LILIN Aida Camera User Manual

Chapter 1.0 Introduction

LILIN P7/Z7 Aida cameras can install Aida plug-in for running number plate recognition system and object recognition system. The camera uses the latest deep learning technology for edge computing. Deep learning technology is introduced by the concept where the machine is told to learn what to look for, the plates, the digits, and the objects. It works out the most descriptive and obvious features for the plate, the digit or the object. In other words, deep learning is told to discover the underlying patterns in classes of images that can give much better result than traditional computer vision.

LILIN P7/Z7 Aida cameras can perform recognition features and work independently for triggering (1) HTTP Post notifies other network devices, (2) digital outputs of the camera, and (3) LILIN Navigator Corporate system. LILIN P7/Z7 Aida cameras are able to run deep learning plug-in for different recognition tasks.

Features

- Support up to 4K recognition and 6 FPF for number plate recognition and 9 FPS for object recognition.
- Recognize up to 6 car plates within a camera.
- Support group denial list, allowed list and exclusion list setting.
- License plate character size and license plate character length can be set.
- Support for license plate JPEG snapshots.
- Support LILIN IO Box interfacing external devices for gate control.
- Support database synchronization for denial list and allowed list.
- Support up to 200 km/h vehicle speed for number plate recognition.
- Support HTTP SDK integration.
- Support LILIN Navigator Corporate.

Chapter 1.1 Trademark

This product contains H.265 (High Efficiency Video Coding, HEVC) codec technologies and is manufactured under the license from Access Advance LLC, and the HEVCAdvance symbol are trademarks of Access Advance LLC.

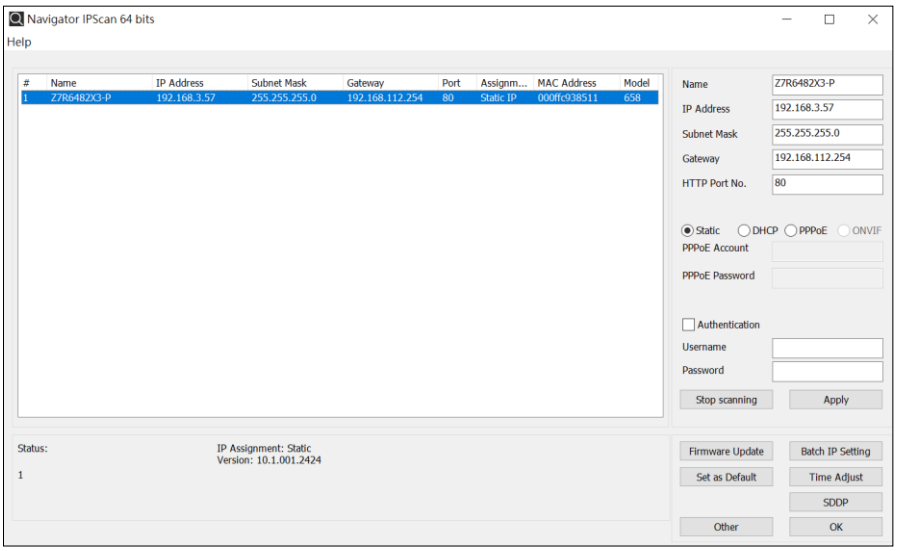
Covered by one or more claims of the HEVC patents listed at patentlist.accessadvance.com.

Chapter 2.0 Before Using This Aida Plug-in

Please, read LILIN P7 and Z7 IP camera user manual before operating LILIN camera. This user manual only focuses on the Aida plug-in features of the camera.

After installing Aida plug-in for the camera, click on the About page. If the Aida camera is not licensed, email System ID to LILIN sales person for trial or purchasing purposes. After purchasing, the Unlocking Key will be sent to you. Please copy-and-paste the Unlocking Key into About dialog for using Aida plug-in features.

Use the LILIN IPScan tool for scanning the camera via the network. You can also use the default IP address at 192.168.0.200 for accessing the camera.



For accessing the camera for the first time, make sure that create a username and password for security purpose.

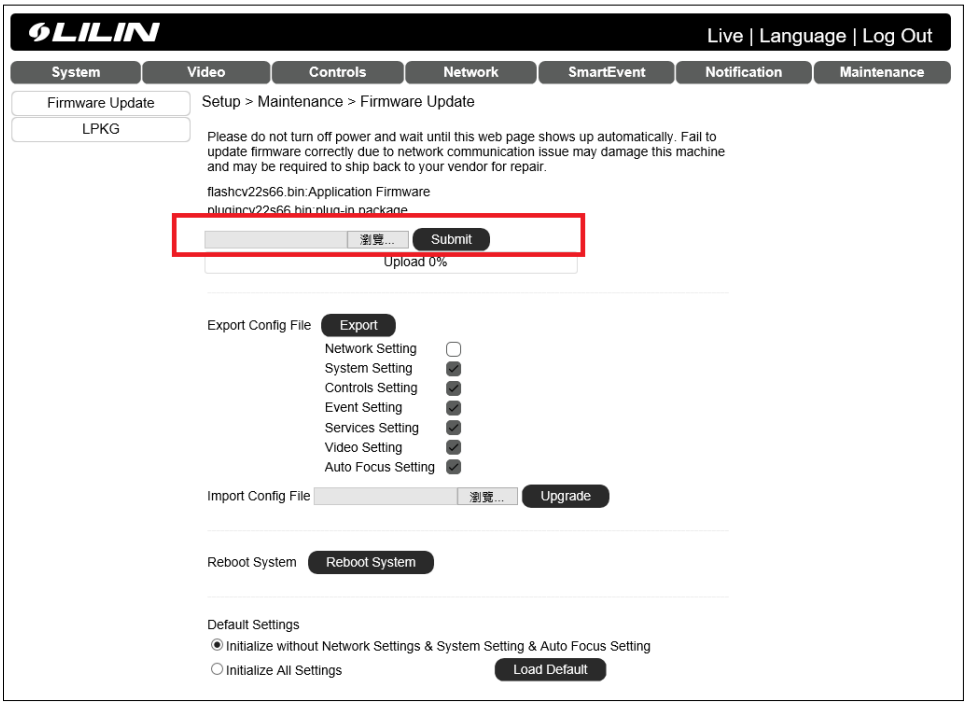
Minimum Password Strength Requirements:

1. The password length must be 8 or more characters.
2. The password must include at least 1 number (0 ~ 9), 1 uppercase letter, 1 lowercase letter and 1 symbol(~ ? / + = , : ; . ’ @ # ¥ % ^ & * ( ) _ -).

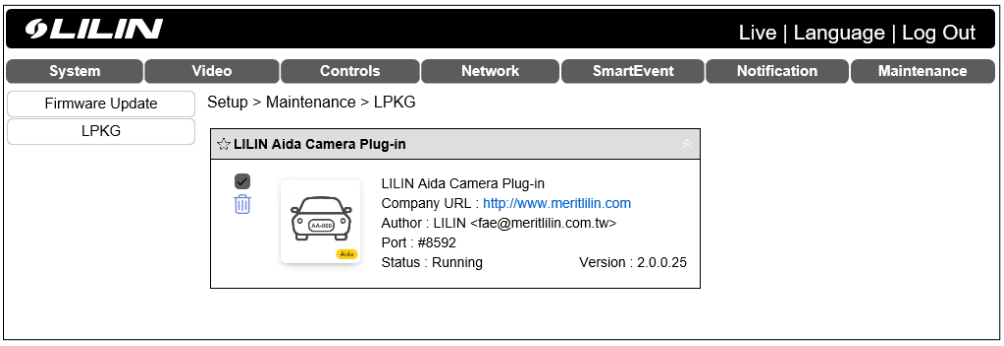
Note: Please preserve the credential for accessing the camera properly. Forgetting the credential for accessing the camera, please perform hardware factory default.

Chapter 2.1 Upgrade Aida Plug-in

Please click "Maintenance -> Firmware Update", the Aida plug-in file format of this product is "plugincv22s66.bin", select the "Browse" button to select the file, and select the "Submit" button to install the plug-in.



After the Aida plug-in gets installed, the Aida plug-in page can see the relevant information of the plug-in as in LILIN Plug-in Package (LPKG) page.



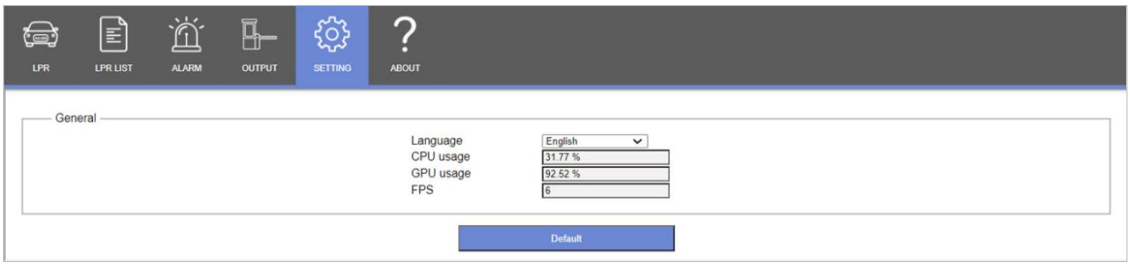
Click on the plug-in icon that can open the plug-in page. LILIN Aida software is at 8592 port. Click ☑ that can enable the plug-in. Click delete button 🗑 that can remove the plug-in.

Chapter 2.2 Aida Plug-in Licensing

If your camera does not have a pre-purchased license key, you can purchase the license key after purchasing the camera. After receiving the unlocking key from the sales representative, click "About" button to enter the “unlocking key " to enable the Aida identification function.

Chapter 2.3 Aida Plug-in GPU Usage

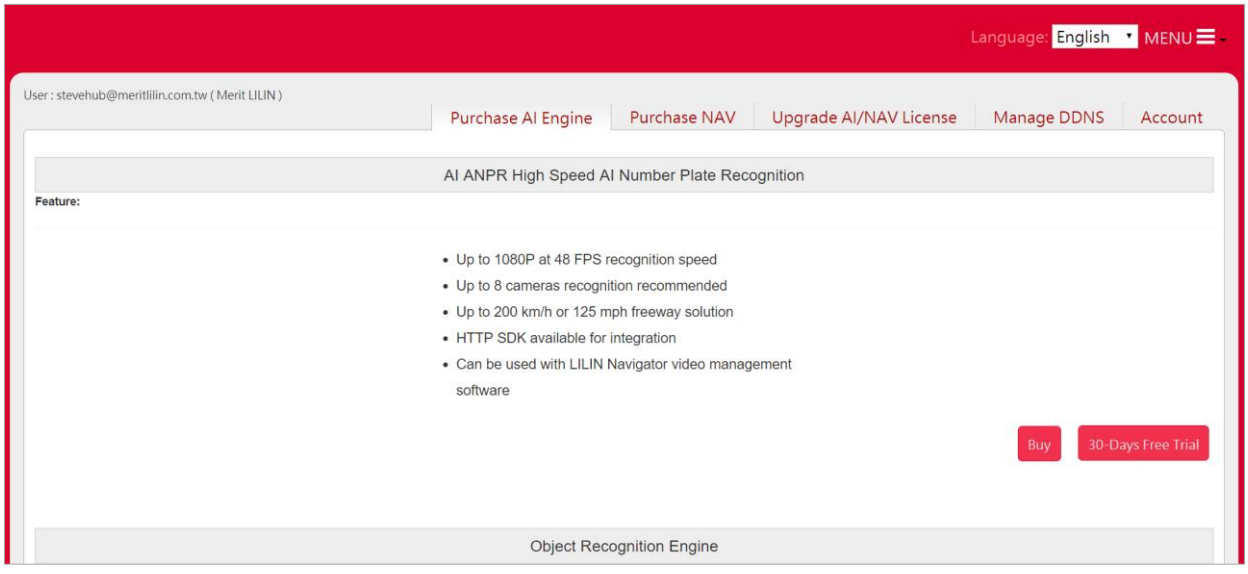
To check GPU usage, CPU usage, and AI recognition frame per second, please visit setting page.



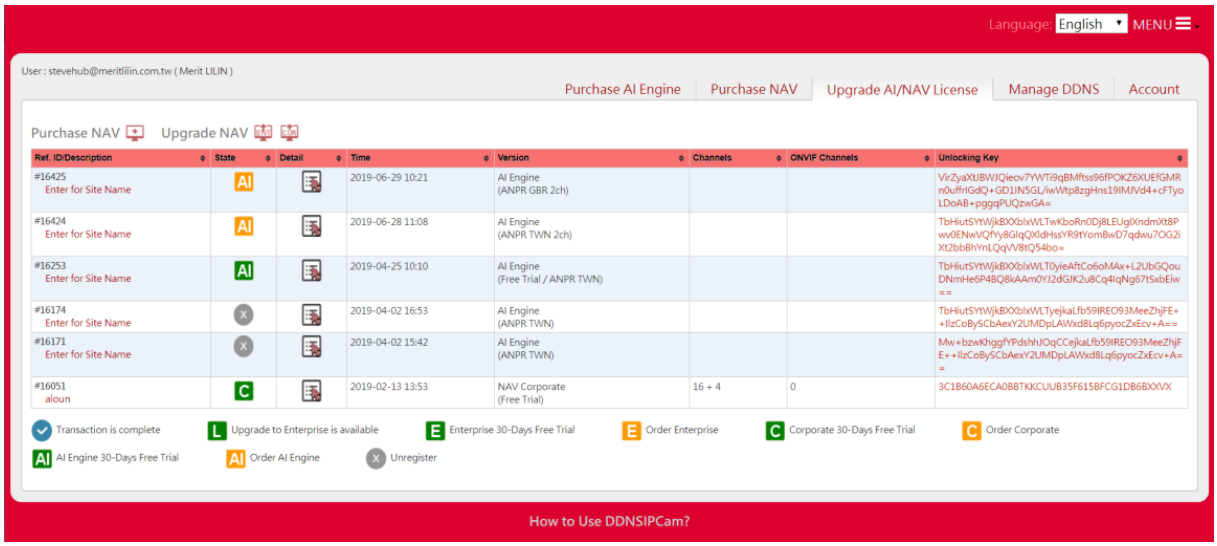
Chapter 3.0 How to Purchase an Aida Plug-in

Chapter 3.1 How to Get a Trial License

To get a trial license, visit https://www.ddnsipcam.com for registering an account. Once an account gets registered, click on 30-Days Free Trial. You will get a trial license. Follow previous step for enter the trial license.



You are able to manage the license keys for Aida Plug-in or Navigator below:



Chapter 3.2 The Following Situations Where Aida Plug-in Might not Work

- In rainy day, the rain drops block the field of view of the detected number plates or objects.
- In foggy environment, the fog blocks the detected number plates or objects.
- The reflection caused by sunshine and mirror
- The large object blocks the license plates.
- Blurry video in a strong wind installation

Chapter 3.3 Caution

Do not use the number plate recognition camera with the gate or the barrier control for vehicle speed over 10KM/h or 6MPH due to recognition rate limitation. This will cause a vehicle crash or accident to the gate or barrier control.

Chapter 3.4 LPR & Object Recognition Requirement

For object recognition, the object needs to be 120x120 pixels in resolution for recognition. For number plate, the plate resolution needs to be 120 pixels in width for recognition

Chapter 3.5 Who Needs this Aida Plug-ins

The following customers are suitable for using LILIN Aida Plug-ins

- System integrators for car park automation
- Software developers for building automation
- Traffic management system developers
- Home automation integrator
- Developers of VMS companies
- Number plate recognition system installers of LILIN NAV

Chapter 4.0 How to use the Aida Camera

Chapter 4.1 The Advantages of Aida Based Number Plate Recognitions

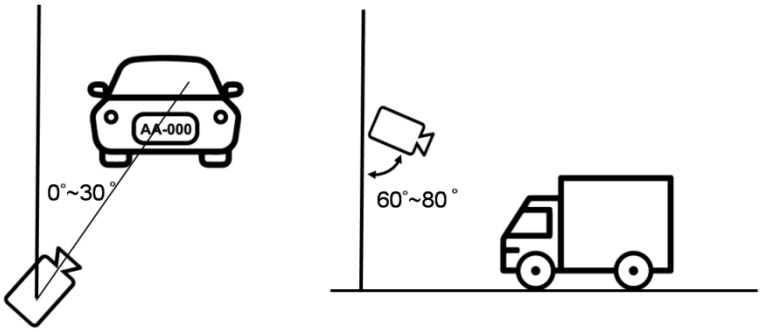
Traditional computer vision technique requires image processing for edge detection, corner detection, and object detection for number plates. The difficulty with this approach of feature extraction in image classification is that you have to choose which features to look for by a given image. This becomes difficult and pretty much impossible when the number of classes, the plates and the digits, you are trying to classify.

Deep learning is introduced by the concept where the machine is told to learn what to look for. It works out the most descriptive and obvious features for each object, the plate or the digit. In other words, deep learning is told to discover the underlying patterns in classes of plate and digit images that can give much better result than traditional computer vision based number plate recognitions.

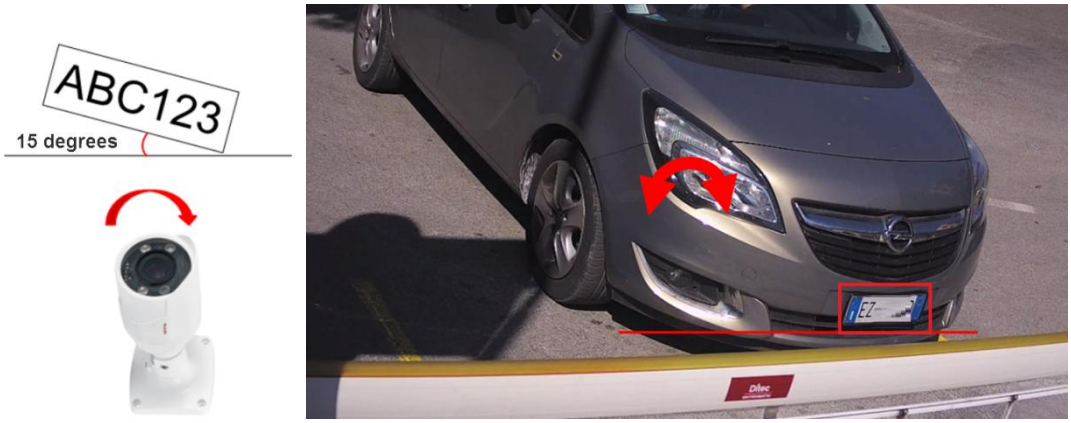
Chapter 4.2 Recommended Camera Installation

Camera installation angle and video quality will affect recognition rate. A good camera installation can increase accuracy rate.

- Do not aim camera direct to headlight.
- Do not install camera less than 60 degrees vertically in between the camera and the pole.
- Do not point the camera to the license plate at wide angle (more than 30 degree) horizontally.

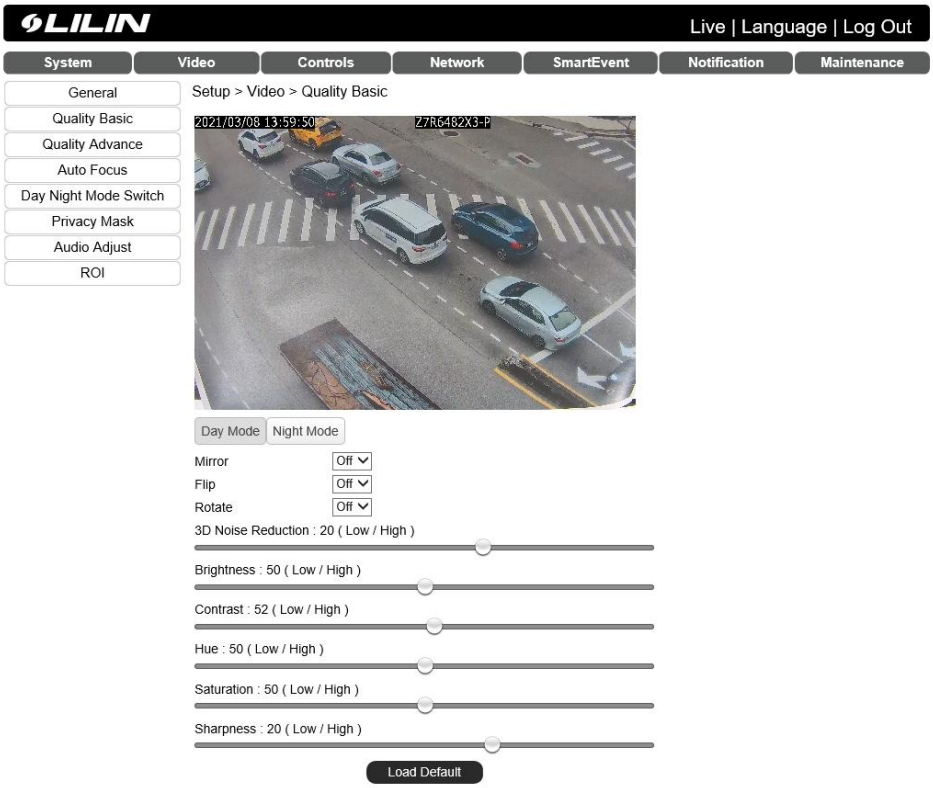


The angle of the license plate cannot exceed 15 degrees. To increase recognition rate, please rotate the camera to the same angle of the license plate.



