DHI-IVS-TB8000-E-GU1

Intelligent Video Analysis Server for Traffic Event Detection

· Separation of rules and algorithms, based on metadata of traditional and deep learning algorithms, for the high performance of various upper-level applications.

· Adopts video cloud architecture and supports dynamic adjustment of computing resources for greater precision and control.

· Automatic detection of lane lines and key points of vehicles.

· Supports the global detection application of PTZ Camera scenes.

· Supports one-click deployment of all-in-one machines for small-scale scenarios and simple demonstrations, and supports distributed cluster deployment for large-scale scenarios.

Motor Vehicle Attributes	ANPR	Vehicle Density	Wrong-way Driving Detection	Illegal Changing Lanes	Parking Detection	Crossing Solid Yellow Line
Traffic Jam Detection	Littering Detection	Speeding Detection	Underspeed Detection	Smoke Detection	Fire Detection	

System Overview

Built on video cloud architecture, TB8000-E series intelligent video analysis server for traffic event detection is a powerful traffic detection device built to the specific standards of . It adopts AIX3200 intelligent analysis card, which combines traditional and deep learning algorithms. The server not only supports real-time video stream access, and outputs abnormal event alarms but with its smart design, it also gives you the control to analyze data according to your preferences based on the defined intelligent rules. The server integrates a variety of intelligent algorithms and supports large-scale clusters,serving the many demands that come with traffic management.

With its dynamic and rich design, the server supports making statistics of traffic flow, and detecting abnormal events such as parking, pedestrian on vehicle lane, non-motor vehicle, traffic jam, traffic flow statistics, littering, area intrusion, illegal lane change, wrong-way driving, construction, obstacle, traffic accident, fog, smoke, fire, crossing solid line, speeding, driving too slow, truck entering prohibited area, hazardous material transport vehicle and driving in emergency lane. It is ideal for traffic management, and applies to scenarios such as expressways, tunnels, bridges, city roads and railways.
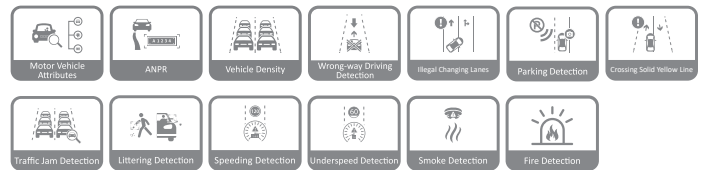
Open Intelligent Rules

1. Training model and rules to form new algorithms. You can add, delete, edit, enable and disable new algorithms.
2. Displays open algorithm lists. You can turn pages and view algorithm name, alarm ID, model name, model parameters and rule type.
3. Algorithms can be created. You must enter the algorithm name, rule type and model name. Alarm ID is optional.
4. Algorithms can be edited. You can edit the alarm ID and alarm name. Chinese, English and a few special characters are supported.
5. Open algorithms can be enabled and disabled, and you can view new event types, analysis management and smart configuration to add helmet positions in order to add newly generated open algorithms.
6. Open algorithms can be deleted. When the open algorithm has tasks, it prompts whether to delete it, and deletes all related information once you confirm to delete.

Alarm Video

1. Alarm videos can be enabled by event.
2. The duration can be configured by event. Range: ±5 s–180 s, ±15 s by default.
3. Supports configuring the video storage disk through the client. It also notifies of full cycle coverage and storage space overflow.
4. The alarm video contains smart frames, and the client performs filtering during playback and decoding. Only the smart frames and target IDs related to the alarm rules cannot be filtered out.
5. Displays the video on the alarm details page. Video recordings can also be played. Supports adjusting the control bar of the video, and notifying when the video corresponding to the event is still being generated while it is being played.
6. Supports downloading alarm videos in .mp4 format (without smart frame) and .dav format (with smart frame). The default format is .mp4.
7. Hard disks can be mounted and unloaded.

Functions

Global Detection

Supports global detection mode for one channel. After global detection mode is enabled, one channel can enable global detection.
1. Lane lines and detection regions are automatically detected.
2. Rule parameters can be configured
3. The lane lines and detection zones can be updated in real time.
4. Available options through the algorithm: Parking, pedestrian on vehicle lane, non-motor vehicle, traffic jam, littering, wrong-way driving, reversing, construction, obstacle, traffic accident, radiation fog, smoke and fire detection.

