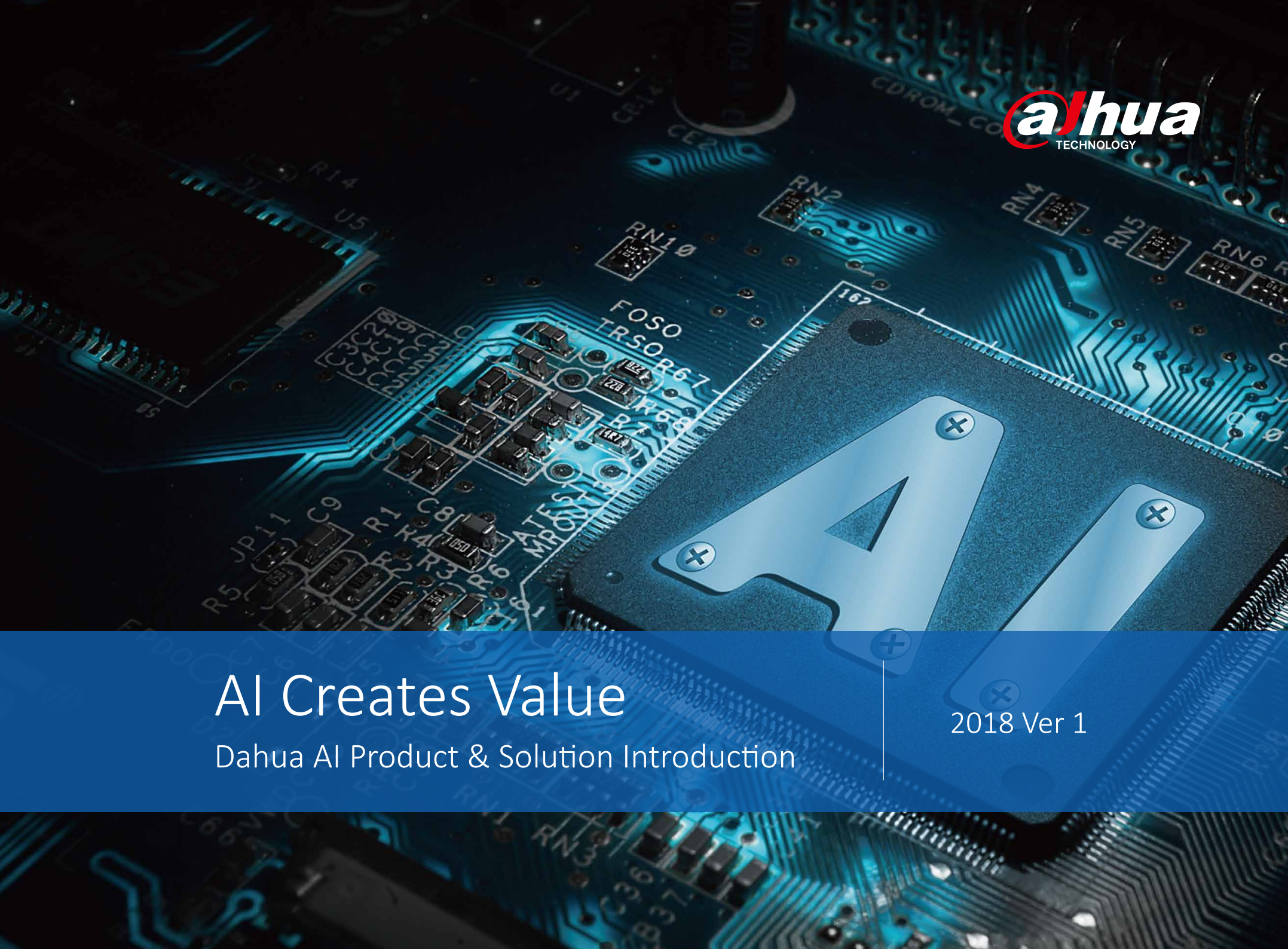


AI Creates Value

Dahua AI Product & Solution Introduction

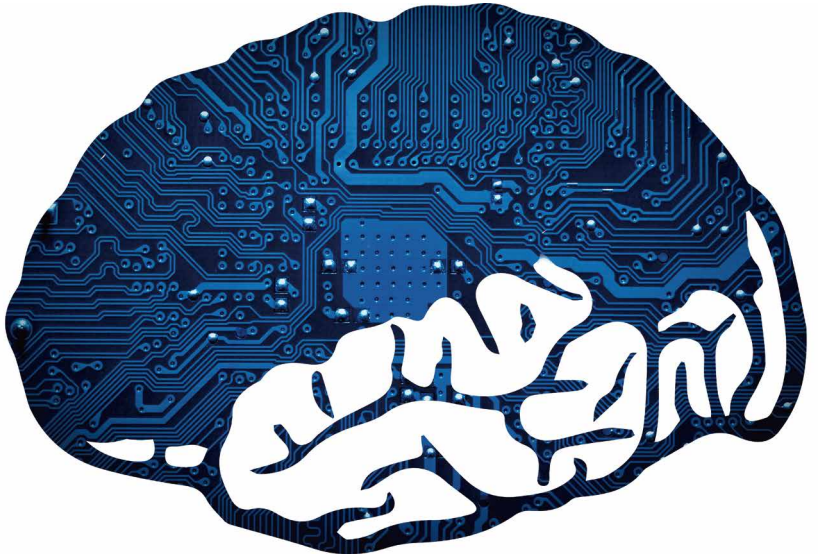
2018 Ver 1

AI Technology

> *For the past 10 years we have been busy creating a world that moves first. In the next 10 years, we will step into the AI first world.*

(Google CEO Sundar Pichai, Oct, 2016)

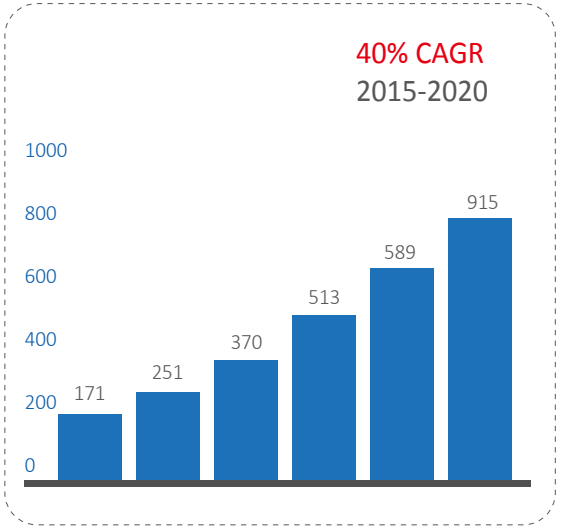
Broadly speaking, AI (artificial intelligence) refers to the branch of science and engineering that produces intelligent machines, especially intelligent computer programs. Narrowly speaking, in the security industry, AI used