Chapter 4.3 Video Quality Setting for License Plate Recognition in High Speed

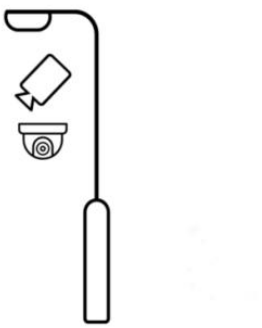
In order to overcome the "motion blur" issue of license plates caused by the speed of the vehicle, please set the shutter at 1/240 ~ 1/20,000 sec. If the vehicle speed is faster, set the shutter at 1/640 ~ 1/20,000 if the light source is sufficient.

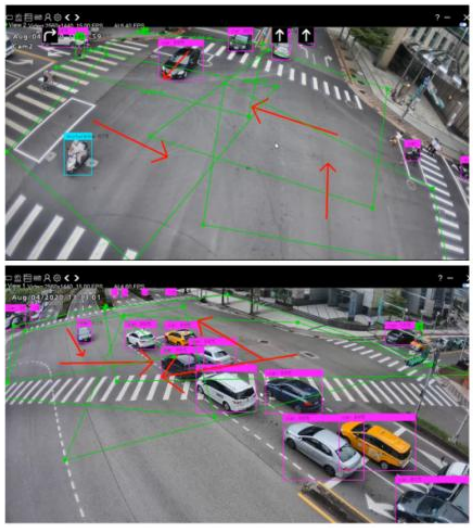


Chapter 4.4 The Camera Installation for Aida Traffic Management

The installation of the camera is important. For cost consideration, installing the camera on a single pole is preferred. For this reason, please make sure that the camera field of view can cover the entire intersection, and the resolution for object identification must be 120 pixels wide x 120 pixels high.

- *One pole installation is preferred.*





Chapter 4.5 Infrared Illuminator

Generally speaking, traffic management cameras are installed in a street light environment. Please contact our company sales representative to suggest a suitable low-light camera for color mode AI recognition. If the camera image quality in low-light conditions is poor, an infrared illuminator can be installed, to perform black and white image recognition, but the recognition rate may decrease.

Chapter 5.0 How to use Aida Plug-in

Chapter 5.1 How to use Aida License Plate Recognition Plug-in

After installing the camera, open the plug-in and enter the "License Plate Recognition" tab, please turn on the "Enable License Plate Recognition" function.

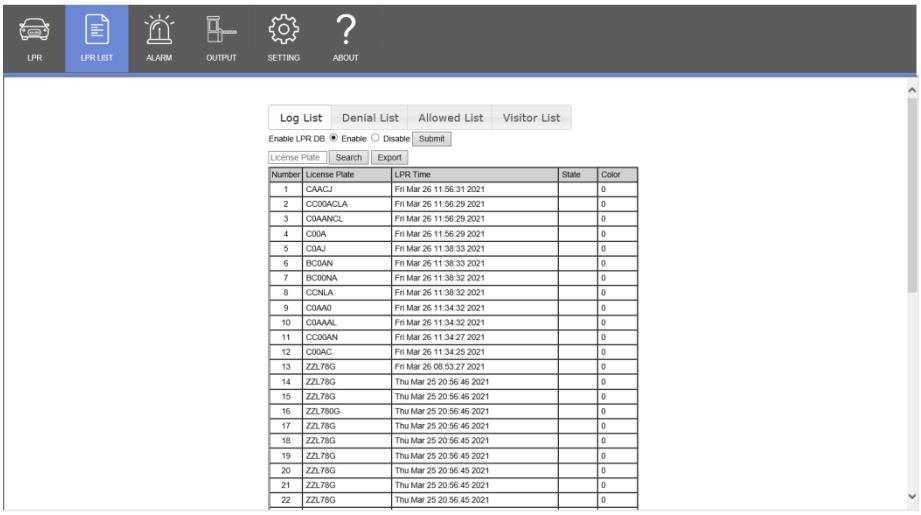
- **Enable LPR:** Enable license plate recognition.
- **Confidence (%):** The confidence rate of the number plate recognition.
- **Min characters:** Minimum number of characters to filter license plate
- **Max characters:** Maximum number of characters to filter license plate.

Chapter 5.2 The Allowed & Denial Lists License Plate Recognition within a Zone

If you need to use the camera's allowed or denial list to trigger the alarm, please enable the Denial list or Allowed list trigger on the "Alarm" page. After the license plate gets recognized and compared with the database of Denial list or Allowed list, the camera's alarm can be triggered.

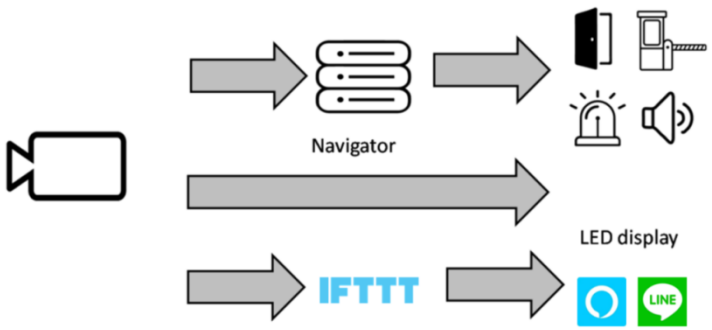
In addition, the user also needs to create the license plate number of the denial and white list database within a detection zone before the alarm is triggered.

Note: Make sure that the detection zone is configured for the number plate detection to trigger alarm.



Chapter 5.3 HTTP Post of Aida Software

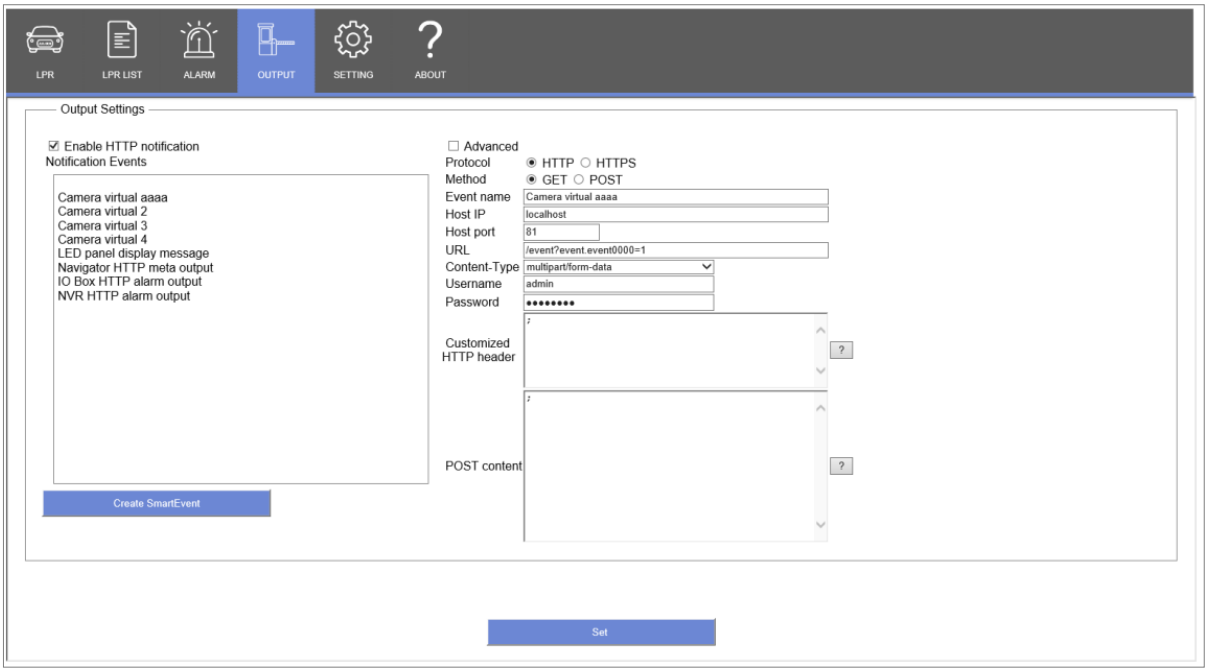
HTTP Post can notify other systems for integration purpose. See examples below:



Click on to launch HTTP notification dialogue box. There are few pre-programmed HTTP CGI commands for interfacing LILIN NVR or IP camera. Click on Add, Delete, and Edit buttons for editing the HTTP Post commands.

For example, to control IP camera's relay output, follow the steps below:

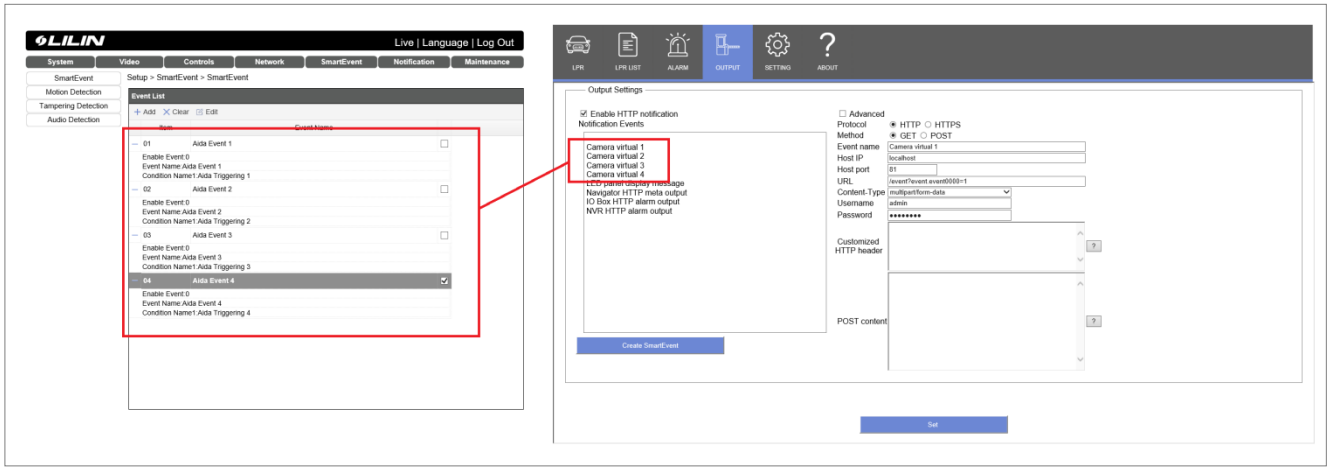
- **Protocol**: Select HTTP port (default) for communication purpose.
- **Method**: Select the target device HTTP protocol method.
- **Event name**: Specify an event name.
- **Username and password**: Enter the username and password of the target device.
- **HTTP Port**: The port number of the target device.
- **URL**: The CGI command of the IP camera for reply triggering output.
- Customized HTTP header
- **Post content**: Customized contents of AI recognition result including "counter", bonding boxes, number plate, and others.



Chapter 5.4 The Outputs of Aida Camera

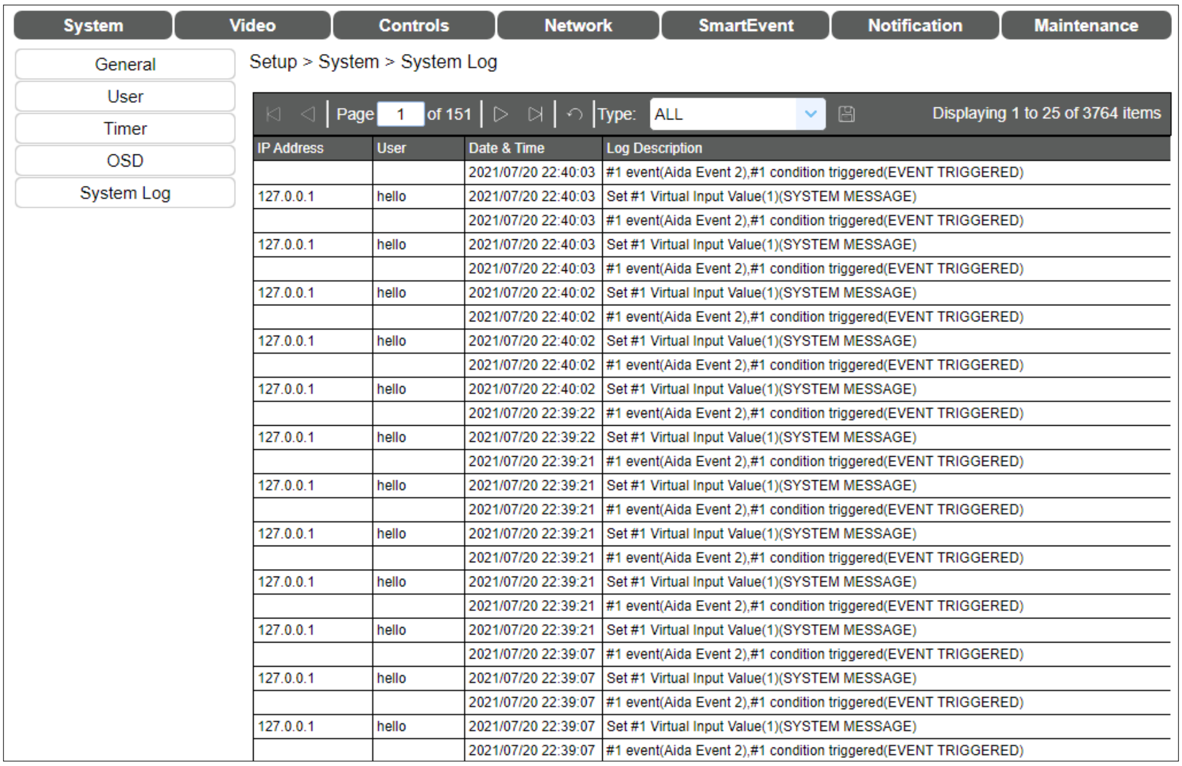
When Aida plug-in detects an object in detection zone alarm or a license plate recognition black and white list, it can perform camera alarm notification, (1) camera-side smart event alarm notification (2) HTTP notification to other systems and (3) counter output.

Create SmartEvent Click the button to automatically create the camera "SmartEvent" alarm output setting. This button can create 4 camera events and correspond to the Camera virtual inputs #1 ~ #4 of the Aida notification event (see the picture below). If Aida plug-in has the AI detection, e alarm output, you can use the camera to trigger the "smart event", select the behavior to be detected and press the output setting button; you can specify the output after behavior detection as



Chapter 5.5 Verify the Output Triggering of Aida Camera

Go to Setup > System > System Log of the camera to verify the triggering by Aida detection.

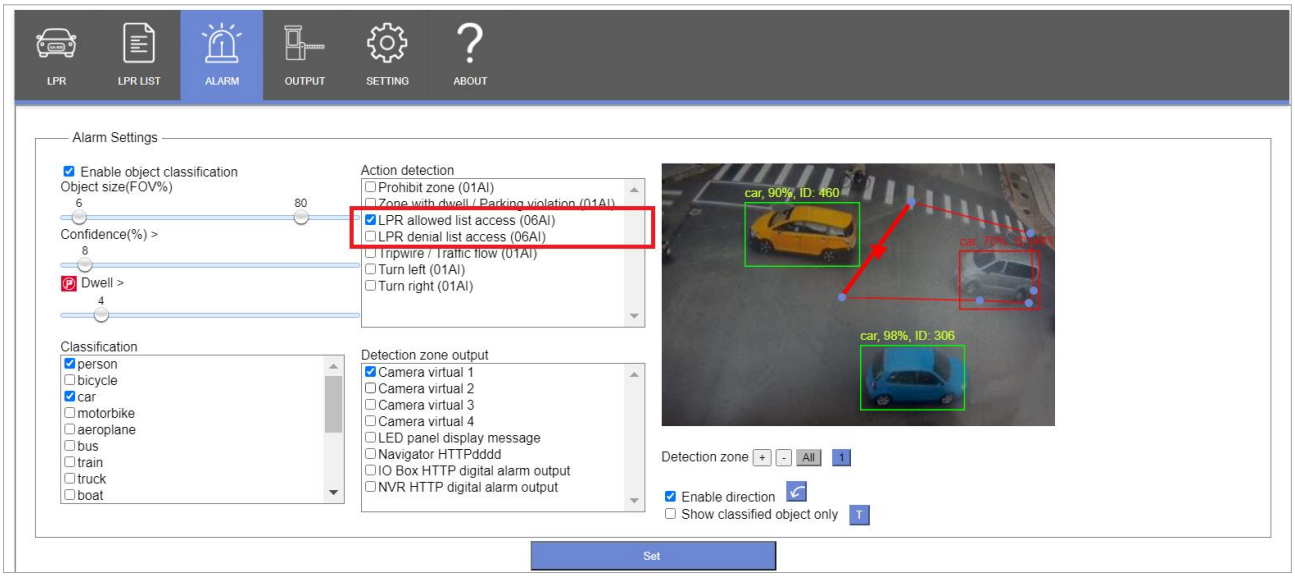


IP Address	User	Date & Time	Log Description
		2021/07/20 22:40:03	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:40:03	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:40:03	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:40:03	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:40:03	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:40:02	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:40:02	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:40:02	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:40:02	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:40:02	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:39:22	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:39:22	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:39:21	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:39:21	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:39:21	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:39:21	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:39:21	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:39:21	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:39:21	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:39:21	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:39:07	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:39:07	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:39:07	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)
127.0.0.1	hello	2021/07/20 22:39:07	Set #1 Virtual Input Value(1)(SYSTEM MESSAGE)
		2021/07/20 22:39:07	#1 event(Aida Event 2),#1 condition triggered(EVENT TRIGGERED)

Chapter 5.6 Digital Output Triggering for Plate in the Denial and Allowed List

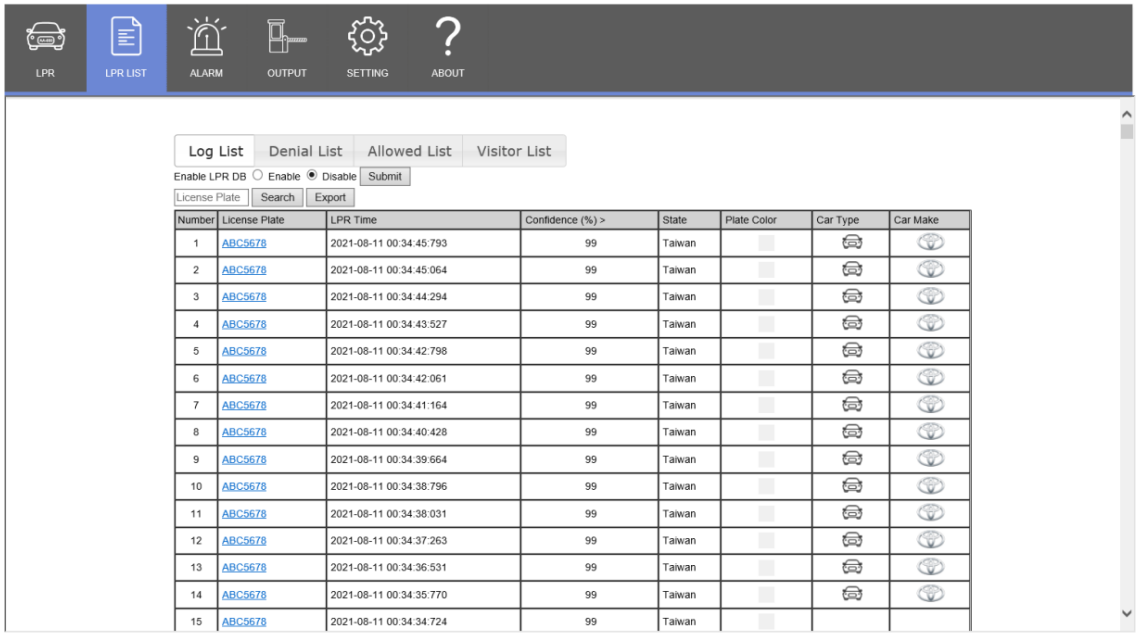
After the license plate is recognized and compared with the denial or allowed list, the digital output can be triggered to open the door programmatically through a smart event. To perform the license plate recognition to open the door, please follow the steps below:

- Enable “Denial” & “Allowed” Lists
- Enable Detection Zone outputs.
- Select Objects
- Specify FOV or confidence for better recognition rates



Chapter 5.7 Car Make, Type, Number Plate Recognition, and Plate Color

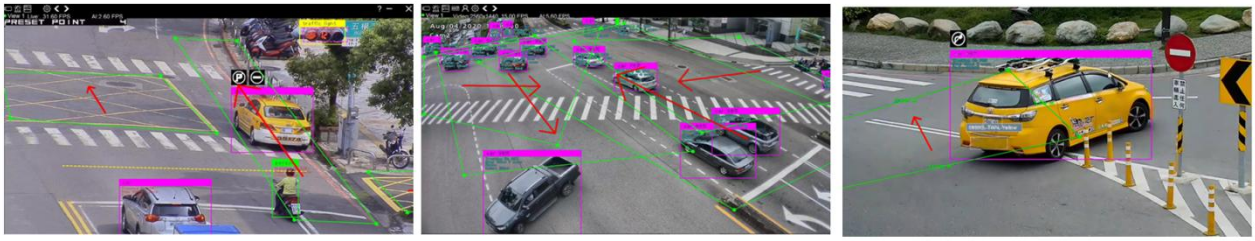
For number plate recognition with car make, type and plate color, please purchase the license key. After entering the license key, the camera will get reboot for loading the AI weights. The recognition results are documented into the LPR List. The recognition performance is at 3 recognitions per second due to that there are 4 AI weights running concurrently.