Plate Number Recognition

Supports ANPR for parking, illegal lane change, crossing the solid yellow line, wrong-way driving, and area intrusion. It is recommended that the license plate width is more than 80 pixels.

Report Generation and Export

Supports alarm information in Excel form, including device, device IP, channel name, event time, event name, event type, lane, license plate number, speed and other information.

Alarm Search

Supports searching for alarm information according to multiple options, such as device, channel, event type, capture time and more.

Scene

Suitable for locations where intelligent applications are required, such as expressways, tunnels, bridges, city roads and railways.

Technical Specification

System

Main Processor	One Intel Xeon E3-1275 V5, 3.6 GHz, 4 C/8 T
Intelligent Card	One AIX3200 intelligent analysis card
Operating System	CentOS Linux release 7.4.1708 (Core)
Memory	Two 8 GB DDR4 memory, maximum 4 slots
Disk	One 2.5" 128 GB SSD and two 3.5" 4 TB HDDs with up to 4 slots. 7.2K RPM SATA 6 Gbps 512N 3.5"

Traffic Event Detection

Multi-rules Application	Multiple rules can take effect simultaneously
Detection Area and Exclusion Area Setting	Supports detection zone and exclusion zone for the server. The server only triggers alarms for events that occur in the detection zone or outside the exclusion zone. Supports up to 1 detection zone and 10 exclusion zones
Real-time Display	Displays detection zone rules and the target tracking box in live view. The rule and target tracking boxes flash on screen when an alarm is triggered
Parking Detection	Detects when a vehicle moves and then stops for longer than the defined threshold. 1. Intelligent Configuration • Parking duration. Range: 1 s–600 s, 10 s by default. • Parking threshold. 3 by default. • Repeated alarm suppression. Supports: on and off, off by default. • Detected priority. Supports: on and off, off by default. • Only takes snapshots of moving vehicles. Supports: on and off, off by default. • Takes multiple snapshots. Supports: on and off, off by default. 2. Alarm Details 1) Includes: Alarm video, alarm pictures, devices, channels, alarm start time, alarm end time, event name, event type, and plate number. 2) Alarm pictures: 2 pictures, including 1 × parking picture and 1 × picture taken 1 s after the alarm. 3) Picture overlay: Target box, target ID, detection region and target points.
Pedestrian Detection	Detects when a pedestrian walks onto the vehicle lane or into an area where pedestrians are prohibited from entering for longer than the defined threshold. 1. Intelligent Configuration • Shortest duration. Range: 1 s–300 s, 2 s by default. 2. Alarm Details 1) Includes: Alarm video, alarm pictures, devices, channels, alarm start time, event name and event type. 2) Alarm picture: 1 picture of the pedestrian. 3) Picture overlay: Target box, target ID, detection region and target points.
Non-motor Vehicle Detection	Detects when a pedestrian walks onto the vehicle lane or into an area where pedestrians are prohibited from entering for longer than the defined threshold. 1. Intelligent Configuration • Shortest duration. Range: 1 s–300 s, 2 s by default. 2. Alarm Details 1) Includes: Alarm video, alarm pictures, devices, channels, alarm start time, event name and event type. 2) Alarm picture: 1 picture of the pedestrian. 3) Picture overlay: Target box, target ID, detection region and target points.
Traffic Jam Detection	Detects when a lane is congested for longer than the defined threshold. Supports reporting on traffic jams based on the lane and region they occur in. 1. Intelligent Configuration 1) Traffic jam on lane settings: • Lane number • Line occupancy ratio. Range: 1–100, 50 by default. • Alarms in intervals. Range: 1–3,600 s, 600 s by default. • Delay time. Range: 1–300 s, 10 s by default. • Sensitivity. Range: 1–10, 2 by default. • Discontinuation time threshold. Range: 1–255 s, 1 s by default. 2) Traffic jam in region settings: • Region • Number of vehicles in traffic jam. • Alarms in intervals. Range: 1–3,600 s, default: 600 s. • Delay time. Range: 1–300 s, default: 10 s. • Sensitivity. Range: 1–10, 2 by default. 2. Alarm Details 1) Includes: Alarm pictures with the target box, alarm video, devices, channel, alarm start time, alarm end time, event name, event type, and plate number. 2) Alarm pictures: 3 types of pictures, including 1 × traffic jam picture, alarm pictures taken in intervals and 1 × picture of the end of the traffic jam. 3) Picture overlay: Traffic jam in lane: Lane; the start and end point of the traffic jam on the lane Region jam: Detection box