is to create environmental analysis equipment. Deep learning technology, or improving intelligence by analyzing and learning from large datasets, has brought about a significant change in the field of AI.



Factors in AI Development

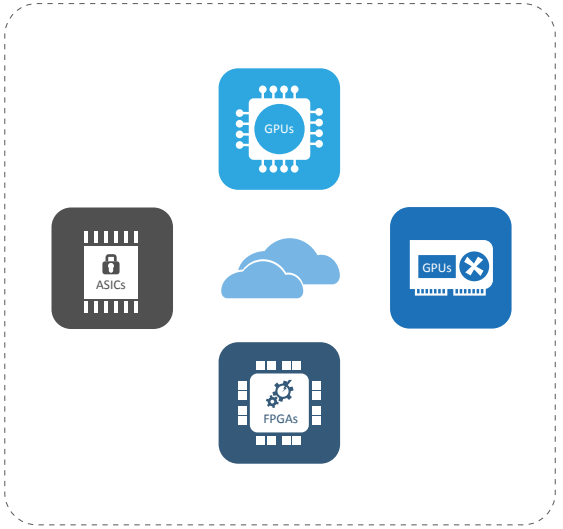
1. Data Capacity

The amount of data stored in global datacenters will increase by 40% annually over the next few years



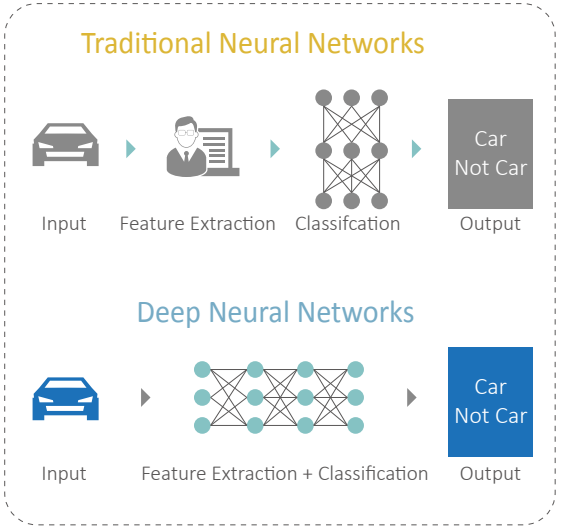
2. Cloud Edge Computing Capability

The integration of GPU, cloud computing, and other high-performance hardware platforms makes computing more powerful than you can imagine.