Number	License Plate	LPR Time	Confidence (%) >	State	Plate Color	Car Type	Car Make
1	ABC5678	2021-08-11 00:34:45:793	99	Taiwan			
2	ABC5678	2021-08-11 00:34:45:064	99	Taiwan			
3	ABC5678	2021-08-11 00:34:44:294	99	Taiwan			
4	ABC5678	2021-08-11 00:34:43:527	99	Taiwan			
5	ABC5678	2021-08-11 00:34:42:798	99	Taiwan			
6	ABC5678	2021-08-11 00:34:42:061	99	Taiwan			
7	ABC5678	2021-08-11 00:34:41:164	99	Taiwan			
8	ABC5678	2021-08-11 00:34:40:428	99	Taiwan			
9	ABC5678	2021-08-11 00:34:39:664	99	Taiwan			
10	ABC5678	2021-08-11 00:34:38:796	99	Taiwan			
11	ABC5678	2021-08-11 00:34:38:031	99	Taiwan			
12	ABC5678	2021-08-11 00:34:37:263	99	Taiwan			
13	ABC5678	2021-08-11 00:34:36:531	99	Taiwan			
14	ABC5678	2021-08-11 00:34:35:770	99	Taiwan			
15	ABC5678	2021-08-11 00:34:34:724	99	Taiwan			

Chapter 6.0 Aida Alarm & Object Classification

For Aida alarm and object classification, follow the instruction below:



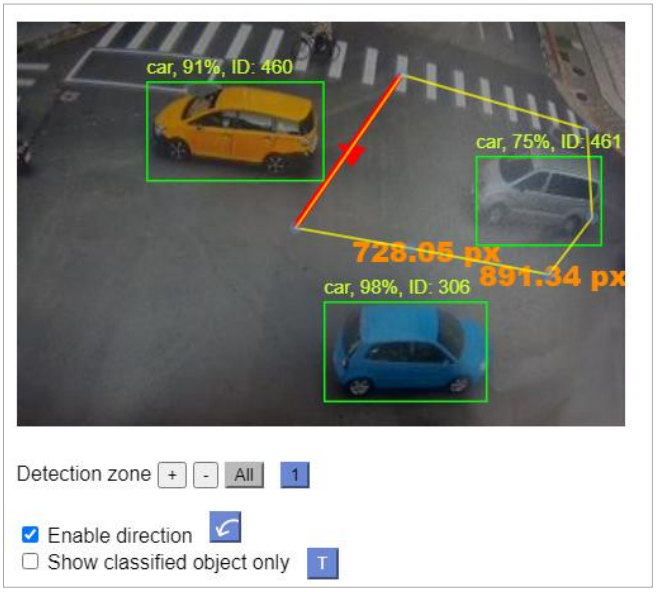
Chapter 6.1 The Settings of Aida Alarm Detection

Click on Enable object classification detection for using AI object detections. For object behaviors, the behavior is defined in a detection zone. There are four detection zones programmable for classified objects. Follow the instructions below for setup.

Note: It is important to disable “Enable object classification” feature, if object detection is not used.

Chapter 6.1.1 Prohibit Zones

Click on [+][−] buttons for inserting or deleting a detection zone. Once a detection zone gets added, drag the Anchor of the zone to fit the environment. There are up to four detection zones for detecting the behaviors of classified objects.



Chapter 6.1.2 Adjust Prohibit Zones

To adjust the detection zone, please use mouse to drag the blue point of a detection zone according to the sense.

Show classified object only T If the OSD screen display of the classified object is displayed, please click "Show classified object only". If you do not want to see the object name and recognition rate, please click T.

Chapter 6.1.3 PX Indicators

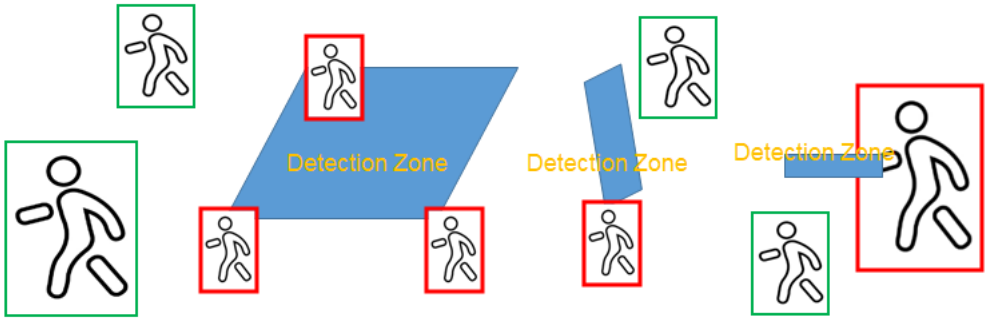
As shown below, the PX indicators can be used for measure the pixel sizes in width and height of a number plate, when a user using a mouse drags the blue point of the zone. The minimum for a object or a plate to be recognized is about 120 pixels in width. The PX indicator resolution is based on the resolution of the camera.

Chapter 6.1.4 Prohibit Zone Detection for Human

To set up an alarm notification for an object entered the prohibited detection zone, please select in the object names in “classification”. Add a detection zone to desired area. Tick on “Prohibit zone detection”. Click “Set” button to save the settings.

This can be used for detecting a person entering a prohibit zone or parking violation.

The prohibit zone works as below: If an object gets classified and enters the prohibit zone as below, the classified objects in the zone get shown in red.



To setup prohibit zone:

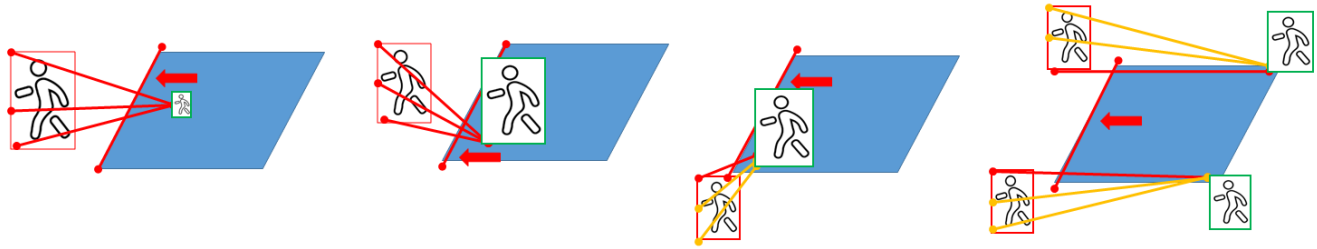
1. Enable the zone for parking area
2. Check the detection objects such as car, truck, SUV, etc
3. Set the dwell for detection zone with dwell

The following situations are supported for AI detection:

Sitting	Bowing	Crawling
		
Light attaching	**Overexposure**	**Far distance at 30m**
		

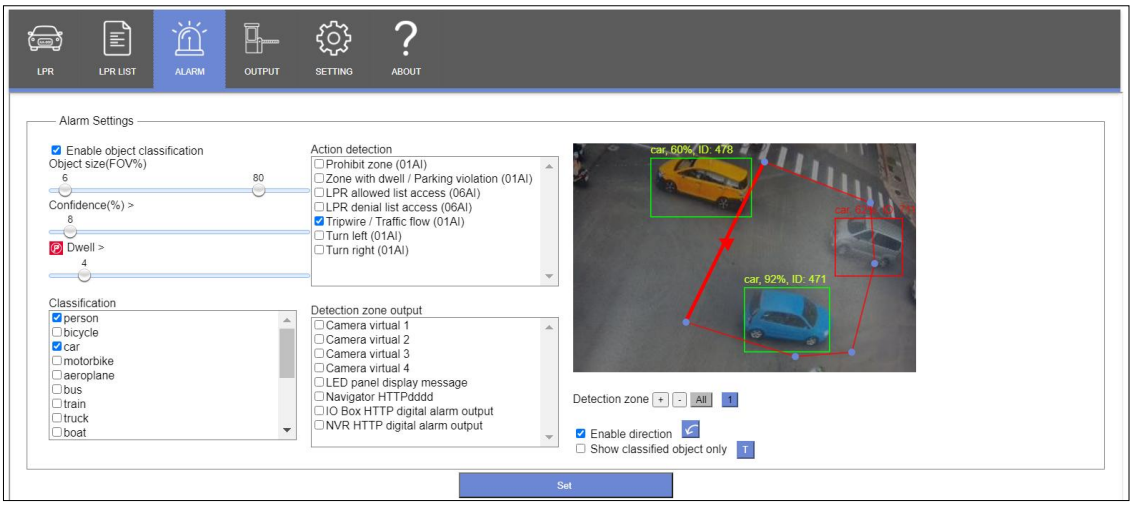
Chapter 6.1.5 Tripwire Detection

Each zone can be configured as directional tripwire mode. There are total 4 zones that can be converted to tripwire modes. The tripwire works as below: A person needs to cross the tripwire based on the flow.



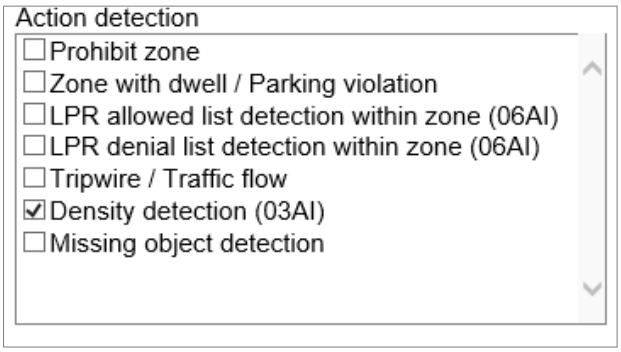
To setup tripwire

1. Enable the zone for parking area
2. Check the detection objects such as car, truck, SUV, etc
3. Select tripwire for detection



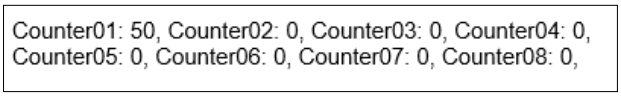
Chapter 6.1.6 Density and Counter Detections

The density detection (crowd detection) and counter are supported. Density detection is to count the classified objects in a detection zone. This function can be used for the detection of too many people in the detection area and trigger the camera alarm. To use this function, please select the "Density detection" feature below.



Please set the counter and set the operand to "=". This feature is to detect and to count the classified objects in the detection zone. If the counter is greater than the trigger counter, it will start to trigger the alarm.

The counter will display the detected counting in the panel after it reaches “Counter Triggering” setting.

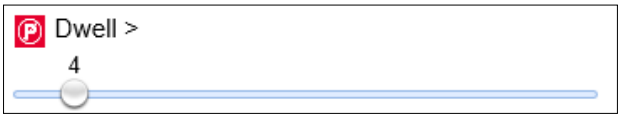


The counter detection is to count the behavior detection. Once it reaches the value of the Counter Trigger, the camera can trigger an action. The example below shows the tripwire with “Counter Triggering” feature at counter #2. The operand is set to “+1” for every triggering. For the counting feature, please follow:

- Enable one of the behavior for a detection zone
- Set operant to “+1/-1”.
- Reset value: Reset to the default value
- Reset every minute: Reset time interval
- Link to post event: List the counting result via HTTP Post
- Post every: HTTP post time interval

Chapter 6.1.7 Missing Object Detection

The missing object detection feature is based on the number of classified objects to be detected in the detection area. If the classified objects leave or are not in the detection area, an alarm will be issued.

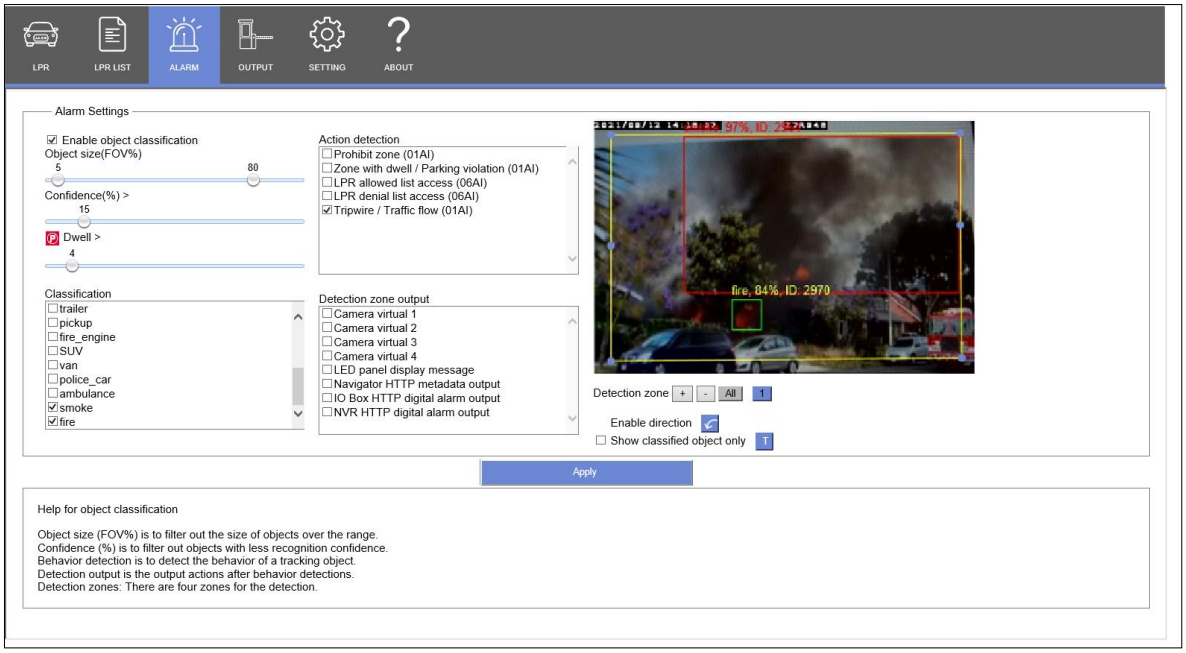


The missing object detection will first lock the target according to the "dwell time". When the target is locked, the locked object leaves the detection based on the "dwell time". The target is detected to be missing, an alarm will be issued.

Note: The missing object detection feature can only be zone #1.

Chapter 6.2 Smoke Detection and Fire Detection

Please click on Smoke (Smoke Detection) or Fire (Smoke Detection) in the "Classification", click "Prohibit zone", and use the mouse to adjust the detection zone. If smoke or fire is detected in the detection area, it will trigger smoke or fire detection alarm.

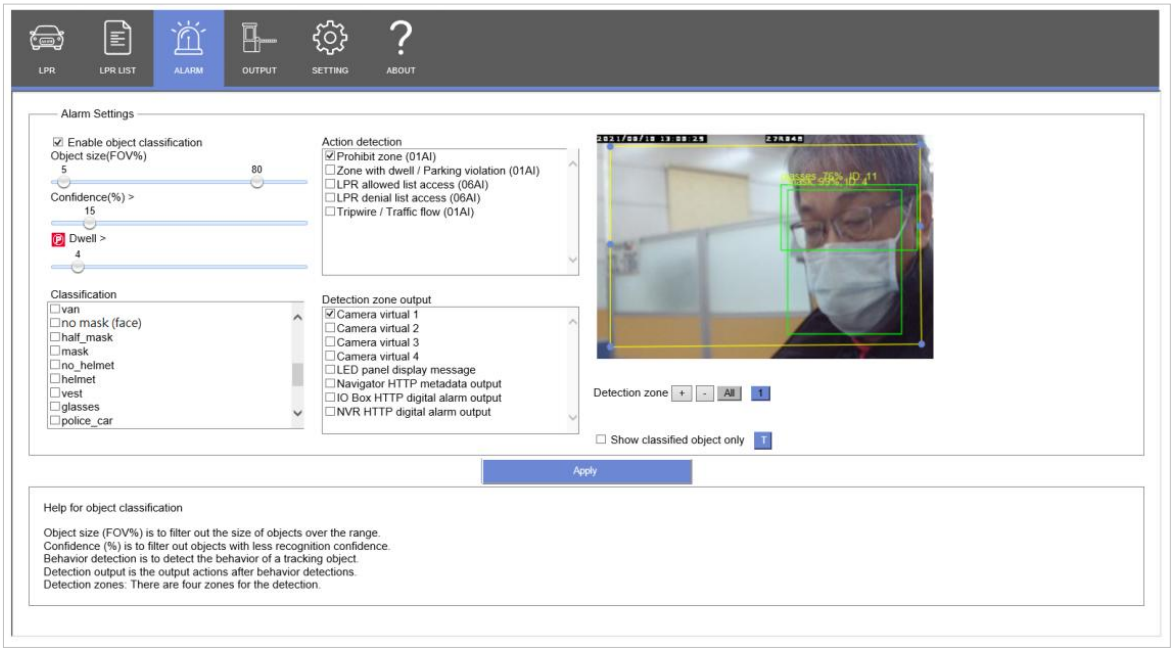


Warning: This technology uses AI image detection technology to detect smoke or fire. Rain, blocked camera or AI detection rate may cause AI technology to trigger false alarms or not triggering an alarm. Do not use this device as fire safety equipment smoke detector and fire detector.

Note: Candles and lighters are not supported.

Chapter 6.3 Health Care Mask Detection

Please click no mask (not wearing a mask), half mask (not wearing a mask properly) or mask (wearing a mask properly) in the "Classification", click "Prohibit zone", use the mouse to adjust the detection zone. If a person with no mask or half mask is detected in the detection area, it will trigger not wearing a mask alarm.



Chapter 6.4 Construction Site Safety Helmet and Vest Detection

Please click helmet (safety helmet) or vest (safety vest) in the "Classification" to detect or select the option of no helmet (not wearing a helmet). Use the mouse to adjust the detection zone. If a person with no helmet is detected in the detection area, it will trigger not wearing a helmet alarm.

Chapter 6.5 PTZ AI Recognition

All above Aida features including number plate recognition can be licensed to LILIN AI PTZ cameras.

There are three states for a PTZ to perform Aida recognition, (1) number plate recognition, (2) detection for preset linking to a detection zone, and PTZ tracking.

If the PTZ is at preset mode, number plate recognition and detection can be performed. You can also set up the tracking mode for the use-case below:

The scenarios could be:

- Tracking

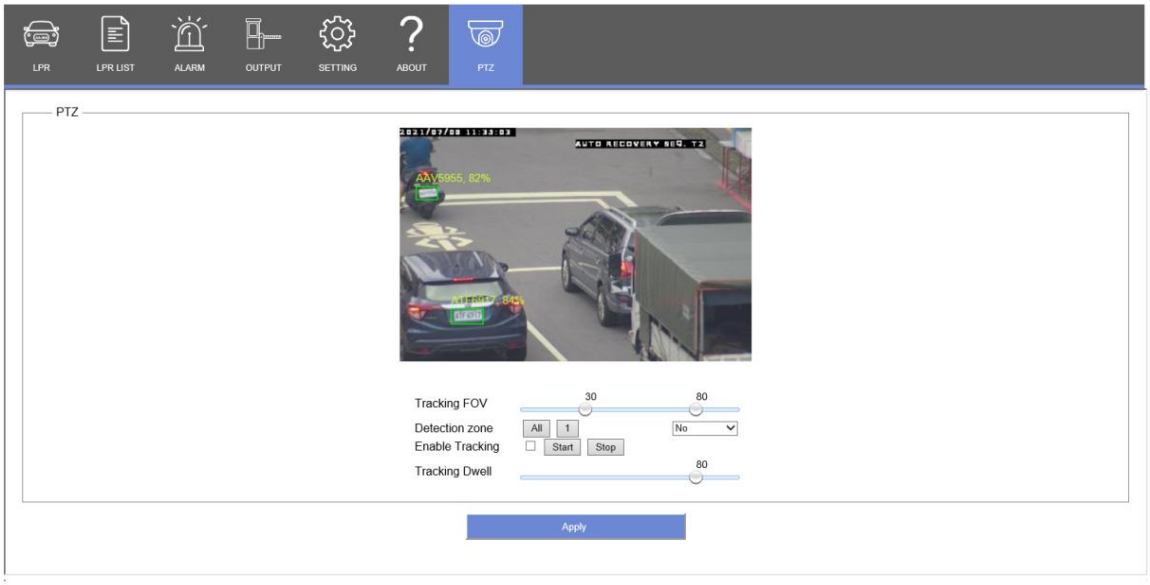
Wildfire monitoring and tracking
No helmet wearing detection and tracking

- Preset point detection zone * 4

People density detection and notification at a preset
Freeway traffic flow counting at a preset

- Number plate recognition for PTZ at stationary or a preset

These features are described below:



Chapter 6.5.1 Number Plate Recognition

For number plate recognition, make sure that the shutter speed is set according to the vehicle speed. Click on Quality Advance icon for changing shutter speed. It is highly recommended to set the Shutter Value Range as below:

- Daytime shutter max: 1/800 or higher
- Nighttime shutter max: 1/400 or higher

For more details, please refer to chapter 4.