Traffic Flow Statistics	Generates statistics on the number of vehicles passing through a road section within a specified time. 1. Counts vehicles that cross the detection line on the lane. Supports counting traffic that is approaching and departing, and not specifying a direction. 2. Statistics Page 1) Displays statistics on: Lanes, traffic flow, small-sized vehicles, passenger vehicles, trucks, average speed, time occupancy ratio, space occupancy ratio, queue length, the distance between 2 vehicles, and the time between 2 vehicles passing the detection line. 2) Displays traffic flow statistics by parameters. • Flow of approaching traffic, including information on small-sized vehicles, passenger vehicles and trucks. • Average speed, time occupancy ratio, space occupancy ratio, queue length, the distance between 2 vehicles and the time between 2 vehicles passing the detection line. • Shows the total traffic flow when there are more than 2 lanes. 3. The traffic flow continues to be accumulated from the last value when an operator is abnormal or the device is restarted. 4. Supports searching for traffic flow by vehicle type, including small-sized vehicle, passenger vehicle and truck. 5. Flow data can be manually cleared, and requires second confirmation.	**Intrusion Detection**	Detects when vehicles enter and remain in an area for longer than the defined threshold. 1. Intelligent Configuration 1) Parameters • Object: Pedestrian, motor vehicle, non-motor vehicle; motor vehicle by default • Action list: Appear and cross, cross by default. 2) Sensitivity: Range: 1–10, 3 by default. 2. Alarm Details 1) Includes: Alarm pictures with the target box, devices, channels, event time, event name, event type, and plate number. 2) Alarm picture: 1 picture of the vehicle intrusion. 3) Picture overlay: Target box, target ID, detection region and lane line
		Illegal Lane Change Detection	Detects when a vehicle crosses the solid yellow or white lane line for longer than the defined threshold. 1. Intelligent Configuration: • Lane Number • Sensitivity. Range: 1–10, 10 by default. 2. Alarm Details: 1) Includes: Devices, channels, event time, event name, event type, lane number and plate number. 2) Alarm pictures: 2 pictures, including 1 × picture of the vehicle changing lanes and 1 × picture of the vehicle after it changed the lane. 3) Picture overlay: Target box, target ID, lane line and target point.
Visibility Detection	Detects when radiation fog appears in the area for longer than the defined threshold. 1. Intelligent Configuration: 1) Shortest duration. Range: 1 s–300 s, 5 s by default. • Alarms in intervals. Range: 1 s–65,535 s, 300 s by default. • Alarm threshold. Range: 1–100. 2) Reports on events when the alarm starts, ends, and for the period it exists. 2. Alarm Details 1) Includes: Alarm pictures with the target box, devices, channels, start time, event name, event type, the thickness of the fog, and the time the fog dissipates. 2) Alarm pictures: 3 types of pictures, including 1 × fog picture, alarm pictures taken in intervals and 1 × picture of the dissipation of the fog. 3) Picture overlay: Target box and detection region.	**Wrong-way Driving Detection**	Detects when a vehicle is driving in the wrong direction for longer than the defined threshold. Supports reporting on the event based on the lane and region they occur in. 1. Intelligent Configuration: • Lane number of detection region • Duration. Range 1 s–300 s, 2s by default. • Driving distance. Range: 0–1,023,200 by default. 2. Alarm Details 1) Includes: Alarm picture with the target box, devices, channels, event time, event name, event type, lane number and plate number. 2) Alarm pictures: 2 pictures, includiH228:H230ng 1 × picture of the vehicle driving in the wrong direction and 1 × picture taken 1 s after the alarm. 3) Picture overlay: Target box, target ID, detection region and lane line.
Littering Detection	Detects when an object is littered by a pedestrian or a person from a vehicle and the litter disturbs traffic for longer than the defined threshold. 1. Intelligent Configuration • Duration. Range: 1 s–300 s, 6 s by default. • Alarms in intervals. Range: 0 s–300 s, 0 s by default. 2. Alarm Details 1) Includes: Alarm pictures with the target box, alarm video, devices, channels, alarm time, event name and event type. 2) Alarm picture: 1 picture of the littered object. 3) Picture overlay: Target box, target ID and detection region.	**Illegal Backing Detection**	Detects when a vehicle is illegally reversing for longer than the defined threshold. For example, when a vehicle illegally reverses on an expressway intersection. 1. Intelligent Configuration • Detection region • Duration. Range 1 s–300 s, 3 s by default. • Driving distance. Range: 0–1,023. It is 200 by default. 2. Alarm Details 1) Includes: Alarm pictures with the target box, devices, channels, event time, event name, event types and plate number. 2) Alarm pictures: 2 pictures, including 1 × picture of the vehicle illegally reversing and 1 × picture taken 1 s after the alarm. 3) Picture overlay: target box, target ID and detection region