3. Algorithm Improvement

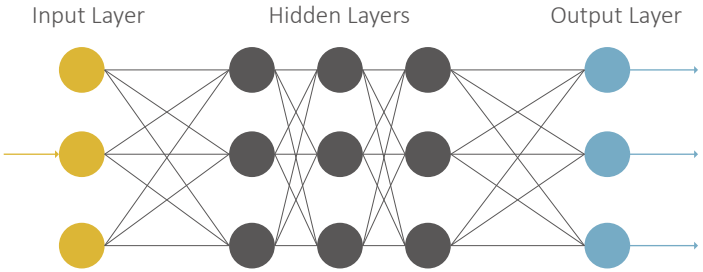
The emergence of deep learning algorithms promote the development of AI technology



Deep Learning Features

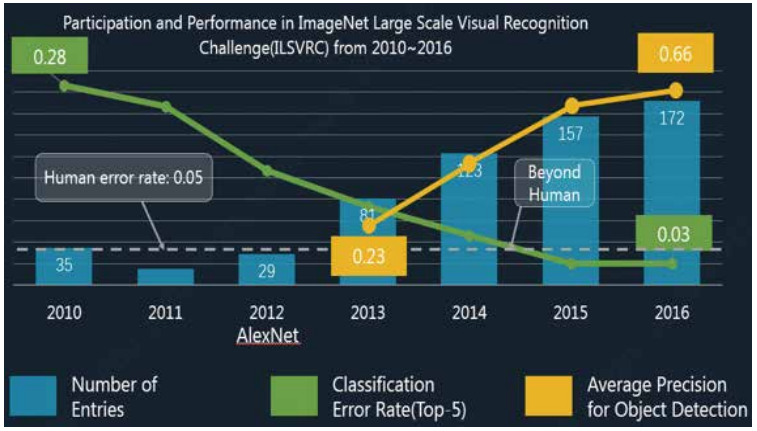
1. Deeper

Compared with traditional algorithms, deep learning algorithms have a deeper structural level. In addition to the common input and output layers, there are more hidden layers in the middle, from the underlying features to more abstract high-level attributes or feature extraction.



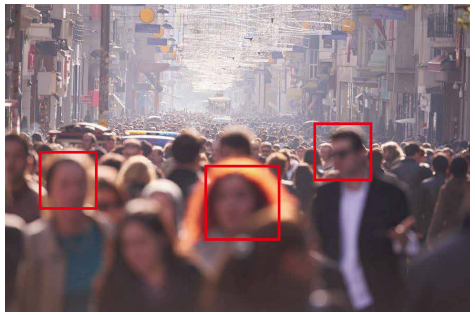
2. Higher Accuracy

In this era of massive data and computations, deep learning follows a positive cycle chain- the larger the data, the higher the accuracy of the algorithm, the higher the accuracy rate, and the more accurate the data collected.

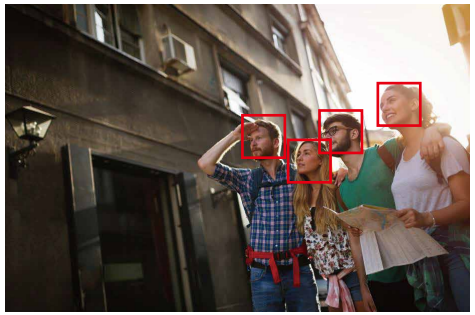


3. Higher Flexibility

Deep learning algorithms are enhanced by training and learning, and can be adjusted quickly and adapt to various new problems. They can learn to identify more object types.