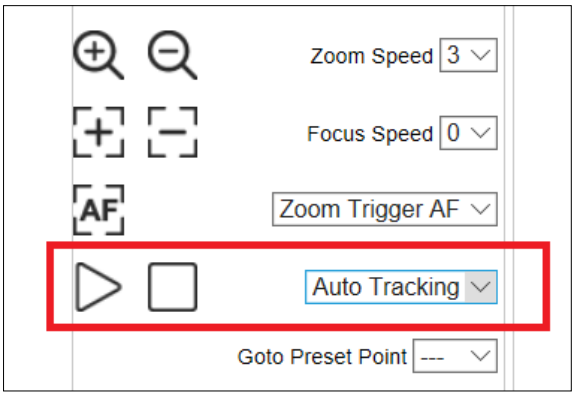
Chapter 6.5.2 PTZ Aida Detection

For Aida detection zone of a PTZ, after finishing detection zone setting for AI detection, please link the detection zone for a preset. Visit Aida Alarm & Object Classification for detail.

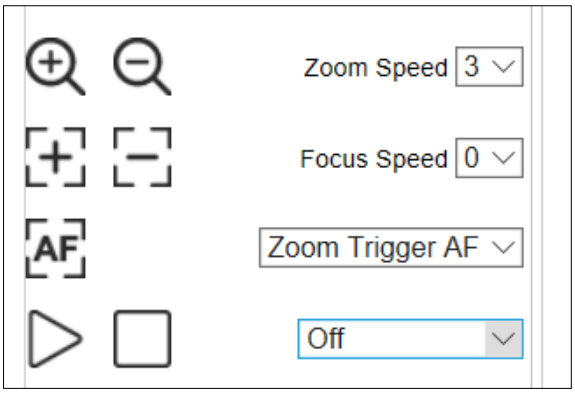
LILIN Aida PTZ constantly detects the lens position if the lens is at a preset (detection zone). If the behavior detection and classification are set on Alarm tab, the SmartEvent can then trigger.

Chapter 6.5.3 PTZ Tracking

The PTZ camera will automatically follow the moving objects classified by Aida on the screen center. To set up tracking feature, select Auto Tracking in Auto Pan box and press Auto Pan Start ▷ button to enable the tracking mode.



To stop auto tracking mode, select Off and click Stop button ☐.



Take over mode: If the PTZ is at tracking, the operations of Click-to-Center, pan, tilt, and stop will be suspended in 5 seconds.

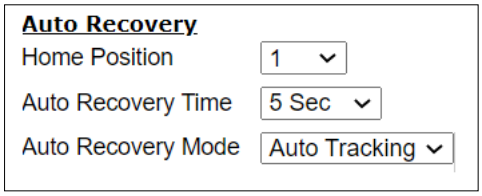
Chapter 6.5.3.1 Home Position Setup

Please assign one of the presets as the home position. The home position is the starting preset point for classified objects. After the tracking objects are out of sight or after the dwell time, the PTZ will return to the home position for the next tracking task.

Chapter 6.5.3.2 Auto Recovery Setup

After finishing the preset setups, setup the following for the PTZ tracking feature:

- Home position: A PTZ preset point is defined as home position for the next tracking.
- Auto Recovery Time: The recovery time for returning back to home position for the next tracking.
- Auto Recovery Mode: Set this option to Home for PTZ tracking.



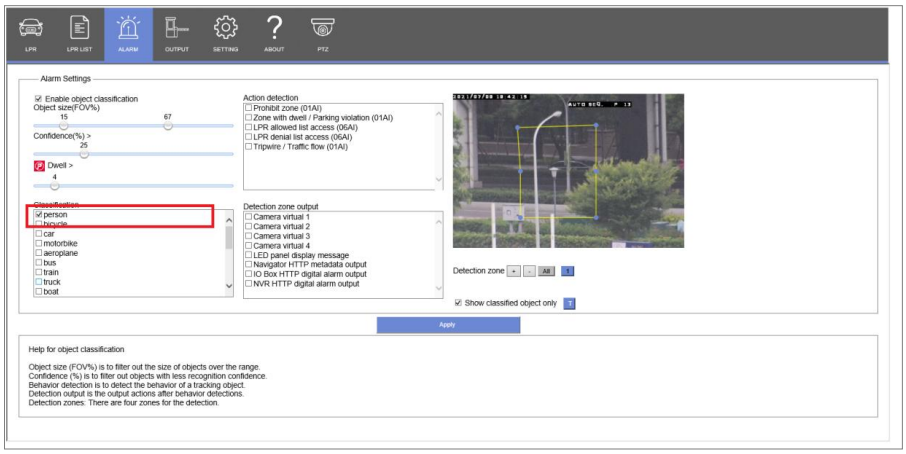
Chapter 6.5.3.3 Advanced Tracking Mode

There are few tracking modes available: (1) first in first track, (2) bigger object first, (3) detection zone tracking. The details are described below:

- Enable tracking start: Start auto pan for enabling tracking feature.
- Enable tracking stop: Start auto pan for stopping tracking feature.
- Tracking mode:
  (1) first in first track: The object first entering the detection zone first to track
  (2) bigger object first: The object is bigger in the detection zone first to track
  (3) detection zone tracking: Zoom out for tracking the target objects
- Sensitivity: 1~6, 1 second per detection for tracking, 1/6 second per detection for tracking
- Target missing waiting dwell: If the object is hidden or missing, the waiting time for tracking
- Detection zone: The detection for object detection for tracking
- Link to: The tracking feature is based on the detection zone and the preset point of the PTZ. Link to is to link a preset point of the PTZ camera.

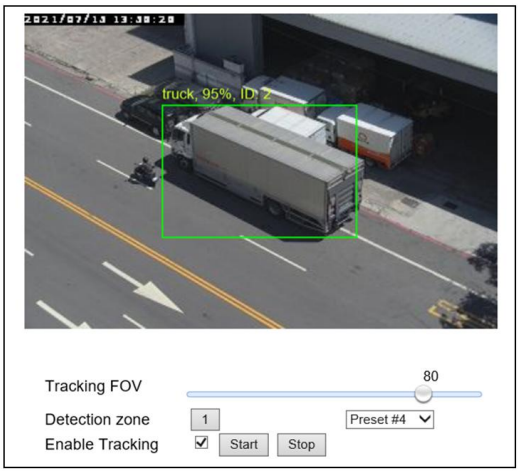
Chapter 6.5.3.4 Tracking Classified Objects

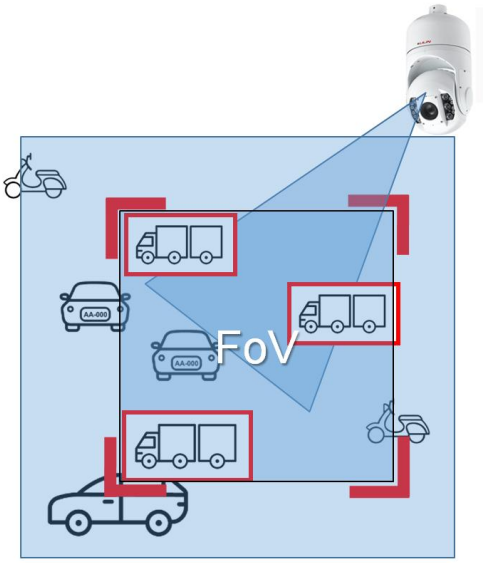
For tracking specific objects, please enable object classification and select the objects for tracking purpose. The example below shows that the PTZ is set for tracking “person” at detection zone #1.



Chapter 6.5.3.5 Tracking FoV

To make the classified objects to the center of the camera field of view (FoV), set up the Tracking FoV. The PTZ lens will perform tracking zoom in and out to fit the tracking FoV based on the outer bounding box.

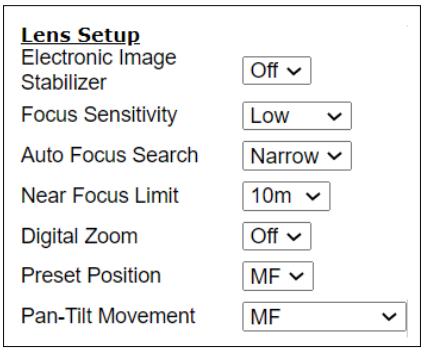




Chapter 6.5.3.6 Tracking Auto Focus Settings

To avoid focusing hunting, make sure the lens focus settings are set as follows:

- AF mode = Zoom Trigger AF
- Focus Sensitivity = Low
- Auto Focus Search = Narrow
- Near Focus Limit = 10m
- Pan-Tilt Movement = MF



Chapter 6.6 The Limitations of PTZ Tracking

There are few PTZ tracking limitations below:

1. The target objects, people and vehicles, of the images are overlapped, because the AI recognition technology may not be able to recognize the object nor tracking. It can be improved by higher the camera installation.

2. The target objects, people and vehicles, must be in full figures of the lens. Partial figures or objects too close to the lens of people and vehicles may not be able to recognize the objects nor tracking due to the limitation of the AI recognition technology.

3. The target objects or vehicles are less than 5% of FoV may not be able to recognize the objects nor tracking due to the limitation of the AI recognition technology.

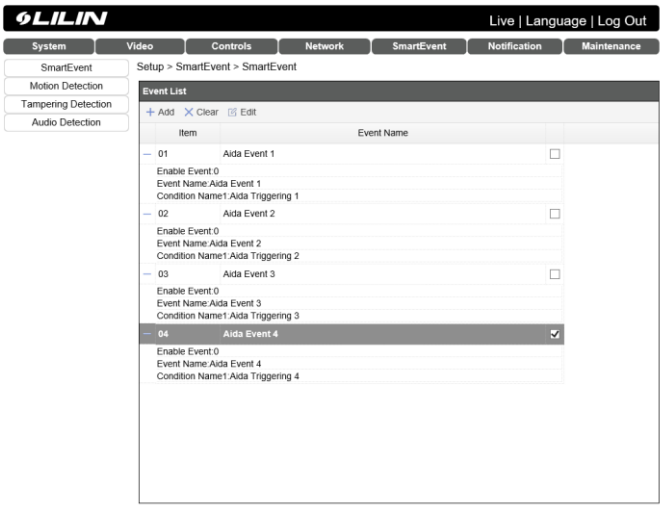
4. When there is no light source or reflector at night (AI recognition for the ships at sea), it may not be able to recognize the objects nor tracking due to the limitation of the AI recognition technology.

5. When the camera lens is blocked due to thick fog or heavy rain, it may not be tracked due to the limitation of AI recognition technology.

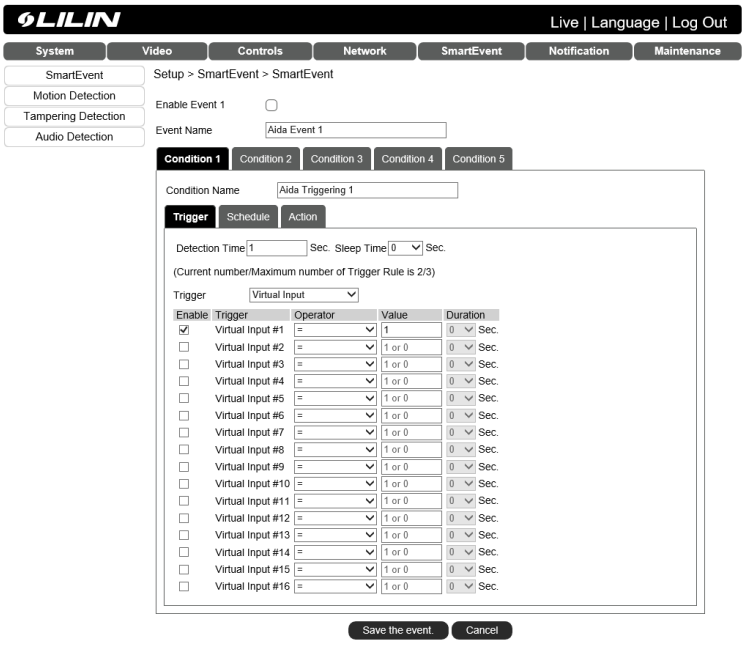
6. The feature of PTZ first-in-tracking of target objects, people and vehicles, the two target objects appearing at the same time and the objects are overlapped in the view of the camera because of the installation angle will not be able to track due to the limitation of AI recognition technology.

Chapter 7.0 SmartEvent
Chapter 7.1 SmartEvent and Condition

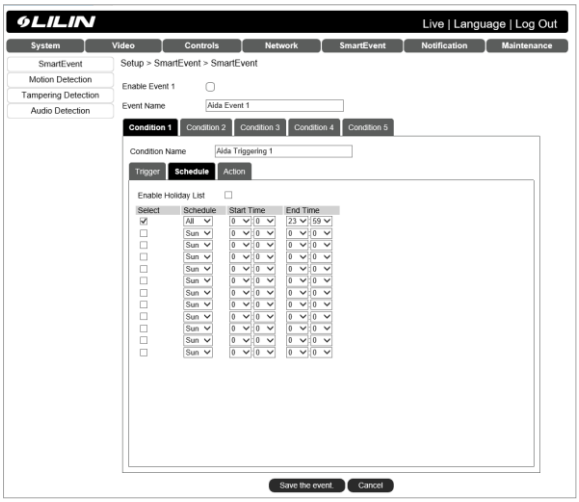
There are a total of 5 events available for Smart Events. The events and events operate independently. If multiple events are required to operate independently, the event can be activated to trigger the alarm output.



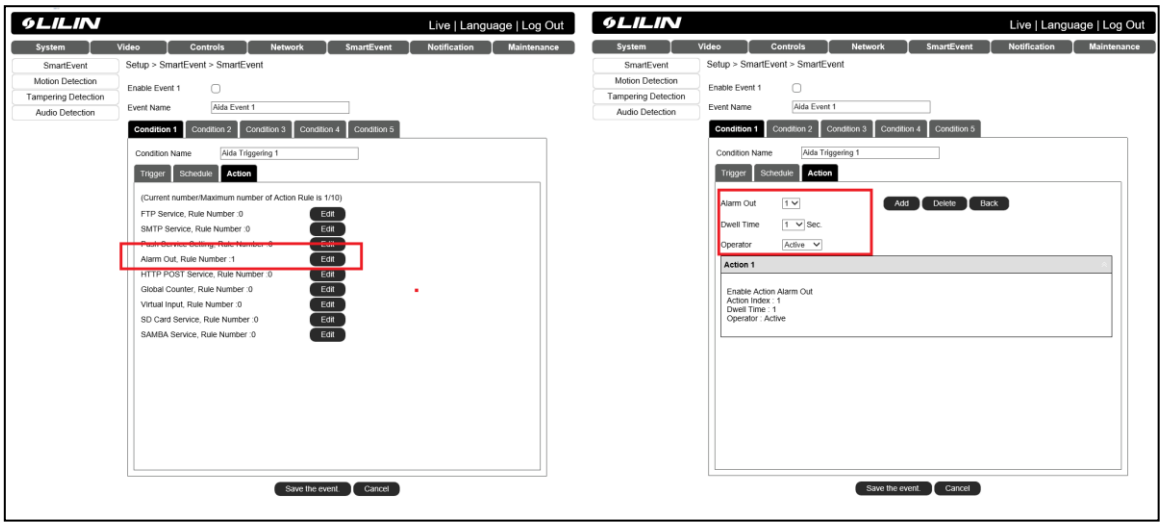
The "conditions" of the SmartEvent is dependent, and the action of the Condition #2 will be executed after the Condition #1 is finished, and the next conditions can be triggered after the condition #2 is finished.



Click "Schedule", enter the week schedule and enter the start and end time of the event.



To set the alarm output to be "executed", please click "alarm output" to trigger the DO alarm to open the door.



Chapter 8.0 LILIN Navigator & Aida Integration

Before installing software, please prepare the following software and hardware tools:

(1) LILIN Navigator software must be version 2.0.0.194 or above.
(2) LILIN Navigator software license key.
(3) LILIN license plate recognition software ANPR installation package.
(4) LILIN Aida license plate recognition license key.

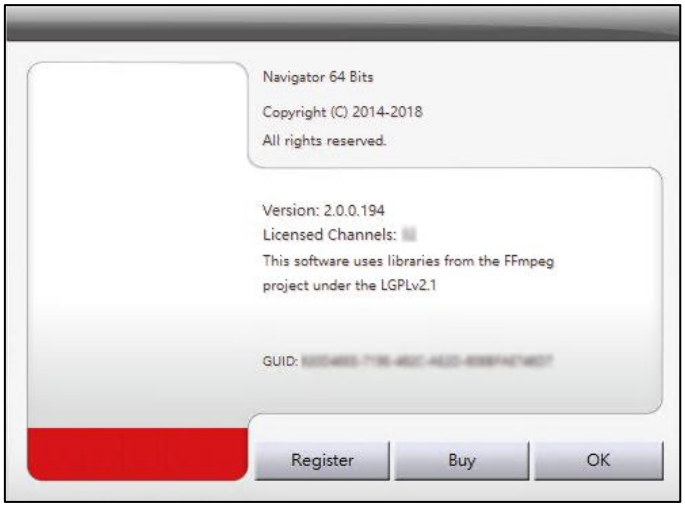
After setting up Navigator AI number plate recognition, Navigator will launch GYNet.exe for recognition. If there is an issue, make sure that GYNet.exe gets launched and GYNet.exe is at HTTP 8592 port.

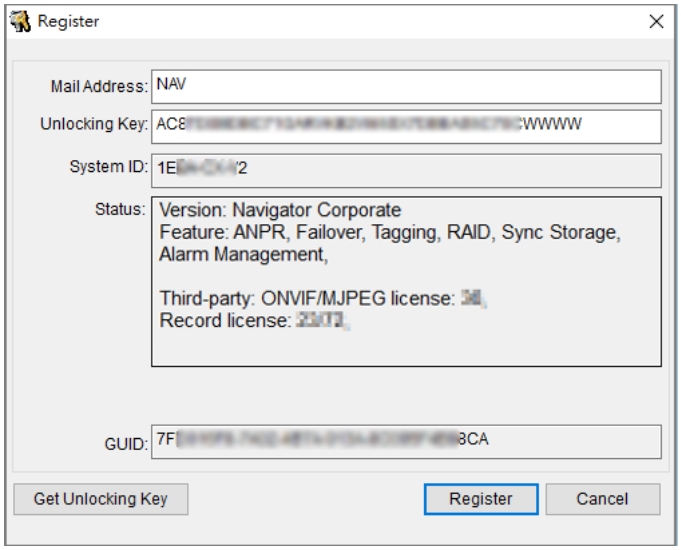
By launching AIPlug-in, the GYNet.exe is also launched for LILIN Navigator VMS via HTTP port 8592.

Click on Navigator software and click camera properties button. Click on ANPR Group setting. Type 8592 port for interfacing LILIN GYNet.exe.

Chapter 8.1 Installation of LILIN Navigator Software and License Activation

Please refer to the user manual of LILIN Navigator and follow the installations steps in sequence. After installation, click on the "?" icon in the upper right corner of Navigator to check the status of the license. Click on register icon to register the license plate recognition software license. Please provide your information including e-mail address, and system ID, and pass this information back to your dealer or sales person who will provide you the license key for full functionality.