Construction Detection	Detects when construction signs are in the area for longer than the defined threshold. 1. Intelligent Configuration 1) Parameters • Shortest duration. Range: 1 s–300 s, 5 s by default. • Alarms in intervals. Range: 1 s–65,535 s, 300 s by default. • Sensitivity. Range: 1–10. It is 5 by default. • Repeated alarm suppression. Supports on and off, off by default. 2) Reports on events when the alarm starts, ends, and for the period it exists. 2. Alarm Details 1) Includes: Alarm pictures with the target box, devices, channels, start time, end time, event name and event type. 2) Alarm pictures: 3 types of pictures, including 1 × picture of the construction sign, alarm pictures taken in intervals and 1 × picture after the sign has been removed. 3) Picture overlay: Target box, target ID and detection region
Obstacle Detection	Detects objects that act as obstacles, such as boxes, in the area for longer than the defined threshold. 1. Intelligent Configuration: 1) Parameters • Shortest duration. Range: 1 s–300 s, 5 s by default. • Alarms in intervals. Range: 1 s–65,535 s, 300 s by default. • Sensitivity. Range: 1–10, 1 by default. • Repeated alarm suppression. Supports on and off, off by default. 2) Reports on events when the alarm starts, ends, and for the period it exists. 2. Alarm Details 1) Includes: Alarm pictures with the target box, devices, channels, start time, time object was removed, event name and event type. 2) Alarm pictures: 3 types of pictures, including 1 × picture of the object acting as an obstacle, alarm pictures taken in intervals and 1 × picture after the object has been removed. 3) Picture overlay: Target box, target ID and detection region
Accident Detection	Detects when vehicles collide, and the collision lasts longer than the defined threshold. 1. Intelligent Configuration: • Alarms in intervals. Range: 1–3,600 s, 600 s by default. • Parking duration. Range: 1 s–300 s, 5 s by default. • Duration of pedestrian in area. Range: 1 s–300 s, 3 s by default. • Vehicle in traffic congestion. Range: 1-300, 14 by default. 2. Alarm Details: 1) Includes: Alarm pictures with the target box, devices, channels, start time, event name and event type. 2) Alarm pictures: 2 pictures, including 1 × picture of the vehicle collision and 1 × picture taken 1 s after the alarm. 3) Picture overlay: Target box and detection region
Fire Detection	Detects when a fire breaks out in the area, and lasts longer than the defined threshold. 1. Intelligent Configuration • Shortest duration. Range: 1 s–300 s, 5 s by default. • Sensitivity. Range: 1–10, 5 by default. • Alarms in intervals. Range: 1 s–300 s, 10 s by default. • Overlap threshold. Range: 0–100, 90 by default. 2. Alarm Details: 1 × alarm picture with the target box, devices, channels, event time, event name and event types.
Smoke Detection	Detects when smog appears and remains in the area for longer than the defined threshold. 1. Intelligent Configuration: • Shortest duration. Range: 1 s–300 s, 5 s by default. • Sensitivity. Range: 1–10, 5 by default. • Alarms in intervals. Range: 1 s–300 s, 10 s by default. • Overlap threshold. Range: 0–100, 90 by default. 2. Alarm Details: 1 × Alarm picture with the target box, devices, channels, event time, event name and event type.
Crossing Line Detection	Detects when a vehicle crosses the solid yellow or white line for longer than the defined threshold. 1. Intelligent Configuration: • Lane lines • Duration. Range: 1 s–300 s, 5 s by default. • Takes snapshots when a vehicle crosses the solid white line. It is off by default. • Sensitivity. Range: 1–10, 5 by default. 2. Alarm Details: 1) Includes: Alarm pictures with the target box, devices, channels, event time, event name, event type, lane number and plate number. 2) Alarm pictures: 2 pictures, including 1 × picture of the vehicle crossing the solid line and 1 × picture taken 1 s after the alarm. 3) Picture overlay: Target box, Target ID, Lane line and Target point.
Speeding Detection	Detects when the speed of a vehicle exceeds the defined threshold, and remains above the threshold for longer than the defined time. 1. Intelligent Configuration: • Lane number • Maximum speed. Range: 60 km/h–180 km/h. It is 120 km/h by default. • Shortest duration. Range: 1 s–300 s, 5 s by default. 2. Alarm Details: 1) Includes: Alarm pictures with the target box, devices, channels, event time, event name, event types, lane number, plate number, maximum speed and driving speed. 2) Alarm pictures: 2 pictures, including 1 × vehicle speeding picture and 1 × picture taken 1 s after the alarm. 3) Picture overlay: target box, target ID, and lane line.
Driving Too Slow Detection	Detects when the speed of a vehicle falls below the defined threshold, and remains below the threshold for longer than the defined time. 1. Intelligent Configuration: • Lane number • Minimum speed. Range: 30 km/h–120 km/h. It is 60 km/h by default. • Shortest duration. Range: 1 s–10 s, 1 s by default. 2. Alarm Details: 1) Includes: Alarm pictures with the target box, devices, channels, event time, event name, event types, lane number, plate number, maximum speed and driving speed. 2) Alarm pictures: 2 pictures, including 1 × picture of the vehicle driving too slow and 1 × picture taken 1 s after the alarm. 3) Picture overlay: Target box, target ID, and lane line.