Blurred Image

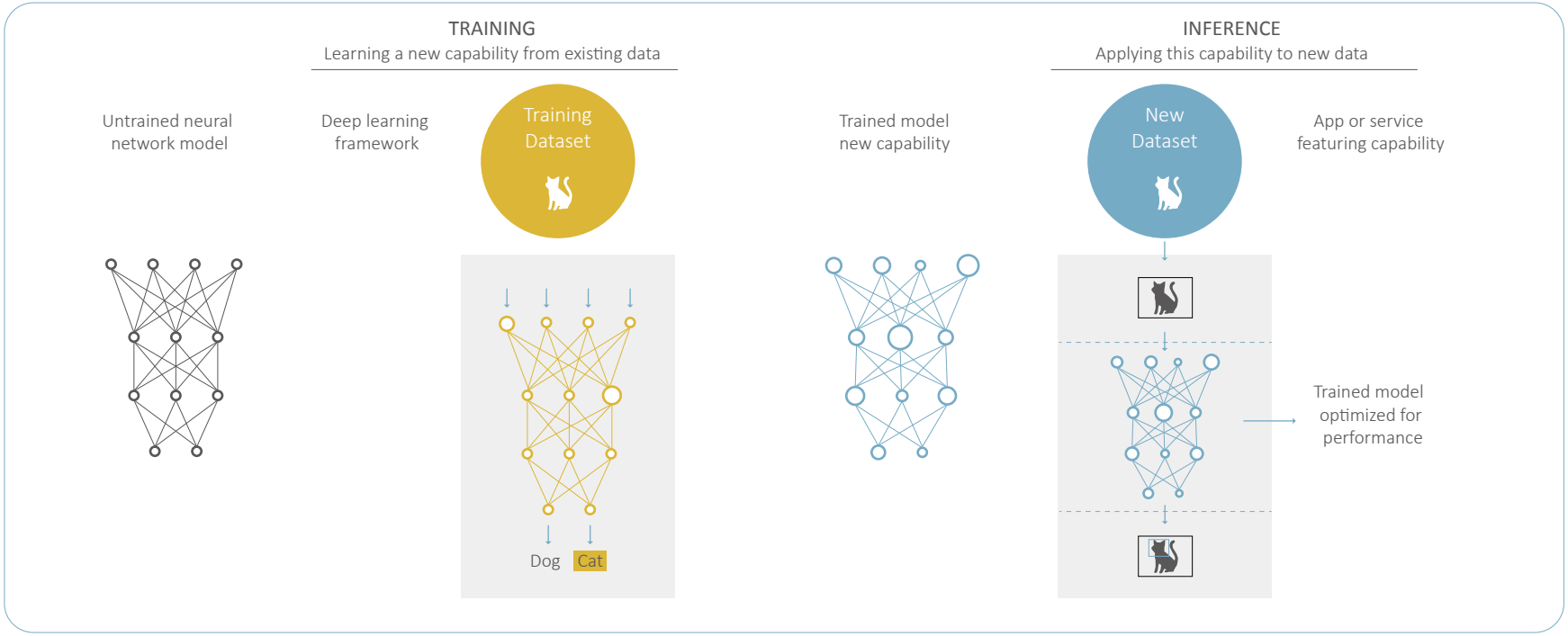


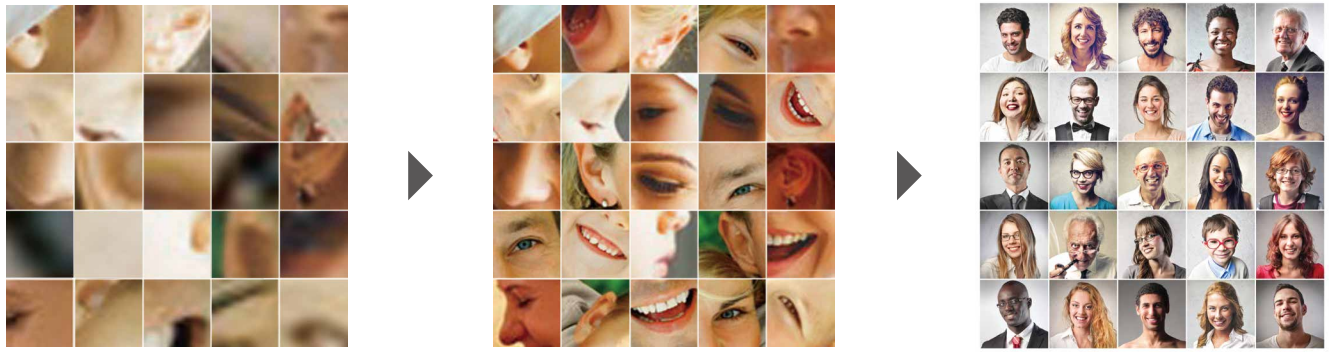
Wide Angle

Small target

4. Eliminates Need for Manual Feature Specification or Optimization

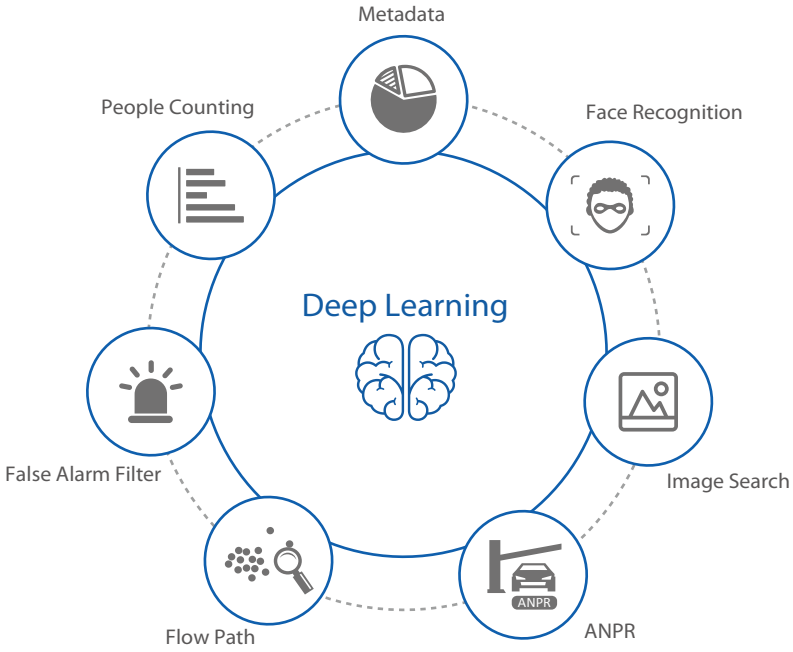
Deep learning does not require manual specification or optimization, and all work is delegated to algorithms. The algorithm simulates a neural network and can extract feature attributes. The more feature attributes, the higher the recognition rate.





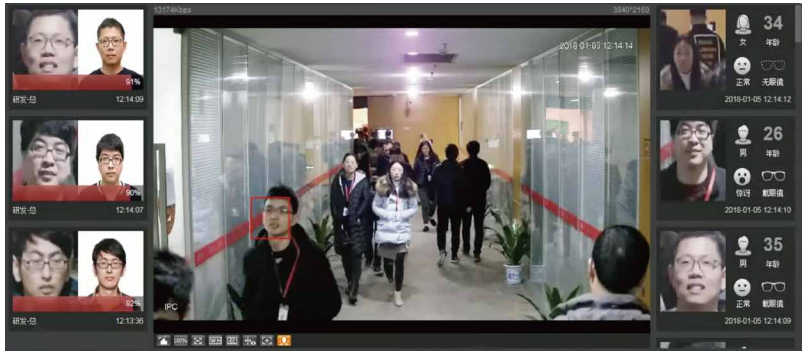
Deep Learning Applications

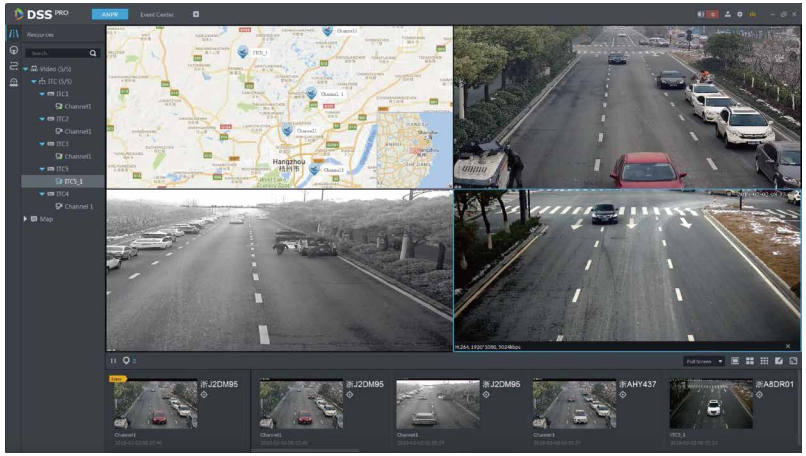
In the surveillance industry, primary target objects of deep learning algorithms are people and vehicles. Taking this into account, Dahua provides the following technology suitable for various applications.



1. Metadata

