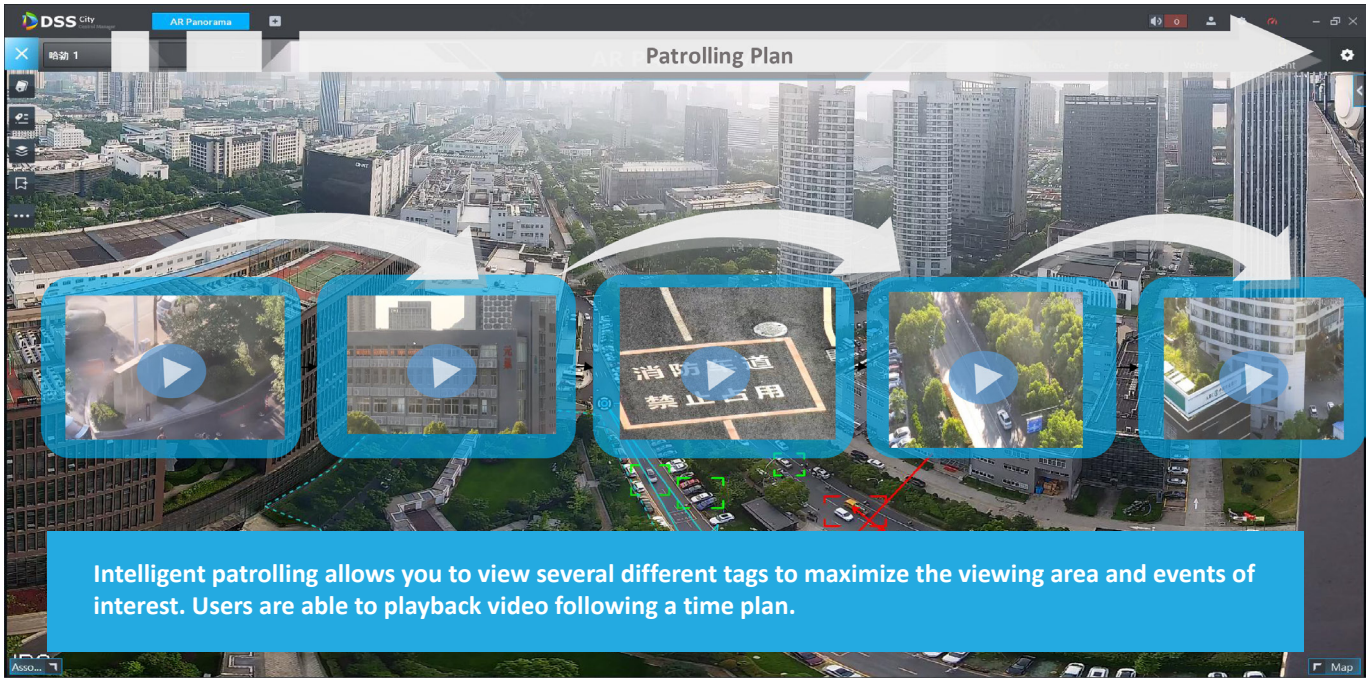


Zone A: 43 people

Zone B:31 vehicles



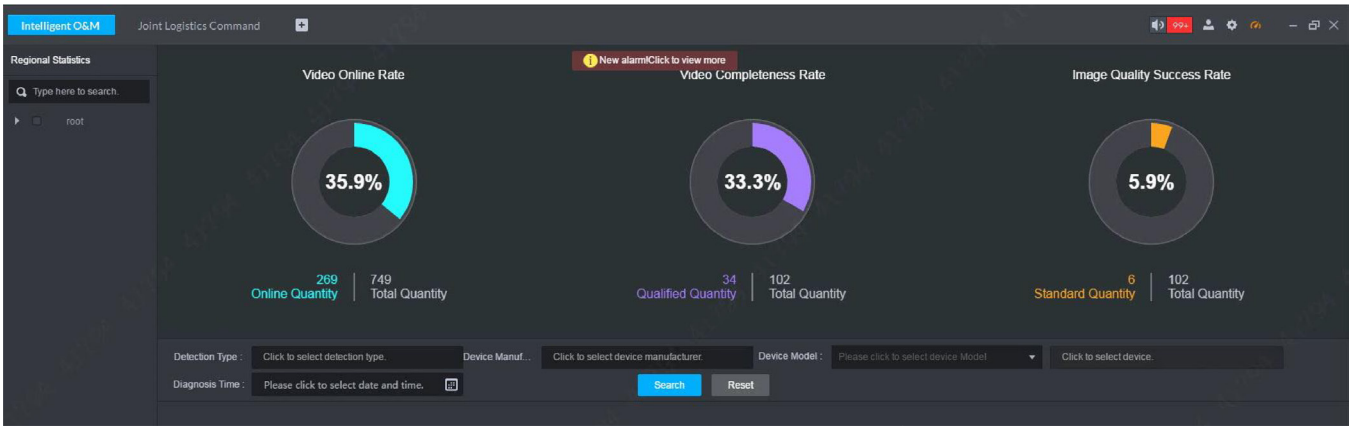
SOLUTION I AR TAG TOUR



SOLUTION I AR SMART TRACKING

By triggering the intelligent rule line in the panoramic picture, the target object can be tracked by a speed dome and the details of the object can be seen more accurately.

SOLUTION I AR PANORAMA SYSTEM



Video Quality Diagnosis (Video Jitter, Video Occlusion, Video Freezing, Video Loss, Video Stripes, Brightness Abnormality, Definition Abnormality, Colour Bias Detection, Noise Detection, Scene Change Detection, Black-and-White Image, Drastic Change in Video).

KEY PRODUCTS

Vehicle Checkpoint
DHI-ITC352-AU3FIRL7

Vehicle Checkpoint
DHI-ITC952-AU3F-IRL7

Edge Storage
DHI-ITSE0804-GN5B-D

People Checkpoint
DH-IPC-HFW7442H-Z

Panoramic Camera
DH-PSDW81642MP-HA360-E9-D440-DC36V

Fisheye
DH-IPC-EBW81230

Mobile Positioning System
DHI-MPTZ3300-2030URANT

Mobile Video Recorder
DHI-MNVR4104-GFW

4G Mobile Speed Dome
DHI-MSB-L200

Hunter Camera
DH-SDT5X405-4F-0600-WA

Law-enforcement Video Recorder
DHI-MPT310/
DHIMPT210

Emergency Phone Tower
DHI-VTA8111AB-4

Keyboard
MKB1100

KEY PRODUCTS

Safe City Basic Platform

Face Big Data Platform

Vehicle Big Data Platform

Command and Control System

Intelligent OAM System

AR Panorama System