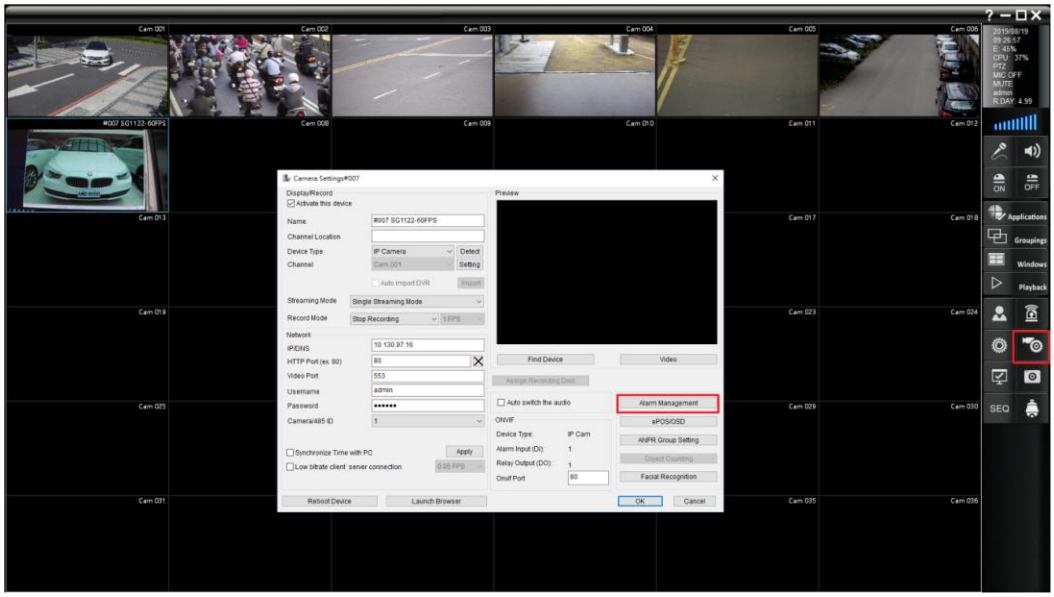


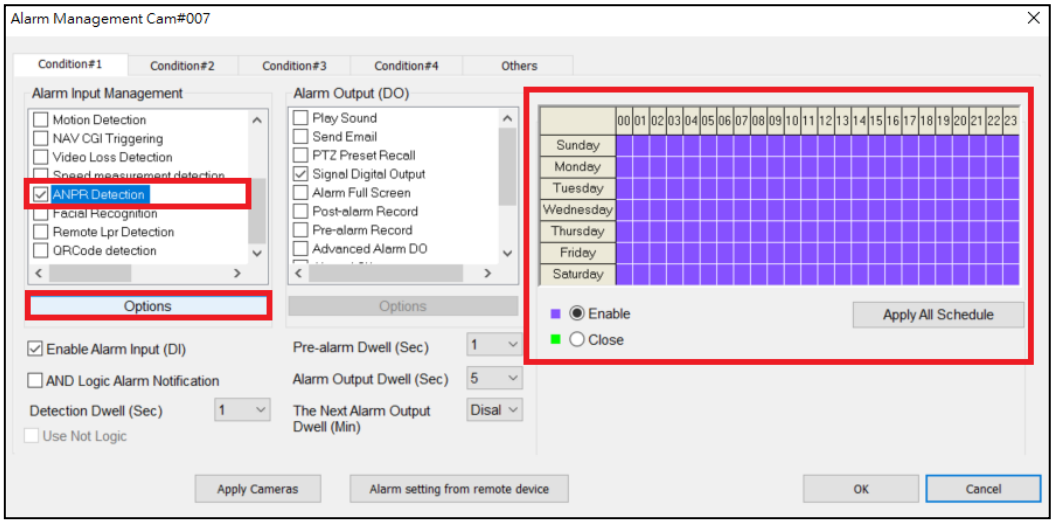


Chapter 8.2 LILIN Navigator Software Setting for Aida Number Plate Recognition

Click  Navigator software and select  camera properties. Click on ANPR Group Setting and make sure that the communication of Aida Number Plate Recognition is at 8592 port.

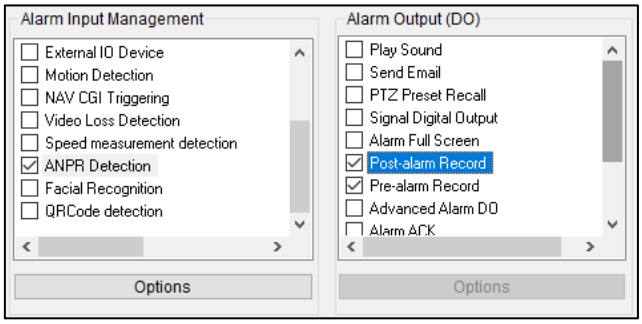
Click Navigator software and select  camera properties. Click on Alarm Management and make sure that the schedule is set to Enable for alarm triggering.





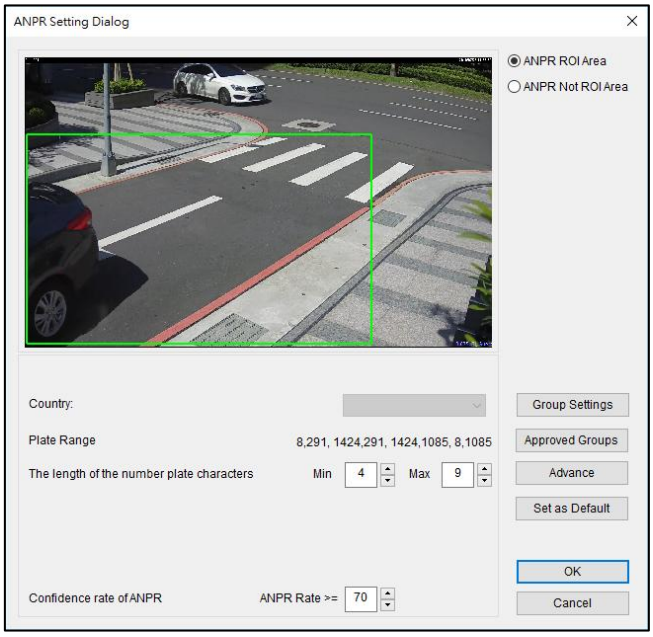
Note: When using Navigator VMS and Aida Plug-in, there is no need for opening AIPlug-in.exe for saving CPU usage.

Please click the camera settings button or the right mouse button on the channel to enter the properties page. Please check “ANPR Detection” option in the "Alarm Input Management" item of the alarm management page. After checking this item, click "Options" to enter the settings.



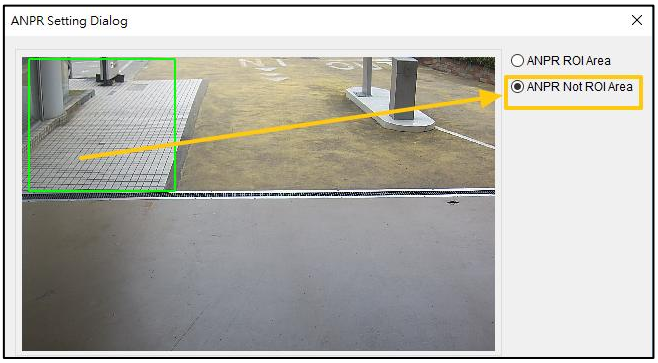
Chapter 8.2.1 Recognition Area of Navigator

The recognition area supports rectangle adjustment. This enables user to conveniently customize the selected recognition area.



Chapter 8.2.2 License Plate Exclusion Area

Some scenes in the recognition area will have tiles or grass obstacles, vehicle misidentification can be reduced through exclusion area.



Chapter 8.2.3 License Plate Character Height Adjustment

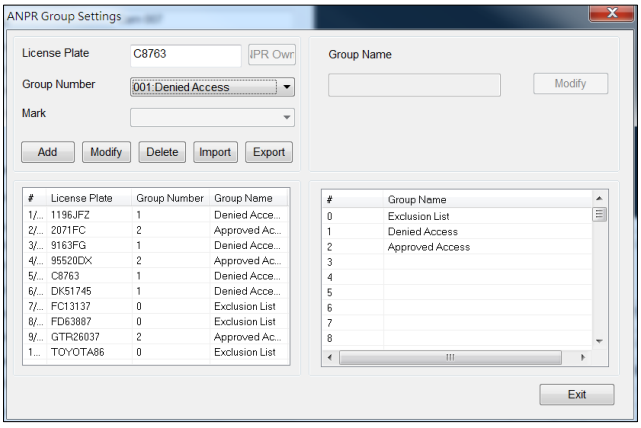
The height of the license plate character can be used to define the text height ratio according to the proportion of on-site license plates. The height of the text should be framed compared with the recommended ratio according to the site license plate number. The system automatically converts the height ratio directly into the dialog box. Maximum and minimum values can be set to identify the range of license plate characters width and height.

Chapter 8.2.4 LILIN Navigator ANPR System List Setting

Group list settings

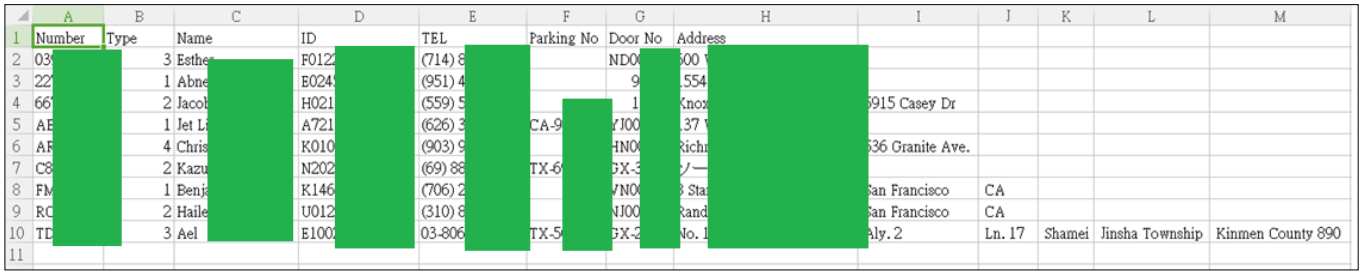
Each group of license plates can be set as a group, for example, preset groups such as "white list", "denial list" or "exclusion list". It is also possible to add a group and specify its function application group, and set the corresponding output after the license plate is detected.

ANPR Group Setting set license plate group, click "License Plate Group Setting". After entering the license plate database, create a group from the list according to the ownership of the license plate, trigger the alarm with this group, and other settings:



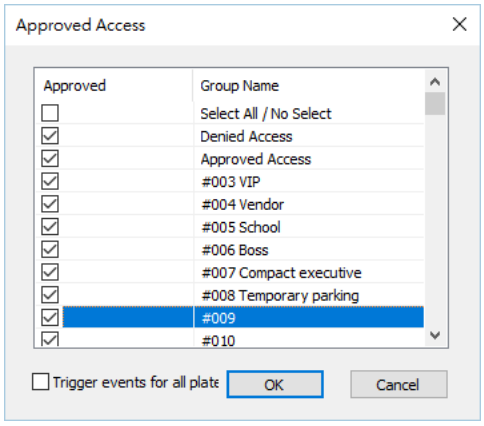
Chapter 8.2.4.1 License Plate Import/Export List

Support import/export list report. The function displays license plate and vehicle information in the Excel CSV file format.



Chapter 8.2.4.2 License Plate Group List Trigger of Navigator

Approved Groups You can select the license plate group setting, to set trigger events after detecting different license plates.



Chapter 8.2.4.3 Trigger Events for All Plates of LILIN Navigator

Check trigger events for all plates to trigger the alarm, whether or not the recognized license plates are on the list.

Chapter 8.2.4.4 Allowed List

The preset allowed list function setting mainly provides that the license plate in the license plate database is recognized, and the camera can send DO output triggering related device, such as the gate controller and the related alarm device. Edit the allowed list function can also customize for other alarm features.

Chapter 8.2.4.5 Denial List

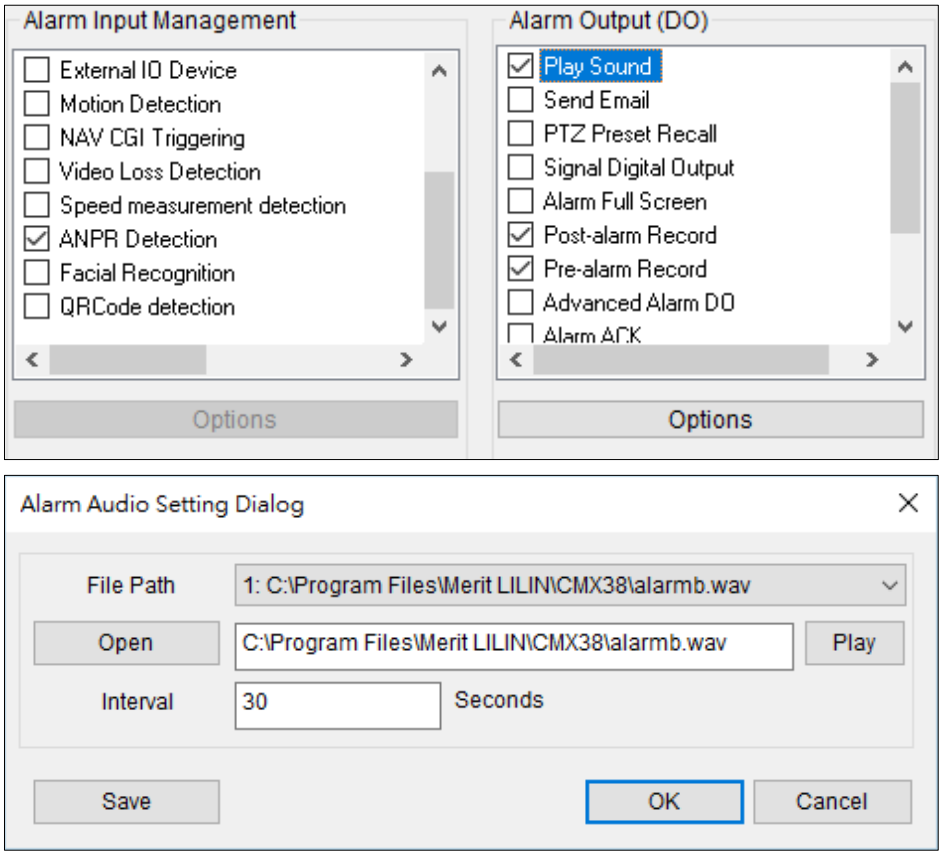
The denial list function setting mainly enables alarm notification when the license plate in the database is recognized. The preset is mainly to trigger the audio alarm notification. Also, other alarm functions can be customized.

Chapter 8.2.4.6 Exclusion List

The preset exclusion list is mainly used to filter not license plate texts. It is mainly used to filter background text font mixed in license plate recognition images. If there are similar requirements, please input the text and filter the text.

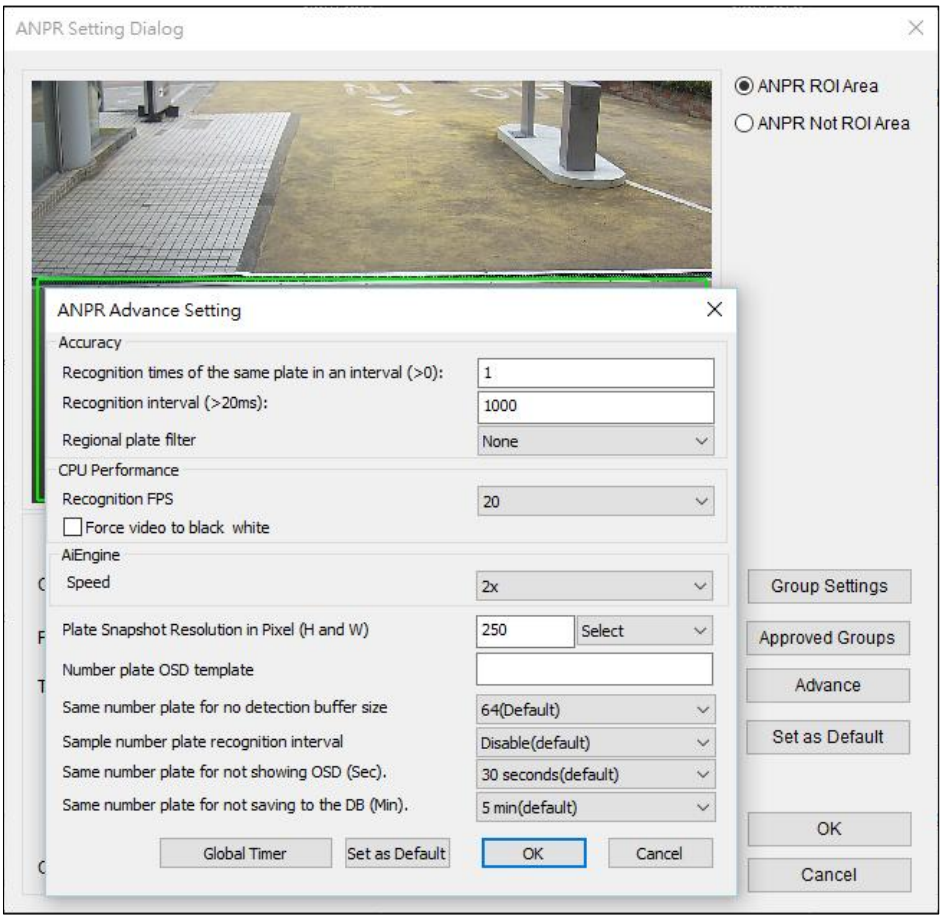
Chapter 8.2.4.7 License Plate Recognition Group Output Settings

When the license plate recognition function recognizes the set license plate group, you can set the corresponding output response of the group, such as the single screen display, trigger DO output function, activate pre and post alarm recording function, or execute output setting.



Chapter 8.2.5 License Plate Advance Setting of Navigator

Click Camera Properties Settings -> Alarm Settings -> License Plate Recognition Settings -> Advanced, and start the settings in the following dialog window:



Chapter 8.2.5.1 Frame Number for Statistic (>0)

Vehicle identification system to analyze the same license plate number repeated several times that the successful identification (such as: advertising car or complex background, can reduce the chance of misidentification).

Chapter 8.2.5.2 Gap Time Between Cars

Driving speed due to different angles or turn misjudgment, you can increase the set value, the system will judge the longer the time.

Chapter 8.2.5.3 Apply Area Plate Filter

At present, Taiwan and Vietnam (two motorcycles or four special vehicles) are supported.

Chapter 8.2.5.4 Maximum Number of FPS Function

Use In multi-channel car detection, can limit the number of vehicles less channel identification number, the license plate identification resources to provide concentrated to the busy channel.

Chapter 8.2.5.5 Grey Level Processing Function

Uncheck the normal image for the RGB mode detection. Check the state of denial or white 256 gray-scale detection, the use of the processor when the pressure is too heavy or poor detection speed improvement.

Chapter 8.2.5.6 Show if not Enough Data for Statistic Function

More complex scenes to set the analysis of the required frame rate, but the recognition effect may not be as expected, if you check this setting, you can show in the case of insufficient frame rate.

Chapter 8.2.5.7 Aida Plug-in Speed

Up to 4x speed can be set. The higher Aida Plug-in speed is, the higher the recognition speed.

Note: Number of recognition channel will affect the CPU pressure, please adjust appropriately.

Chapter 8.2.5.8 Snapshot Around More Pixels

License Plate Screenshot Custom pixel size (JPEG)
default snapshot directory -> C: \Program Files\Merit LILIN\CMX38\Capture\ANPR

Note: To prevent system constantly writing to C driver (SSD drive), please change the directory other than "Disk C" for storing the screenshot directory.

Chapter 8.2.5.9 Snapshot Photo Text Template

License plate snapshot wording please follow examples of illustrations.

Chapter 8.2.5.10 Same Number Plate for no Detection Buffer Size

For identification of vehicle with long term parking in the parking lot, the same license plate does not keep detected while the maximum parking time limit has not exceeded.

Chapter 8.2.5.11 Same Number Plate Recognition Interval

For the same license plate recognized a number of times, setting the interval time can reduce the alarm trigger for the same license plate.

Chapter 8.2.5.12 Same Number Plate for not Showing OSD (Sec)

For the same license plate recognized a number of times, setting the interval time can reduce the POS display on the screen.

Chapter 8.2.5.13 Same Number Plate for not Saving to the Database (Min)

For the same license plate recognized a number of times, setting the interval time can reduce same license plate repeatedly enter the database.

Chapter 8.2.6 Global Timer

Support IP camera DO to trigger an automatic global timer, set the start time for starting up the countdown to trigger DO alarm.