Detection of Trucks Entering Prohibited Area	Detects when a truck enters the detection zone. 1. Intelligent Configuration: • Sensitivity. Range: 1–10, 3 by default. 2. Alarm Details: 1) Includes: Alarm pictures with the target box, devices, channels, event time, event name, event type and plate number. 2) Picture overlay: Target box, target ID, lane line and target point.	Traffic Event Detection Type	Includes parking, pedestrian on vehicle lane, non-motor vehicle, traffic jam, traffic flow statistics, littering, area intrusion, illegal lane change, wrong-way driving, construction, obstacle, traffic accident, fog, smoke, fire, crossing solid line, speeding, driving too slow, truck entering prohibited area, hazardous material transport vehicle and driving in emergency lane.
		Traffic Parameters	Traffic flow, average speed, time occupancy rate, space occupation rate, space headway, time headway and queue length
Detection of Hazardous Material Transport Vehicle	Detects when a hazardous material transport vehicle crosses the detection line. 1. Intelligent Configuration: • Sensitivity. Range: 1–10, 3 by default. • Hazardous material transport vehicle. It is tank car by default. 2. Alarm Details: 1) Includes: Alarm pictures with the target box, devices, channels, event time, event name, event type and plate number. 2) Picture overlay: Target box, target ID, lane line and target point.	Parking Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Pedestrian Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Non-motor Vehicle Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Traffic Jam Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Traffic Flow Statistics	According to test data (1080P access), the traffic accuracy rate is over 90%.
		Visibility Detection	Subject to actual test
Detection of Driving in Emergency Lane	Detects when a vehicle enters the emergency lane. 1. Intelligent Configuration: • Sensitivity. Range: 1–10, 3 by default. 2. Alarm Details: 1) Includes: Alarm pictures with the target box, devices, channels, event time, event name, event type and plate number. 2) Picture overlay: Target box, target ID, lane line and target point.	Littering Detection	According to test data (1080P access), the detection rate is 80%, and the effective rate is 80%.
		Intrusion Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Illegal Lane Change Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Wrong-way Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
Plate Number Recognition	Supports ANPR for parking, illegal lane change, crossing the solid yellow line, wr ong-way driving, and area intrusion. It is recommended that the license plate width is more than 80 pixels	Reversing Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Construction Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 80%.
Report Generation and Export	Exports alarm information in Excel form, including device, device IP, channel name, event time, event name, event type, lane, license plate number, speed and more	Barrier Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Traffic Accident Detection	Subject to actual test
Alarm Search	Supports searching for alarm information according to multiple options, such as device, channel, event type, capture time and more	Fire Detection	Subject to actual test
		Smoke Detection	Subject to actual test