Vehicle Search Server

Vehicle Analysis Server

Face Recognition Intelligent Server

Video Quality Analysis Server

Cloud Database
DHI-CCS-CloudDB

Cloud Storage Metadata Server

Cloud Storage Node

Solar Panel
ZDNY-275

Solar Gel Battery
6-CNF-100

Special Distribution Box
DH-PFM377-D4830

UPS
DH-PFM351-900

Wireless Transmission Device
DH-PFM880E

Wireless Transmission Device
DH-PFM886-20

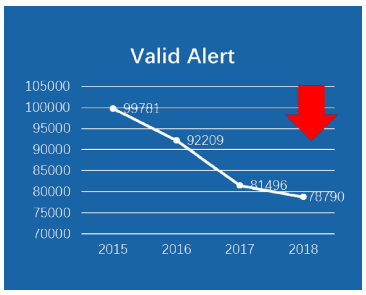
Multi-service Video Management Platform
DHI-M70-4U-E

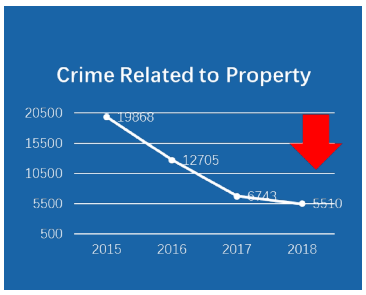
IR Lamp
DHI-ITALE-080BAIR7-P

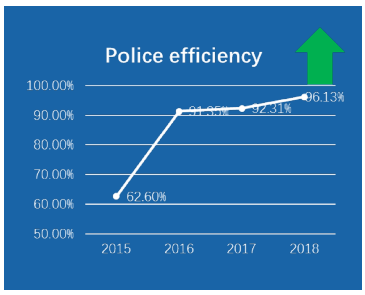
CONCLUSION

ACHIEVEMENTS & BENEFITS

In February 2016, Dahua and Hangzhou Municipal Public Security/Jianggan District Bureau signed a strategic “Safe City” agreement. The overall results have opened a new chapter in smart policing:







2018 Achievements

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Dahua UK & Ireland

Dahua UK & Ireland

Driving Innovation to an AIoT Future

* AIoT is the convergence of Artificial Intelligence (AI) and the Internet of Things (IoT) where connected devices meet human interface. This is enabling unlimited possibilities through the integration of connected devices and security solutions.

Ver.1, October 2020

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