Chapter 8.2.7 Set as Default

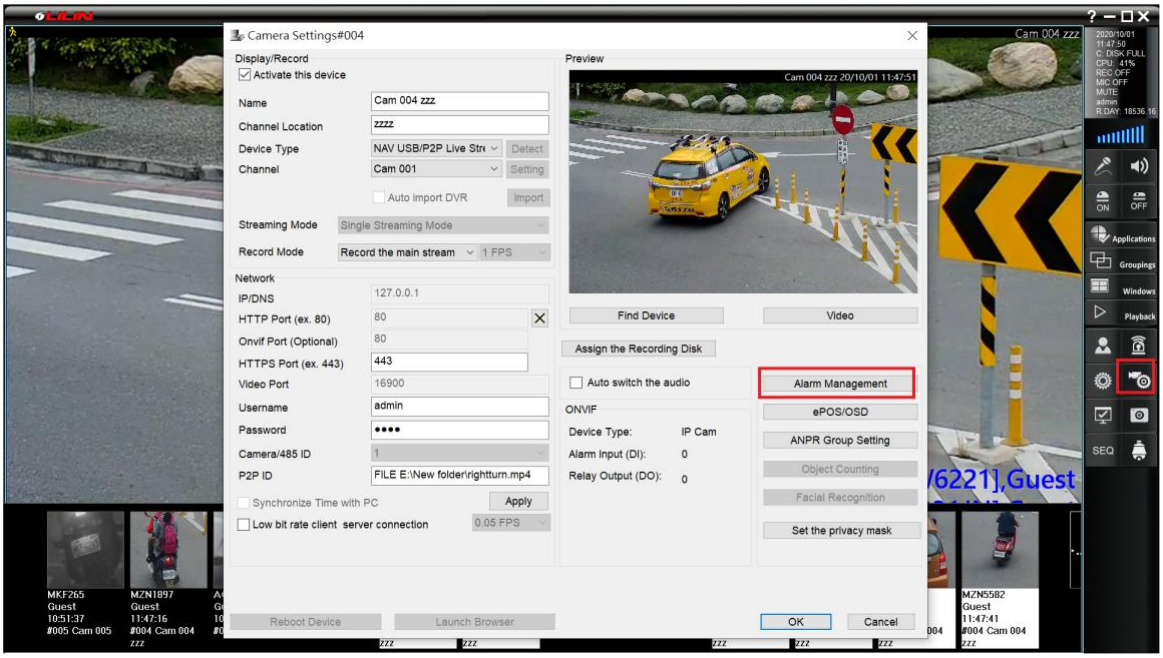
For restoring license plate advanced setting to default settings, set as default.

Chapter 8.3 Behavior Detection Setting of Aida Software

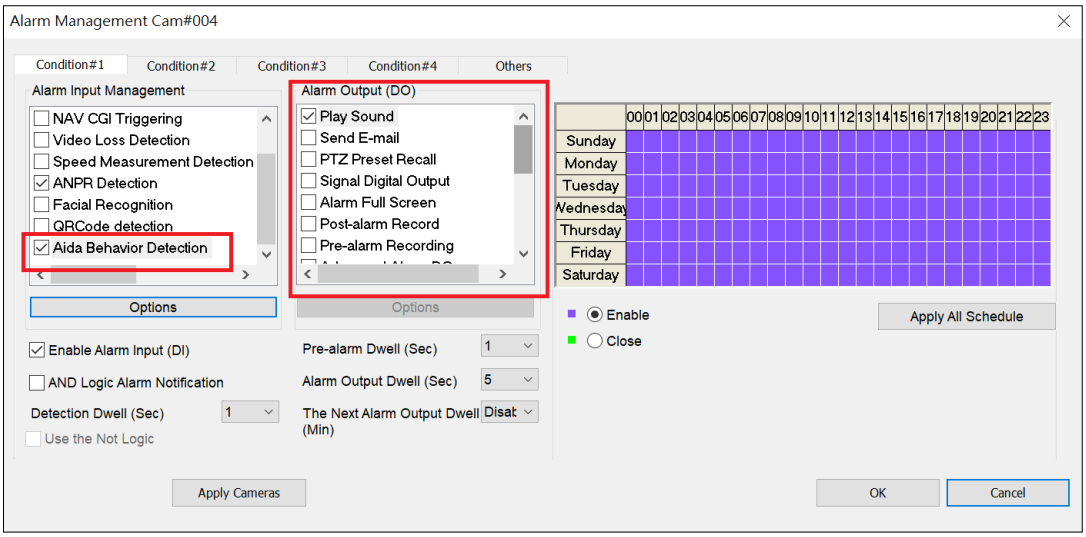
For Aida behavior detection and Navigator settings, please set the relevant detection area in Aida Plug-in first, as follows:

Chapter 8.3.1 Navigator and Aida Behavior Detection Settings

Click "Camera Properties" and click "Alarm Management" to configure Aida's behavior detection.



Click "Options" in "Alarm Input Management" to set Aida's behavior detection.

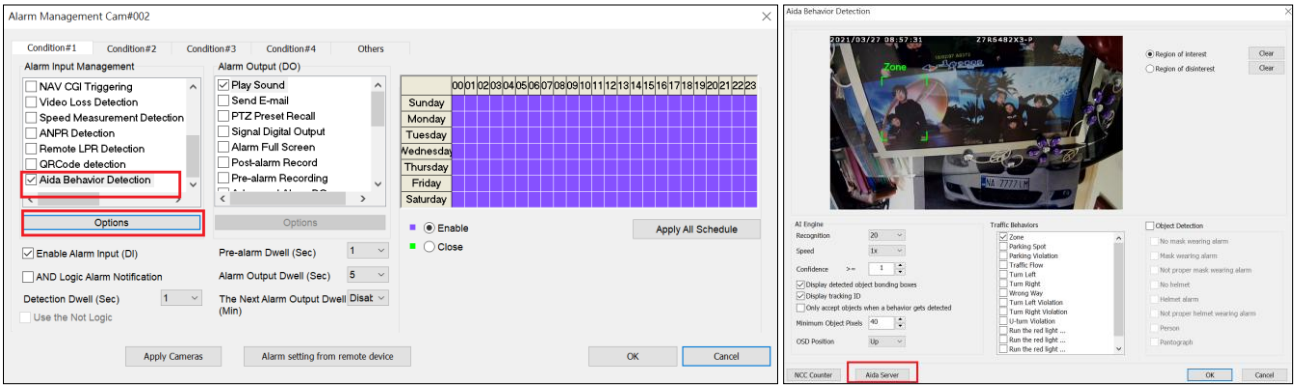


To set up the Aida host, please click on the "Aida Server" option to set up the communication between Navigator and Aida. The Aida server has two important options:

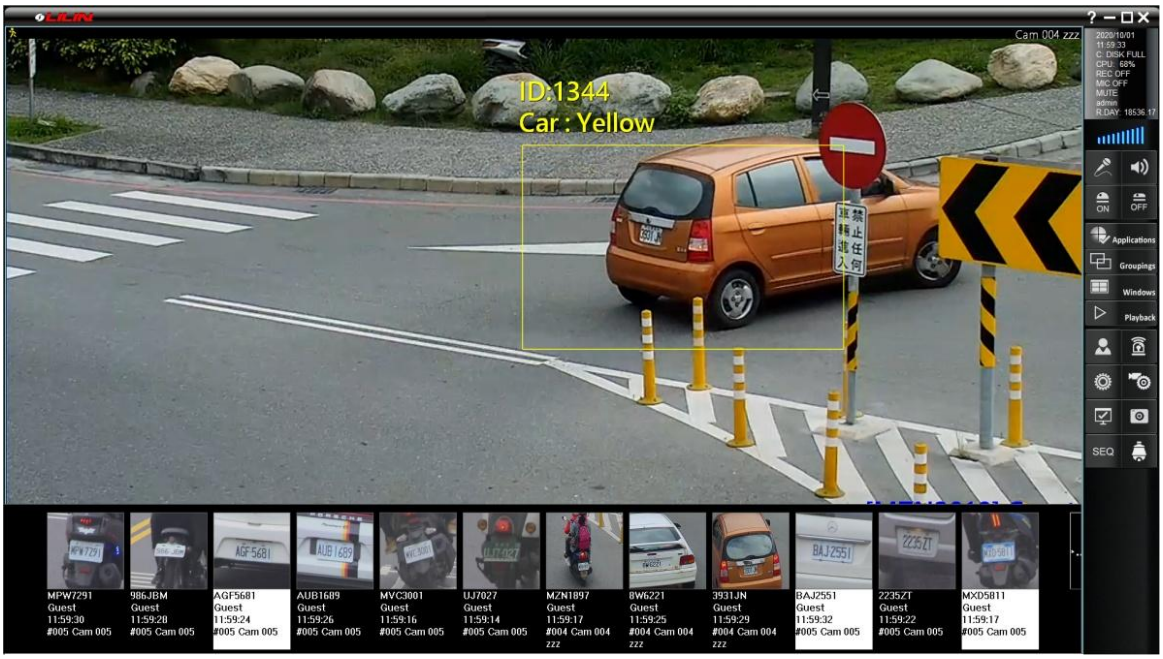
(1) Send the image to the Aida server for detection.
(2) Get recognition result from the video of the Aida server.

Send the image to the Aida server for identification—Navigator sends the video to the Aida server to display the recognition result

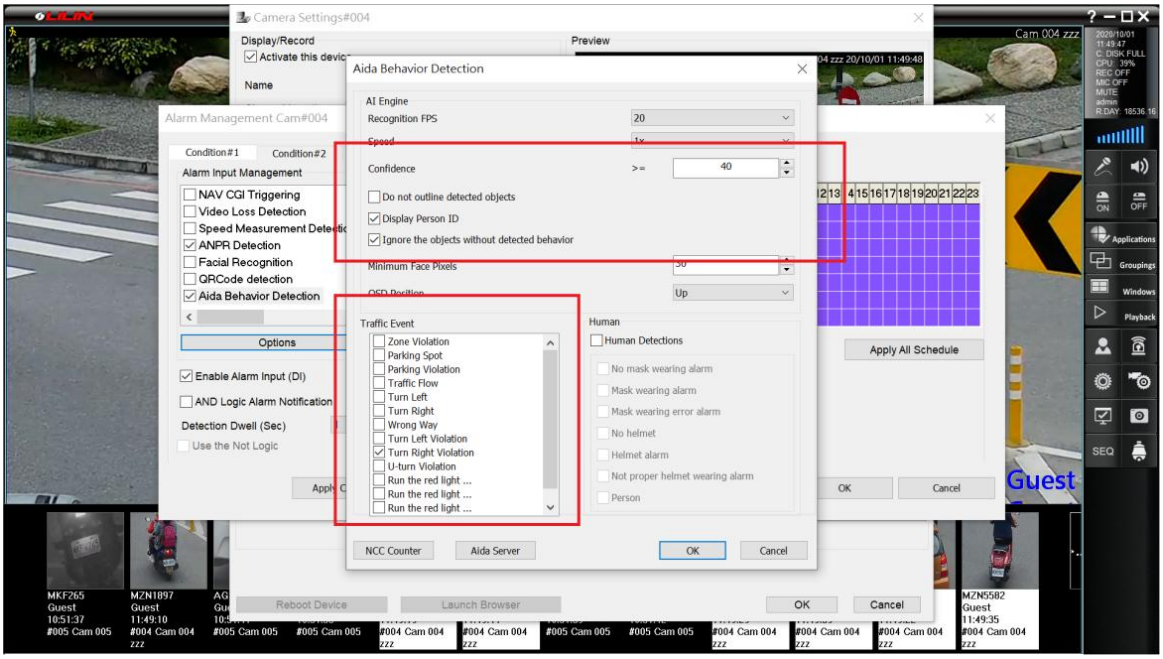
Get the recognition result from the video of the Aida server—Navigator will display the recognition after receiving from the Aida server, and the Aida server will actively connect to the IP camera.



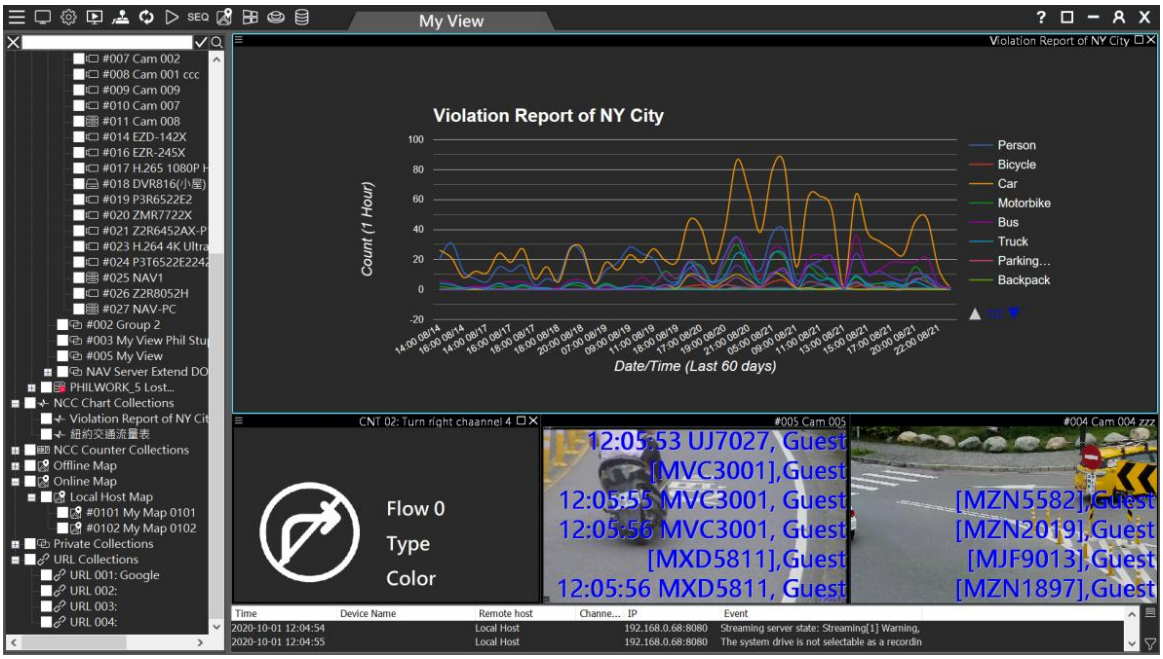
After above settings, Navigator can receive the Aida behavior detection and number plate recognition shown below:



Click "Options" in "Alarm Input Management" to configure Aida's behavior detection.

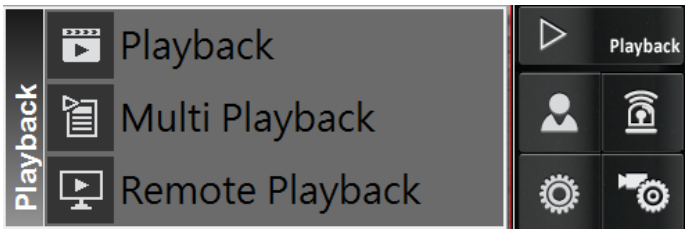


Navigator Control Center can also receive and display the behavior and number plate recognition via Aida Plug-in.

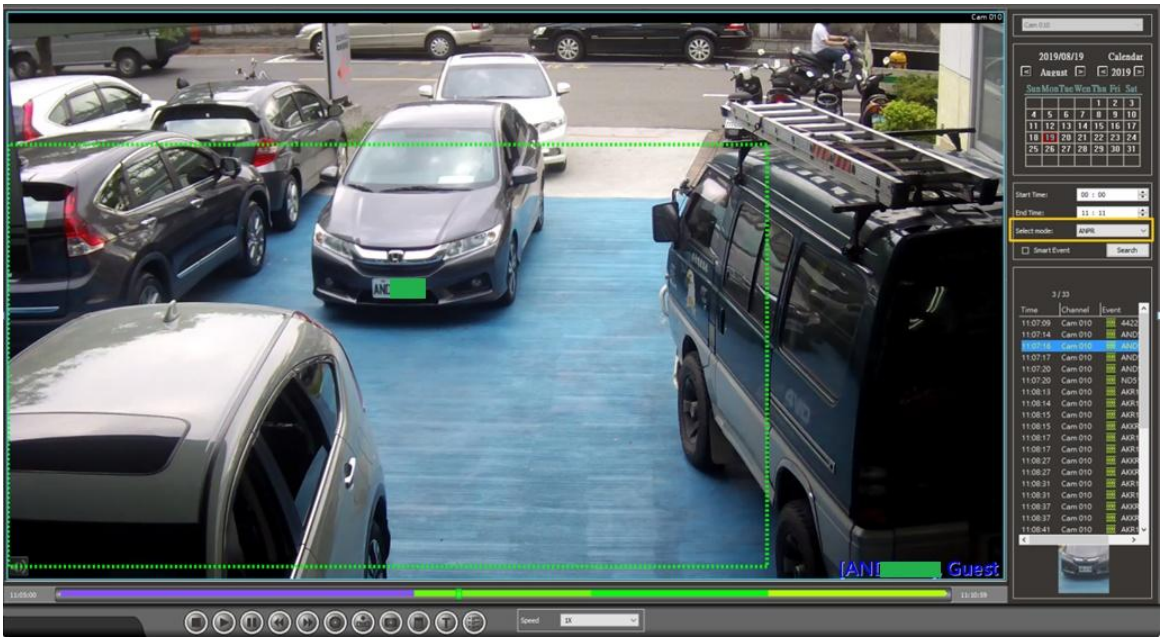


Chapter 9.0 License Plate Number Playback of LILIN Navigator

Please enter Playback mode in Navigator-> Playback

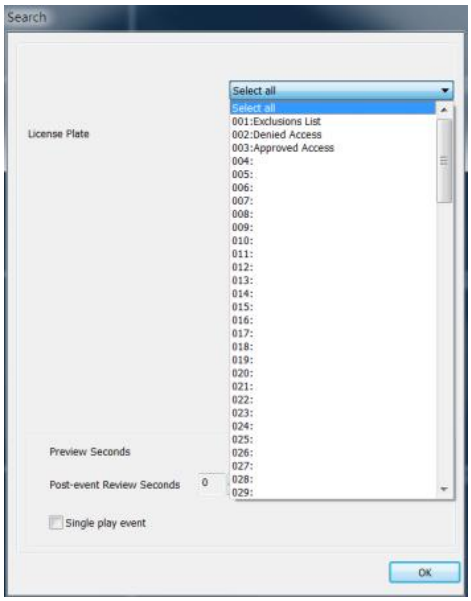


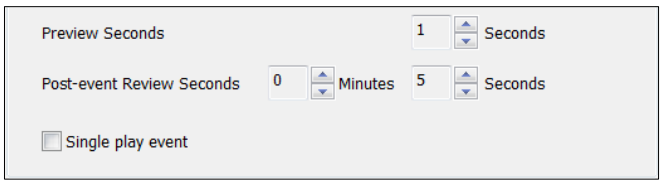
Please click the playback date, select "license plate recognition" mode. Check the playback time of the image.



Chapter 9.1 ANPR List Search of LILIN Navigator

Support search for preset groups such as "Allowed List", "Denial List" or "Exclusion List."
And support for playback video features "event pre-broadcast" or "post-event playback."



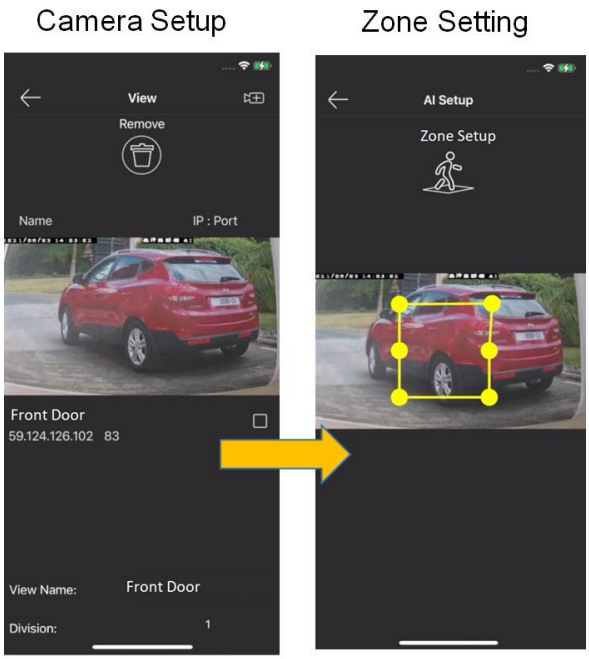


Chapter 10.0 iOS and Android Apps

LILINHome apps are able to push the snapshots, once a behavior gets triggered. The snapshot of an AI behavior can be sent to LILIN Event Cloud and retrieved by LILINHome apps.