Metadata is feature attribute information extracted from a target object which can be used for data retrieval. Currently, there are three main kinds of metadata in the security industry: human face, human body, and vehicle metadata. Facial information includes sex, age, glasses, masks, expressions, beards, etc. Human body information includes tops, pants, clothing color, hair, backpacks, etc. Vehicle information includes license plate, color, brand, model, etc.

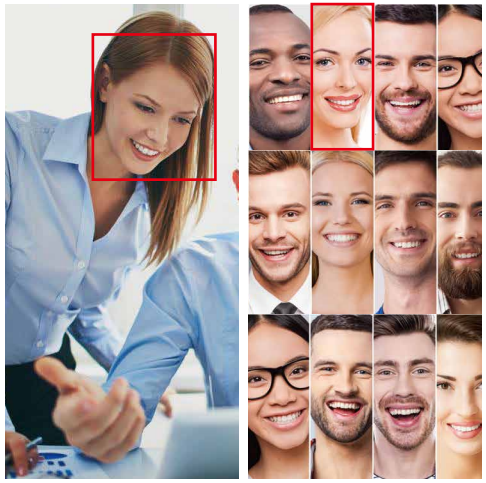




2. Face Recognition

The face recognition function can be used to determine whether faces are present in the input face image or video. If faces are present, the position and size of each face and the position of the main features of each face are further given, and according to the information, the identity characteristics of each face are extracted and the human face will be modeled. Each face model is compared with face models stored in the known faces database to identify each face. There are three methods of comparison: 1:1/ 1:N/ N:N.