Traffic Event Detection Application Scenes

Scene Attribute	Widely used in traffic management, road operations and maintenance scenarios such as expressways, urban expressways, viaducts, tunnels, and cross-sea bridges	Crossing Line Detection	According to test data (1080P access), the detection rate is 90%, and the effective rate is 90%.
		Speeding Detection	Subject to actual test
Camera Installation	Front installation (recommended) and side installation	Driving Too Slow Detection	Subject to actual test
Camera Installation Height	6–12 meters recommended, two or three lanes can be captured	Detection of Trucks Entering Prohibited Area	Subject to actual test
Camera installation Angle	Recommended pitch angle is between 10°–15°, covering about 50 m–100 m (164.04 ft–328.08 ft) and lane inclination angle < 30° when side-mounted	Detection of Hazardous Material Transport Vehicle	Subject to actual test
		Detection of Driving in Emergency Lane	Subject to actual test

Traffic Event Detection Performance

Video Resolution	1080p or higher	Global Detection	Up to 20 rules with 16 channels of single card
Analysis Capability	xE: E refers to intelligent analysis card, and x refers to the number of the card. A single intelligent analysis card supports simultaneous access analysis of 32 1080P cameras, except for special algorithms. Please see the product overview calculation formula for details	Alarm Video	1. Max. 192-channel 4 MP cache, each card with 32 channels 2. Up to 32 task video (within 4 MP) can be written to HDDs at the same time. When the limit is exceeded, an error log is printed, showing the reason why the recording was stopped. 3. Supports playing back video of up to 4 channels at the same time.

Port

Network	2 × gigabit Ethernet ports
USB	2 front USB 2.0 ports, 2 rear USB 3.0 ports and 2 rear USB 2.0 ports
VGA	1
DVI	1
DP	2

General

Power Supply Mode	100 V/240 V, 50Hz /60 Hz, 6 A/3 A
Power Redundancy	Single power supply
Power Consumption	≤ 400 W
Operating Temperature	+10 °C to +35 °C (+50 °F to +95 °F)
Operating Humidity	10%–80% (RH) (29 °C/84.2 °F)
Storage Temperature	+10 °C to +65 °C (+40 °F to +149 °F)
Storage Humidity	5%–95% (RH) (33°C/91.4 °F)
Gross Weight	16.0 kg (35.27 lb)
Net Weight	8.5 kg (60.6 lb)
Dimensions	43.5 mm × 438.5 mm × 550.0 mm (17.13" × 172.64" × 216.54") (H × W × D)
Packaging Dimensions	271.0 mm × 625.0 mm × 895.0 mm (106.69" × 246.06" × 352.36") (H × W × D)
Installation	Standard 19" rack installation with guide rail
Mean Time Between Failures	69.6 years
Certification	CCC: 2018010911092424 CE: SHEM190801615601ATC/SHEM1908016156AT FCC: SHEM190801615701ATC/SHEM1908016157AT

Filter

Product Type	All-in-one server integrated software and hardware

Ordering Information

Type	Model	Description
1U Intelligent Video Analysis Server for Traffic Event Detection	DHI-IVS-TB8000-E-GU1	1U Intelligent Video Analysis Server for Traffic Event Detection

Dimensions (mm[inch])