Chapter 10.1 Camera Setup for AI Behaviors

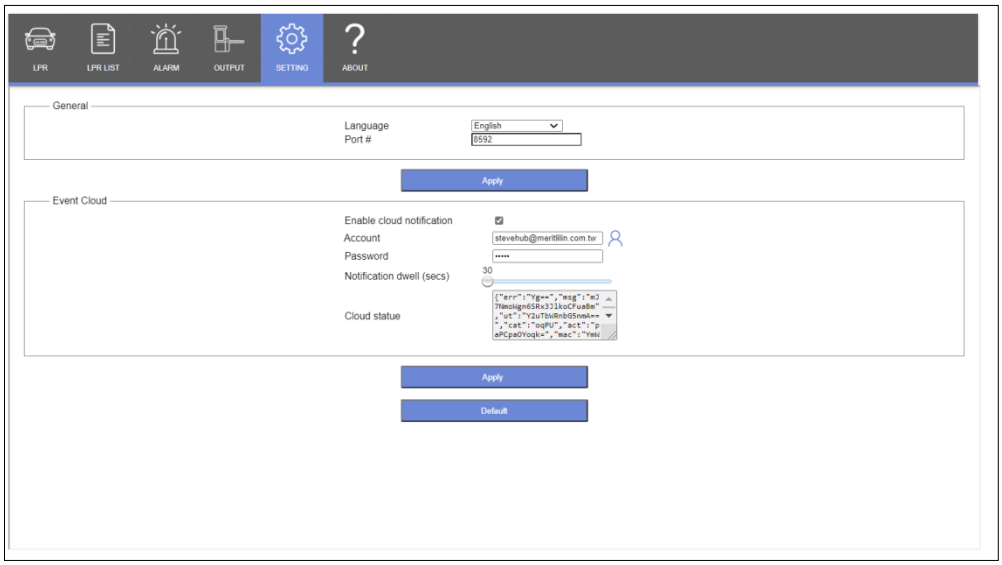
After the camera gets setup for its IP address, port number, username and password, a user can setup AI detection zone for IP camera. There are four detection zones available for setup.



Chapter 10.2 AI Behaviors Push Notifications

The snapshots are stored in LILIN Event Cloud at https://event.ddnsipcam.com. To enable the service, click on "Enable cloud notification" option. Provide username and password of LILIN Event Cloud. LILIN AI camera will push the snapshots to LILIN Event Cloud.

Notification dwell: The sending interval in between the detection.

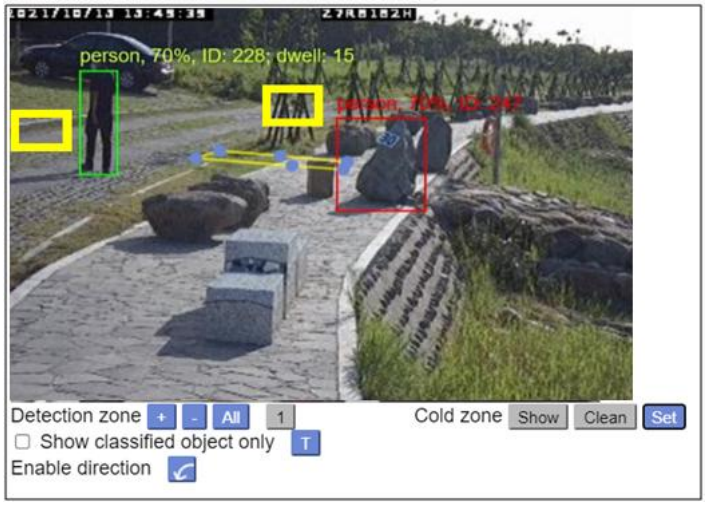


Chapter 10.3 Cold Zone

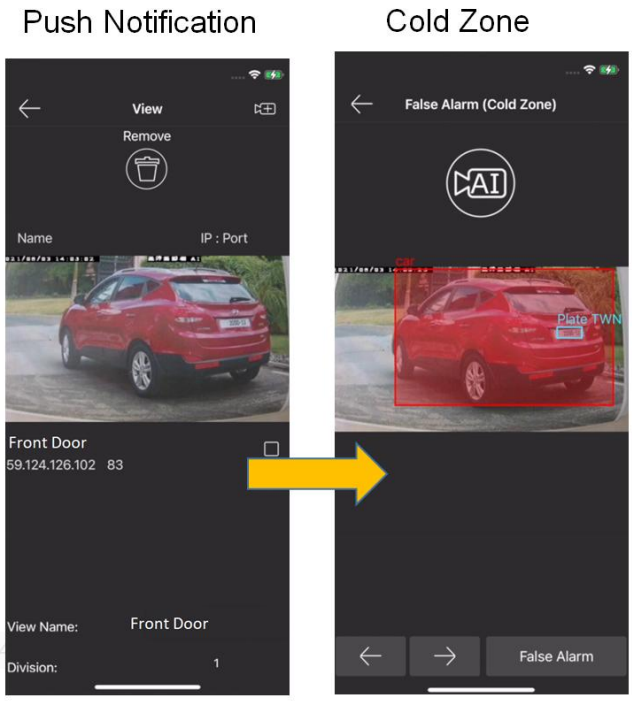
The camera can support "Cold Zone" reporting for false alarm. For example, the picture below, the rock is recognized as a person. Training the AI to adapt to the environment is a time-consuming task. The Cold Zone technology can suppress the recognition rate of the misclassified stationary object.

To set the cold zone, follow the steps below:

(1) Click Set button.
(2) Click on the bounding box of the misclassified object.
(3) Click show to see the cold zone object for five second.
(4) There are up to 8 cold zones can be set.
(5) To clear all cold zones, click on Clear button.

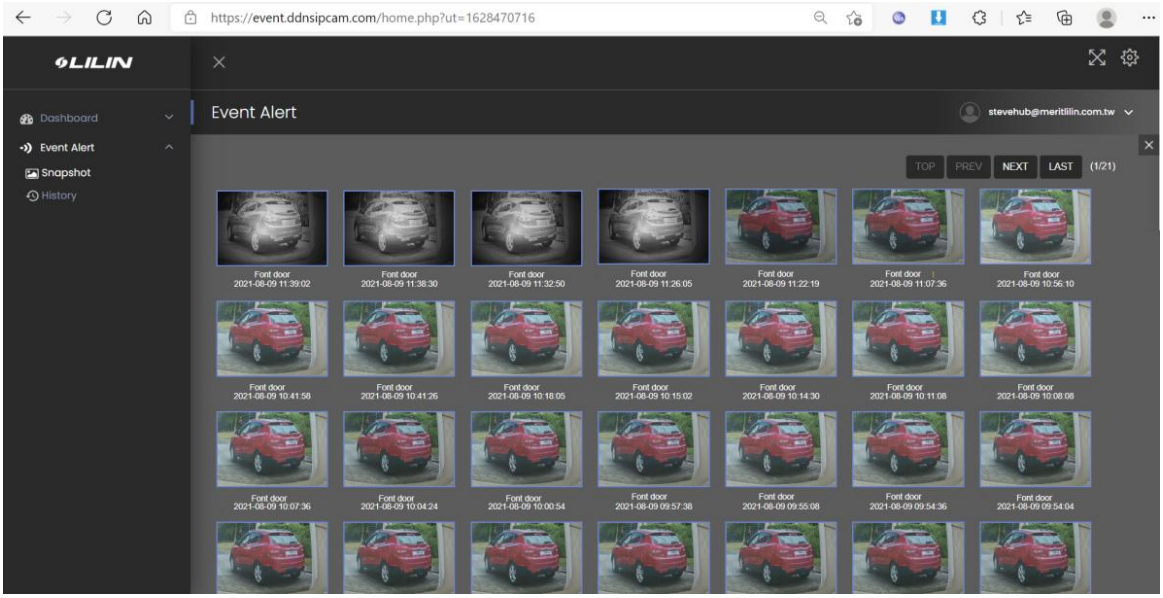


LILIN Event Cloud will push event notification to your mobile phone, after it got the snapshots from LILIN AI camera. If the notification is a false alarm, you can click the false alarm button feedback to LILIN camera for reducing the recognition rate.



Chapter 10.4 LILIN Event Cloud

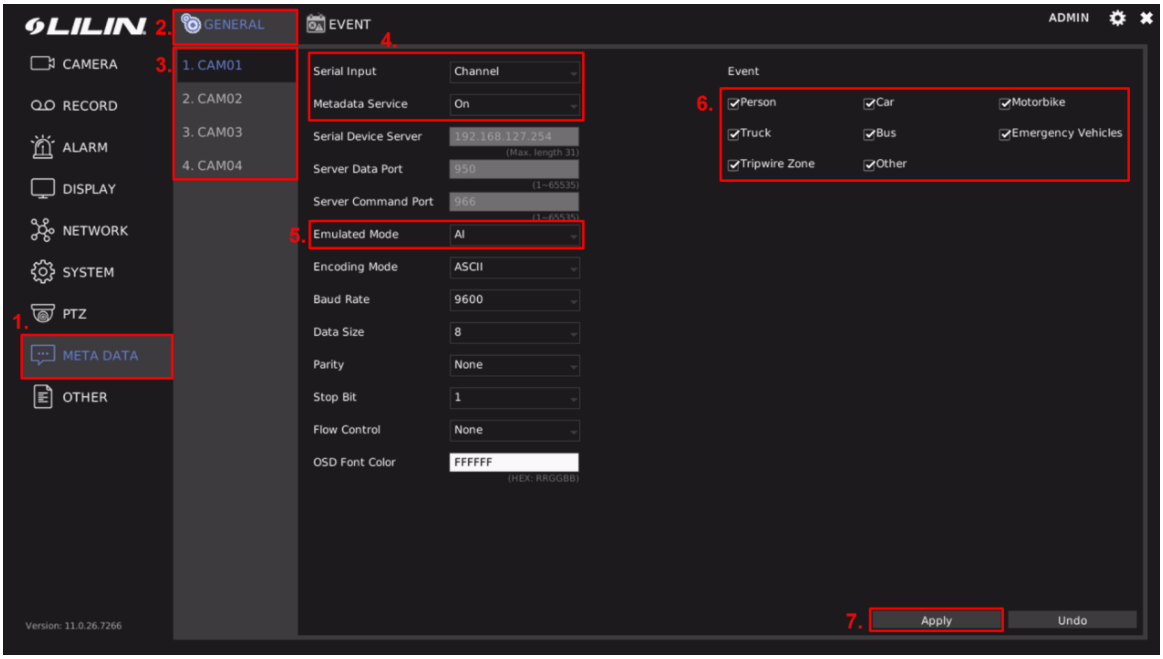
LILIN Event Cloud offers Dashboard and Event Alert to the users who can conveniently analyze the events statistics and get the event images.



Note: For free service, there are only 512 pictures for storing the snapshots.

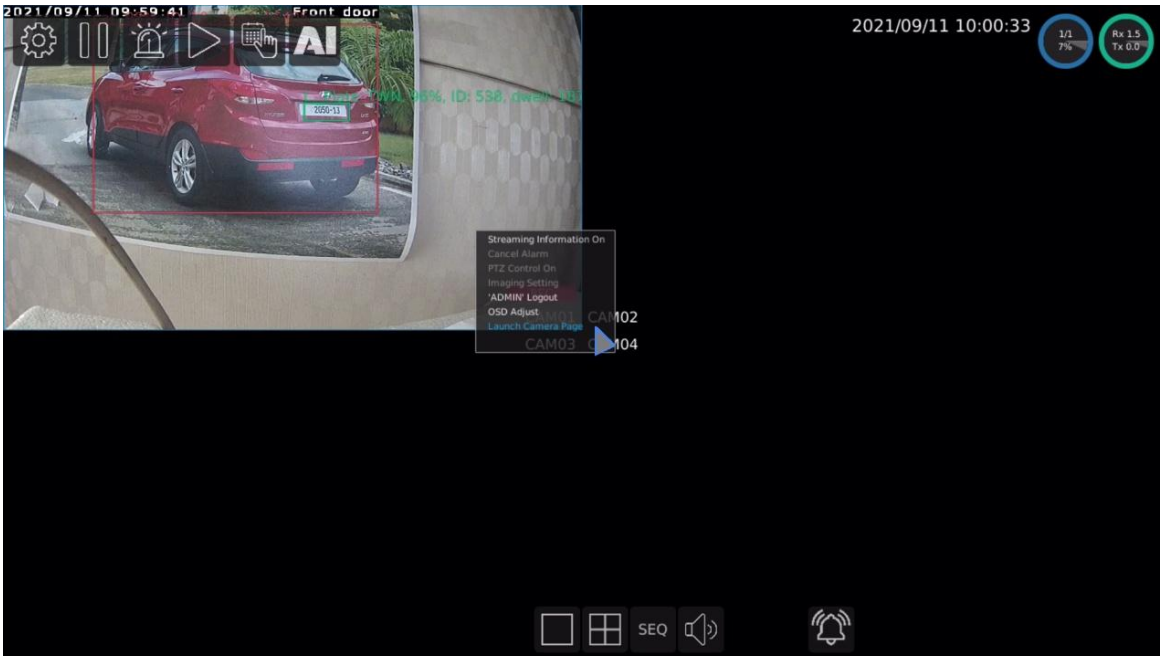
Chapter 11.0 NVR/DVR Integration
Chapter 11.1 AI Object / Behavior Recognition Setting
Chapter 11.1.1 AI Event Setting

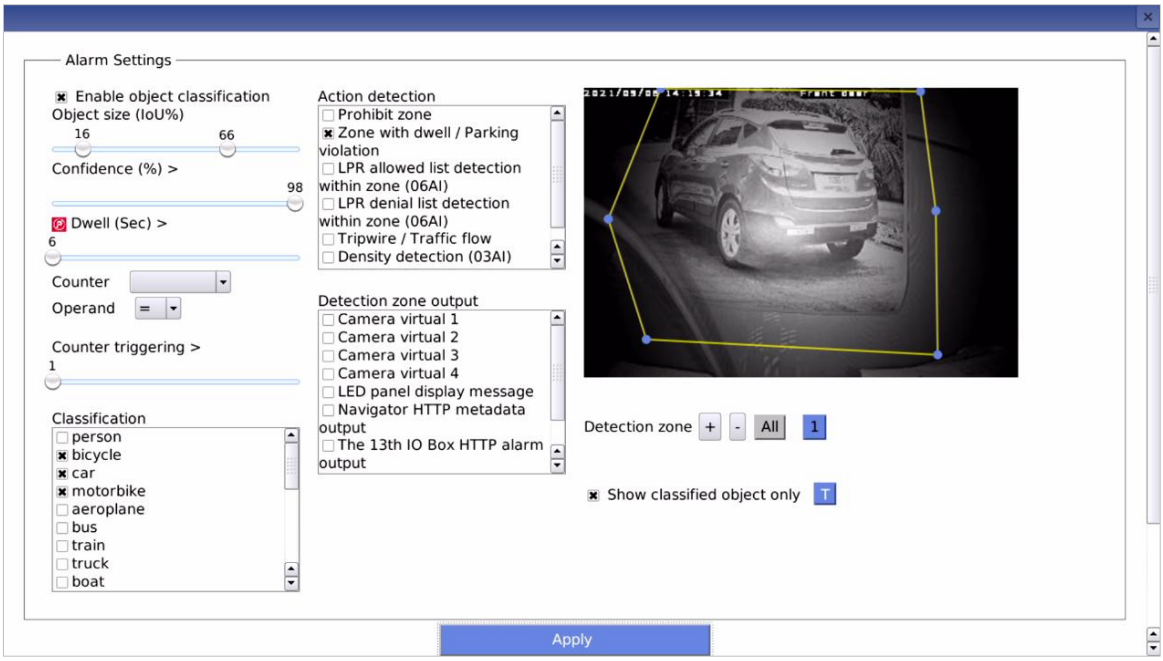
- Click on META DATA > General > AI camera (06AI) channel.
- Serial Input: Select Channel.
- METADATA Service: Select On.
- Emulated Mode: Select AI.
- Event: Click according to requirement, person, car, motorbike, truck, bus, emergency vehicles, tripwire zone, other.
- After completing the setting, click on “Apply”.



Chapter 11.1.2 AI Camera Setting

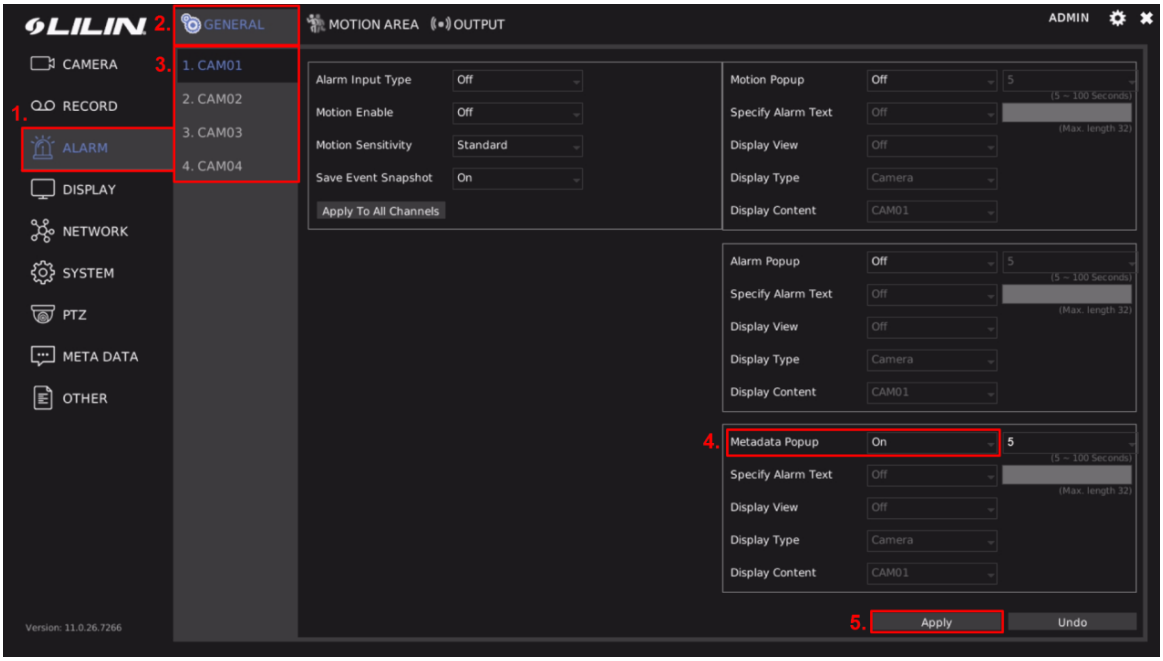
On the live screen of the local NVR, right-click on the AI camera channel and click "Launch camera page" to enter the AI-related camera settings. (For detailed settings, please refer to the AI camera manual).



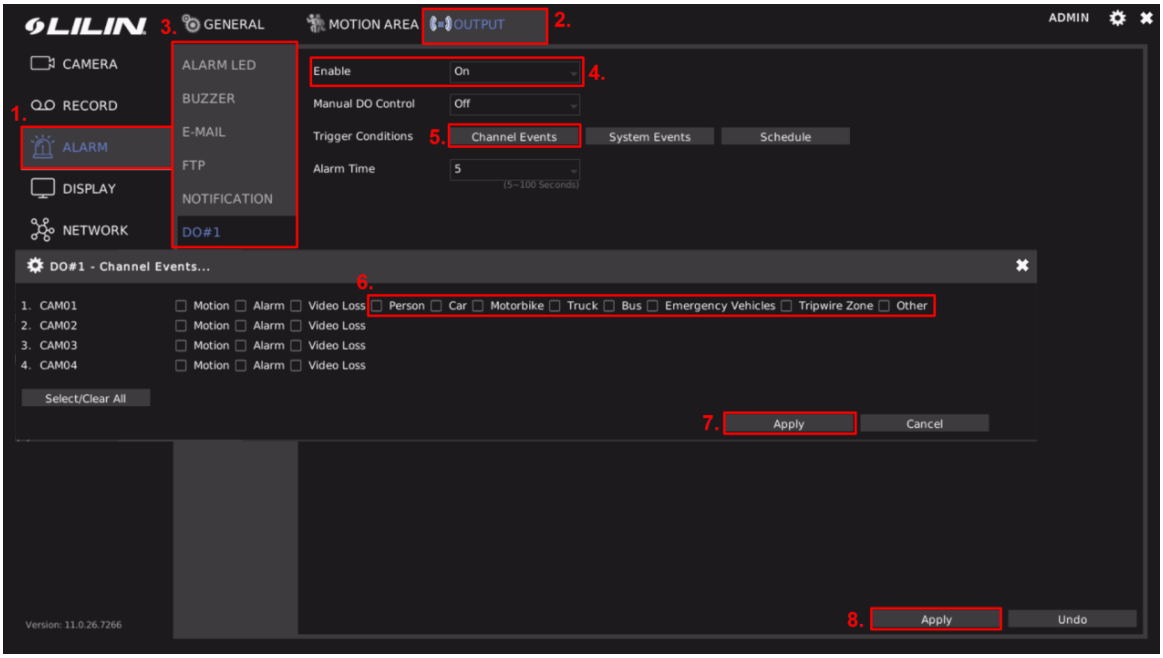


Chapter 11.1.3 Alarm Setting

- General Setting: Click on Alarm > General > AI camera (06AI) channel.
- Metadata Popup: Select On.