1：1



1：N

N：N

3. ANPR

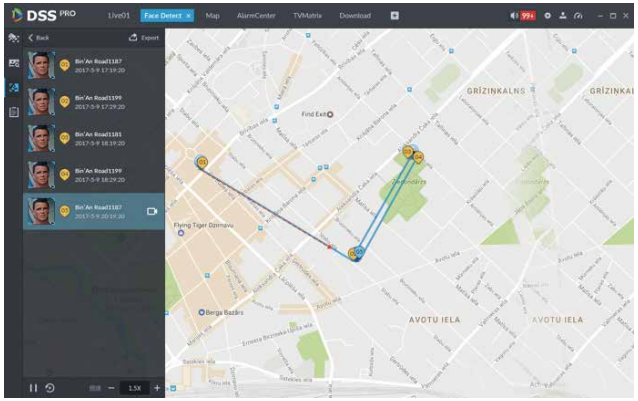
ANPR (Automatic Number Plate Recognition) is a technology that uses optical character recognition on images to read license plates with high recognition accuracy.. ANPR applications include toll collection, traffic monitoring and security, speed and journey time measurement, parking and access control, etc.

4. Image Search

Image search function refers to the use of facial, human body, or vehicle images to search for related pictures and video information.

5. Flow Path

Video frames from DeepSense cameras at different locations are integrated to trace target movement via image matching and image searching techniques.



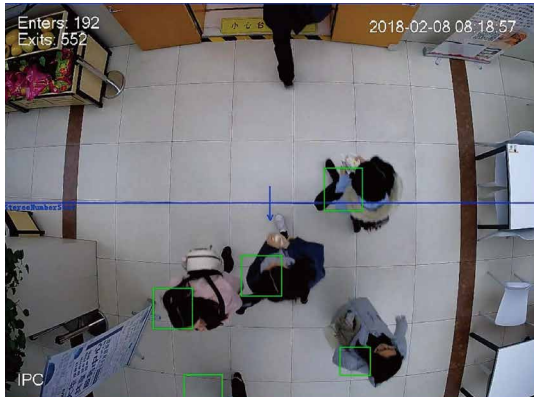
6. False Alarm Filter

Further analysis is performed on detected behaviors or events, automatically filtering out false alarms introduced by animals, rustling leaves, bright lights, rain or snow, etc., greatly improving alarm accuracy.

Microphone Array

7. People Counting

The number of people that enter/leave/pass some specific areas within specific time periods is counted after filtering out non-important targets (shopping carts, wandering personnel, etc.)



Product Overview

Model	Image	Face capture	Metadata	Face recognition	Blacklist alarm	Human body capture	People counting	Height detection	Queue detection and alarm	Dwell time management	Crowd density detection and alarm	False alarm filter, human behavioral analysis (tripwire, instrusion, loitering, entry/exit, abandoned/missing object, fighting, falling, trailing, etc)	False alarm filter	Vehicle capture	Vehicle recognition (brand, color, type, model, etc.)	ANPR	Human, non-motorized and motor vehicles capture	Parking violation detection	Traffic incident detection and capture (parking, reversing, driving the wrong way, U-turn, speeding, under min speed, littering and debris, illegal changing lanes, crossing the solid line, traffic jam, pedestrian, etc.)	Traffic data statistics (traffic flow, queue length, lane occupancy, speed, traffic status,etc.)
IPC-HF8242F-FD IPC-HFW8242E-Z-IRA-FD IPC-HDBW8242E-Z-FD		√	√																	
IPC-HF8242F-FR IPC-HFW8242E-Z-IRA-FR IPC-HDBW8242E-Z-FR		√	√	√	√															
IPC-HF3241F IPC-HFW3241E-Z IPC-HDBW3241E-Z												√								
IPC-HDW8341X-3D							√	√					√							
IPC-HD4140X-3D							√	√					√							
IPC-EBW81240							√		√	√			√							
IPC-HFW8841X-3D				√								√								
SDT5A225-2F		√	√	√	√	√							√	√	√					
SDT6AE240-2Z4		√	√	√	√								√	√	√	√		√		
SD8A240VA-HNA		√	√	√	√								√	√	√					
IPC-PSD81642-A360											√									
ITC231-RU1A-(IR)L			√											√	√	√	√			√
ITC952/352-RFIA-IRL														√	√	√			√	

Recommended Models

IPC-HF8242F-FD
IPC-HFW8242E-Z-IRA-FD
IPC-HDBW8242E-Z-FD

DeepSense Face Capture Camera

- Face capture
- Face capture speeds up to 10faces/s
- Metadata

IPC-HF8242F-FR
IPC-HFW8242E-Z-IRA-FR
IPC-HDBW8242E-Z-FR

DeepSense Facial Recognition Camera

- Face recognition. Supports storage of 10,000 images
- Face capture speeds up to 10faces/s
- Metadata
- Blacklist alarm

IPC-HF3241F
IPC-HFW3241E-Z
IPC-HDBW3241E-Z

DeepSense Deep IVS Camera

- Deep IVS

IPC-HDW8341X-3D

DeepSense Daul-lens People Counting Camera

- 3D stereo camera
- People counting
- Height detection
- False alarm filter

IPC-HFW8841X-3D

DeepSense Multi-lens Behavioral Analysis Camera

- 3D stereo camera
- 4K resolution get more details
- Face capture speeds up to 10faces/s
- Face recognition. Supports storage of 10,000 images
- Supports human behavioral analysis: fighting, falling, stalking, loitering,etc.

Recommended Models

SDT5A225-2F

DeepSense Smart Capture Camera

- Human / vehicle capture
- Face recognition. Supports storage of 10,000 images
- Human metadata
- Vehicle metadata (color, brand, model, etc.)
- Blacklist alarm

SDT6AE240-2Z4

DeepSense Parking Violation Detection Camera

- Human / vehicle capture
- Face recognition. Supports storage of 10,000 images
- Human metadata
- Vehicle metadata (color, brand, model, etc.)
- Illegal parking
- Blacklist alarm

SD8A240VA-HNA

DeepSense Deep IVS Camera

- Face capture
- Face recognition. Supports storage of 10,000 images
- Human metadata
- Vehicle metadata (color, brand, model, etc.)
- Blacklist alarm
- False alarm filter
- Classify humans and vehicles

IPC-PSD81642-A360

DeepSense Camera

- Crowd density detection and alarm
- 48x optical zoom
- Smart tracking

ITC231-RU1A-(IR)L

DeepSense ANPR Camera

- Vehicle capture
- ANPR
- Vehicle recognition
- Metadata
- Traffic data statistics (traffic flow, queue length, lane occupancy, speed, traffic status, etc.)

ITC952/352-RF1A-IRL

DeepSense ANPR Camera

- Vehicle capture
- ANPR
- Vehicle recognition
- Traffic incident detection and capture (parking, reversing, wrong-way driving, illegal U-turn, speeding, driving too slow, debris, illegal lane change, crossing solid line, traffic jams, pedestrians, etc.)

Product Overview

Model	Image	Face recognition	Metadata	People counting	Queue detection and alarm	Crowd density detection and alarm	False alarm filter,human behavioral analysis (tripwire, intrusion, loitering, entry/exit., abandoned/missing objects, fighting, falling, stalking, etc.)	ANPR	Vehicle recognition (brand, color, type, model, etc.)	Blacklist alarm	Image search
IVSS7008-1T IVSS7016-4T IVSS7024-8T		√	√				√	√	√	√	√
NVR5000-I		√	√							√	√
XVR8208A-4KL-XI XVR8216A-4KL-XI XVR8208A-4K-XI XVR8816S-4KL-XI		√	√	√	√	√	√	√		√	
IVS-F7500-P		√	√							√	√
IVS-F7200-P		√	√							√	√
IVS-T7000								√			

Recommended Models

IVSS7008-1T
IVSS7016-4T
IVSS7024-8T

DeepSense 8ch/16ch/32ch Face Recognition IVSS

- 8/16/24 HDD
- Max. 32 channel face recognition. Real time notification when target face/vehicle detected. Image search by face/vehicle images
- Max. 32 channel face/body/vehicle metadata. Real time notification when target face metadata (age, gender, glasses, expression, mask, beard), human body metadata (height, clothes color, pants color) detected- no need for continuous manned monitoring
- Video search by face/human body/vehicle metadata- no need to search videos frame by frame and whether with or without face image
- Max. 100,000 face image database
- Max. 10 million face metadata or face images
- 400Mbps/512Mbps input bandwidth
- 8K decoding capacity
- Supports human behavior analysis. Fighting, falling, stalking, loitering, and other behaviors detected with high accuracy powered by deep learning algorithms. Pushes alarms in real time
- Supports deep learning IVS functions (line crossing, intrusion, region entrance, and exit detection with high accuracy powered by deep learning algorithms. Used in airports, metro/railway stations, prisons, power plants, etc.)

NVR5000-I

DeepSense 2ch/4ch Face Recognition NVR

- 2/4 HDD
- 2/4 channel face recognition. Real time notification when target face/vehicle detected. Image search by face/vehicle images
- 2/4 channel face/body metadata. Real time notification when target face metadata (age, gender, glasses, expression, mask, beard), human body metadata (height, clothes color, pants color) detected- no need for continuous manned monitoring
- Video search with face/human body metadata-no need to search video frame by frame and whether with or without face image
- 50,000 face picture database
- Max. 1 million face metadata or face images
- Supports deep learning IVS functions (line crossing, intrusion, region entrance, and exit detection with high accuracy powered by deep learning algorithms. Used in airports, metro/railway stations, prisons, power plants, etc.)

XVR8208A-4KL-XI
XVR8216A-4KL-XI
XVR8208A-4K-XI
XVR8816S-4KL-XI

DeepSense 8ch/16ch Recognition & Analysis XVR

- 2/8 HDD, each up to 10TB capacity
- Supports perimeter detection and false alarm filtration with 95% accuracy on all channels
- Face recogniton, metadata of vehicle recognition; Supports whitelist/blacklist comparison and real time notifications
- Supports all channels dispatch and control based on human face;
- Support max. 4 channels people counting, crowd density analysis and queue detection; trajectory or fix-point heat map optional
- Max. 4 channel face metadata storage including age, gender, glasses, mask, beard, expression (smile, angry, calm, disgust, happy, sad, etc.)
- Supports max. 4 channel of smart tracking based on human detection to replace previous three-dimensional tracking
- Supports human behavior analysis. fighting, falling, stalking, loitering, and other behaviors detected with high accuracy powered by deep learning algorithms. Pushes alarms in real time

Recommended Models

IVS-F7500-P

DeepSense Facial Recognition & Analysis Server

- Max.100 channel image streaming face recognition
- Max.16 channel video streaming face recognition
- 25 faces can be identified in single picture. Real time notifications when target face detected (age, gender, glasses, expression, mask, beard). Image search by face images
- Support for up to 200faces/s face image modeling
- Support for up to 300,000 face image database
- Support for 76,800,000x/s face image comparision
- Support for storage of up to 14 million face images (1080P)
- Supports flow path applications via intergration with Dahua DSS platform.

IVS-F7200-P

DeepSense Facial Recognition & Analysis Server

- Max 50 channel image streaming face recognition
- Max 8 channel video streaming face recognition
- 25 faces can be identified in single picture. Real time notification as target face shown (age, gender, glasses, expression, mask, beard). Image search by face images
- Support for up to 100faces/s face image modeling
- Support for up to 300,000 face picture database
- Support for 38,400,000x/s face image comparision.
- Support for storage of up to 2 million face images (1080P)
- Supports flow path applications via intergration with Dahua DSS platform

IVS-T7000

DeepSense Vehicle Recognition Server

- Support for storage of up to 2 million face images (1080P)
- Support for up to 10 ANPR camera channels camera in entrance port (3 lane).
- Support for up to 500 parking detector channels (3 parking)
- ANPR accuracy rate more than 95%
- Supports flow path applications via intergration with Dahua DSS platform

Applications

Smart Retail

Loss Prevention

When a suspected “habitual thief” appears at the entrance, the face recognition camera immediately sounds a blacklisted personnel alarm, notifying the loss manager and related personnel.

Customer Information

Analyze and generate statistics about the foot traffic in designated areas, and perform in-depth analysis on the relationship between customer age, sex, mood, weather, and passenger flow, allowing stores to provide customers with more intimate service.

Smart Industrial Park

Face Recognition

Face Recognition/ANPR camera is used to achieve facial/LP access control, sounding an alarm when unfamiliar visitors are detected.

Deep Learning IVS

Based on deep learning algorithms, the deep learning IVS camera greatly improves the accuracy of detection by automatically filtering out animals, rain, rustling leaves, and other causes of interference.

Smart City

Face Recognition

Face recognition cameras on city roads can be used to plot the trajectory of target objects.

Intelligent Traffic

ANPR cameras can engage in road traffic flow data collection as well as illegal behavior detection and capture.

ENABLING A SAFER SOCIETY AND SMARTER LIVING

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* Design and specifications are subject to change without notice.

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