- Alarm Setting: Click on Alarm Setting > Output > Select according to required output type. Example: DO#1:
- Enable: Select On.
- Trigger Conditions: After clicking the channel event, click according to requirement, person, car, motorbike, truck, bus, emergency vehicles, tripwire zone, other.

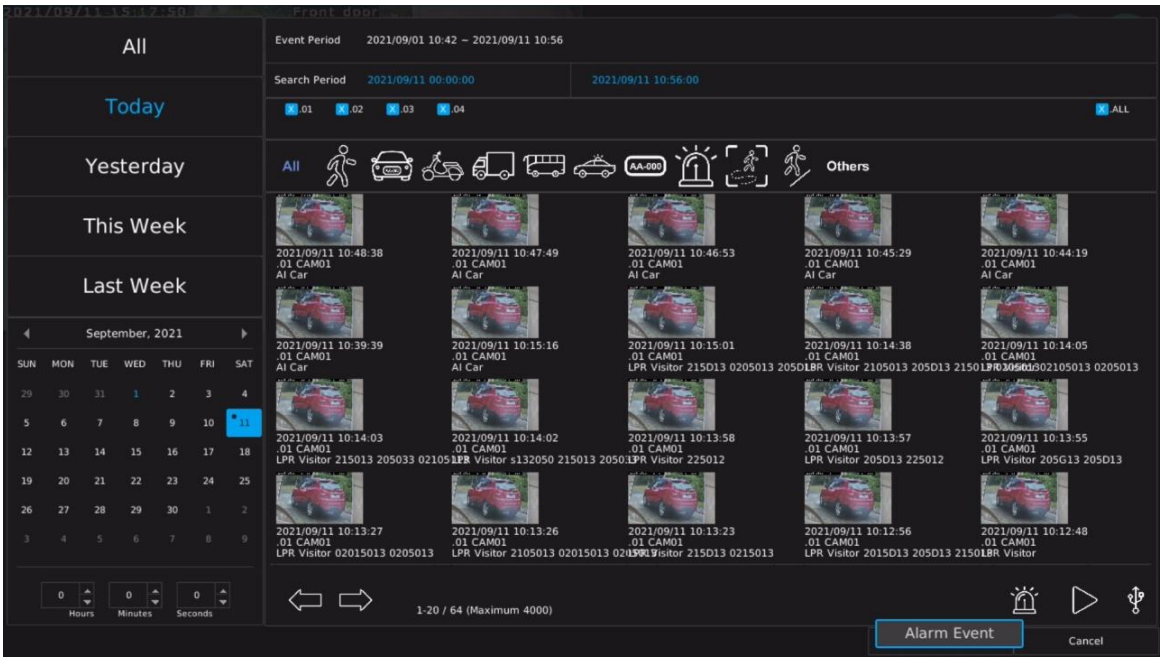


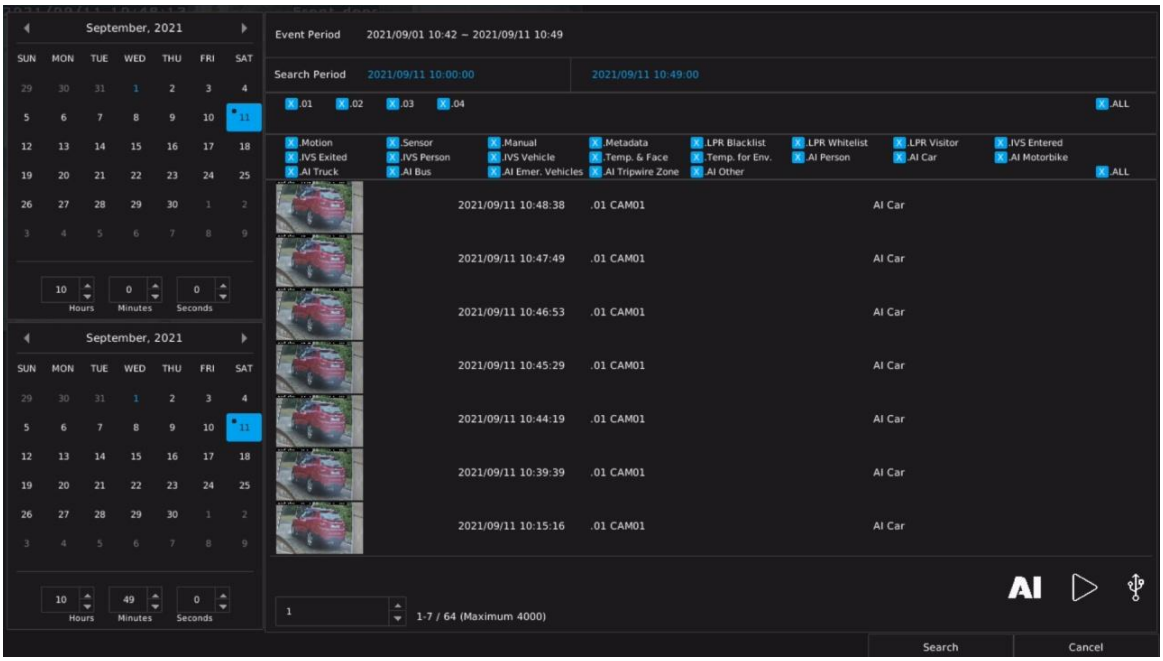
Chapter 11.1.4 Event Search

On the local NVR, click on the AI icon to enter the AI event search screen.

The default search time of the system will start at 00:00:00 of the current day, and end at the time user enter the search screen. To change the search time, click on the time on the lower left and adjust the search time. Due to limited system resources, the system can only provide screenshots of the most recent 4,000 events. The latest events will be listed on the first tab, and each tab will display up to 20 events. To switch the event page, click on the left and right arrow icons, or click the channel number and event icons as the search filter conditions.

To display all events list, click on the “Alarm Event” button. To return to AI event, please click on the AI icon.





Event Search Filter Conditions					
	Person			License Plate	
	Car			Sensor	
	Motorbike			Detection Zone	
	Truck			Tripwire	
	Bus			Other	
	Emergency Vehicles				

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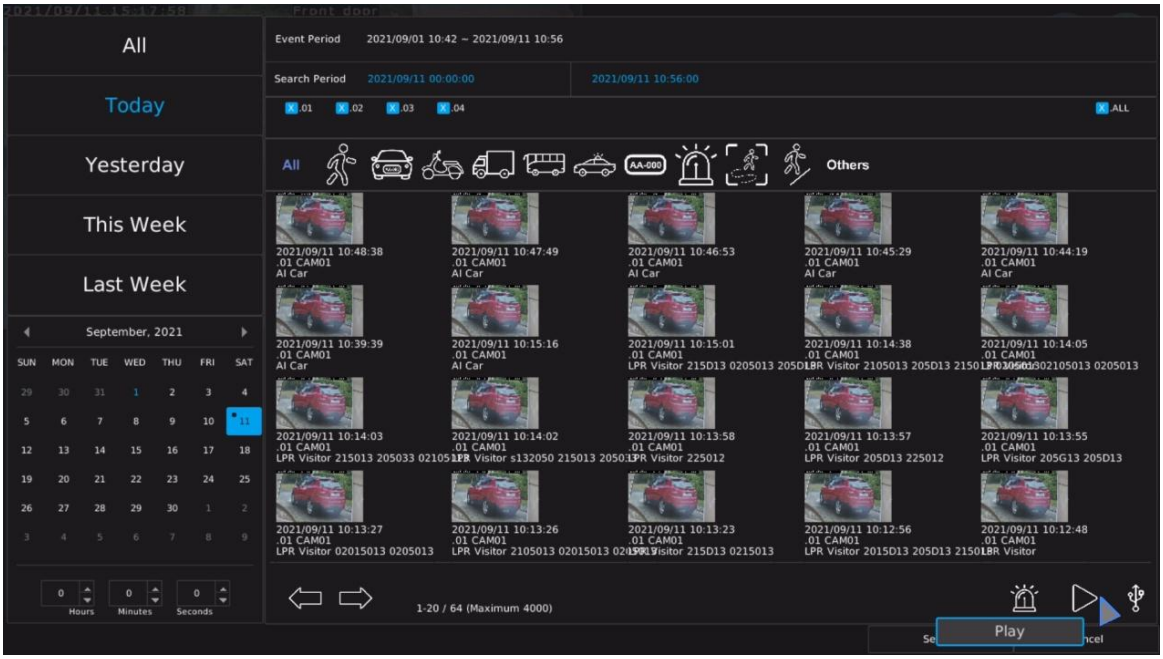
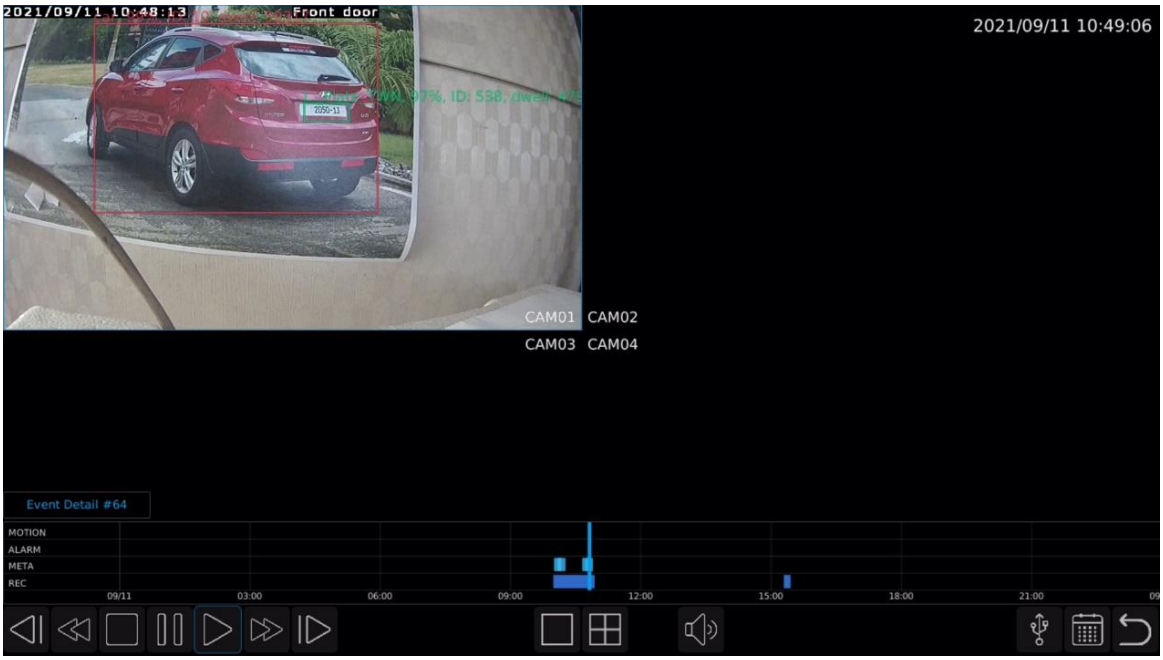
Chapter 11.1.5 Event Playback

To playback the event, please double-click on the AI event or alarm event. Or single click on the event and then click the “Play” button.

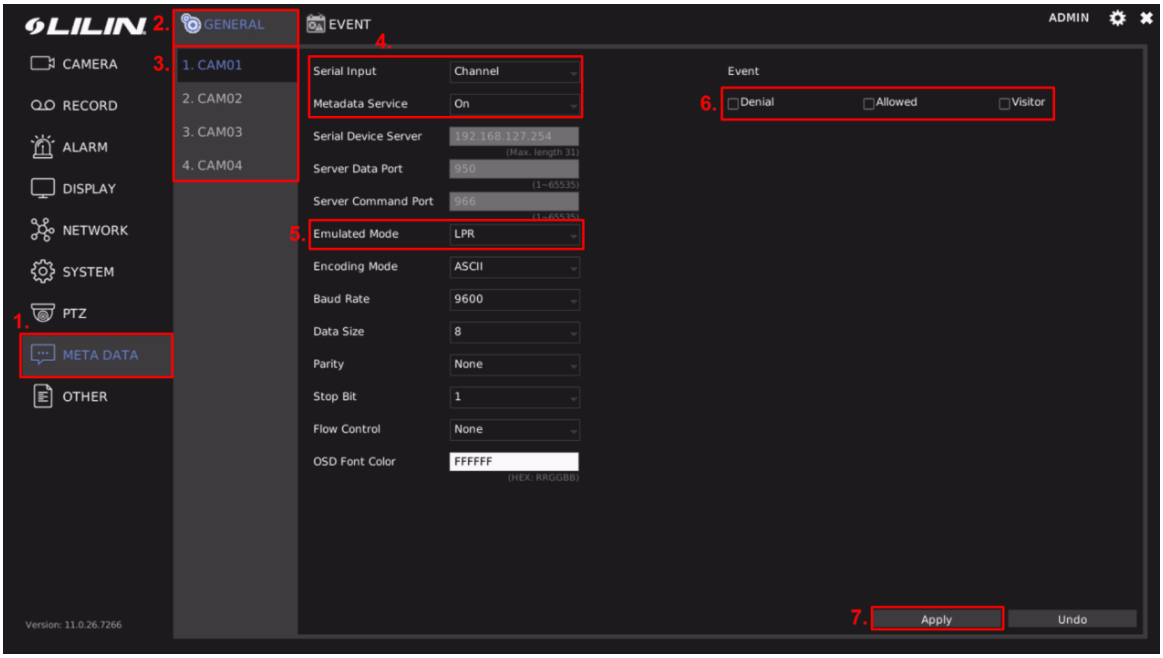




Chapter 11.2 AI License Plate Recognition Function Setting

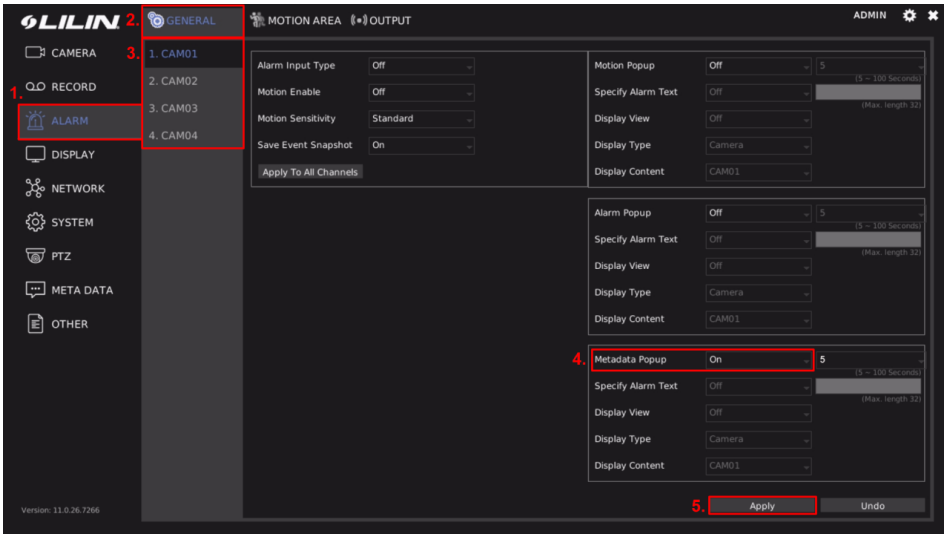
Chapter 11.2.1License Plate Recognition Event Setting

- Click on META DATA > General > AI camera (06AI) channel.
- Serial Input: Select Channel.
- METADATA Service: Select On.
- Emulated Mode: Select LPR.
- Event: Click according to requirement, denial, allowed and visitor.
- After completing the setting, click on “Apply”.

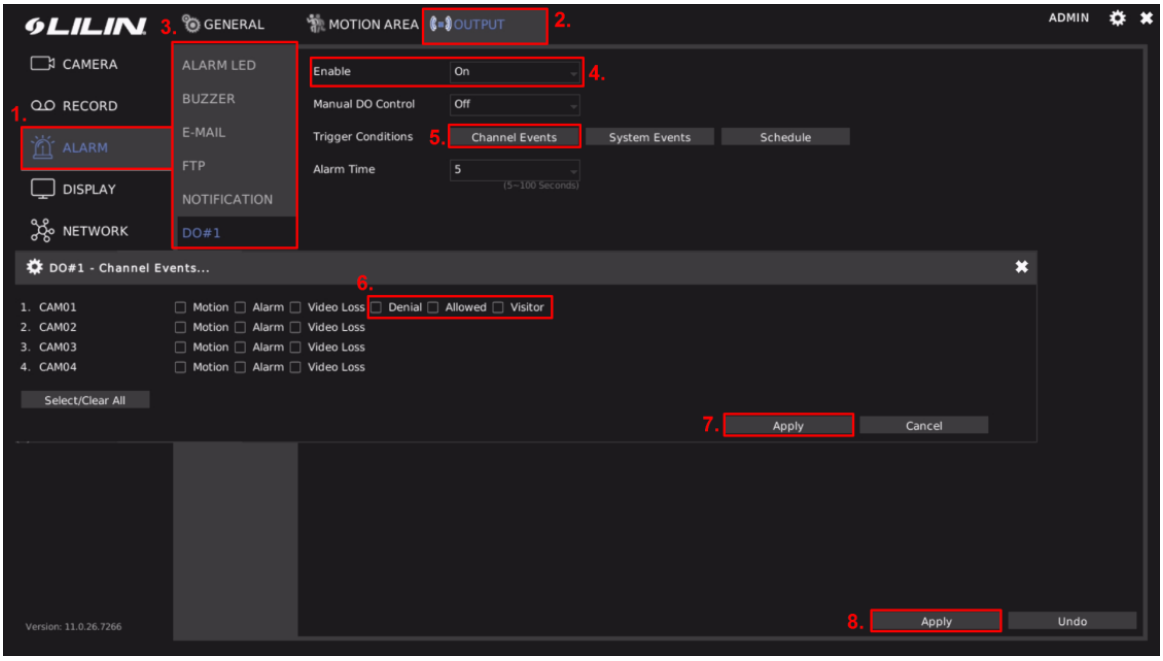


Chapter 11.2.2 Alarm Setting

- General Setting: Click on Alarm > General > AI camera (06AI) channel.
- Metadata Popup: Select On.

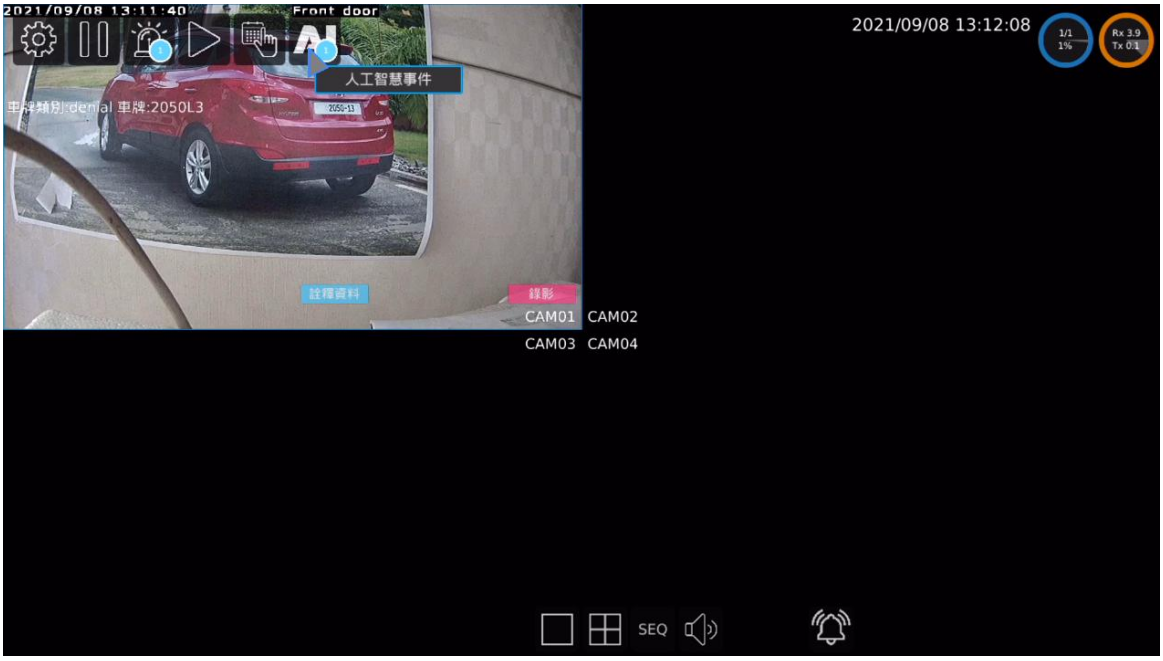


- Output Setting: Click on Alarm > Output > Select according to required output type.
  Example: DO#1:
  Enable: Select On.
  Trigger Conditions: After clicking the channel event, click according to requirement, denial, allowed and visitor.



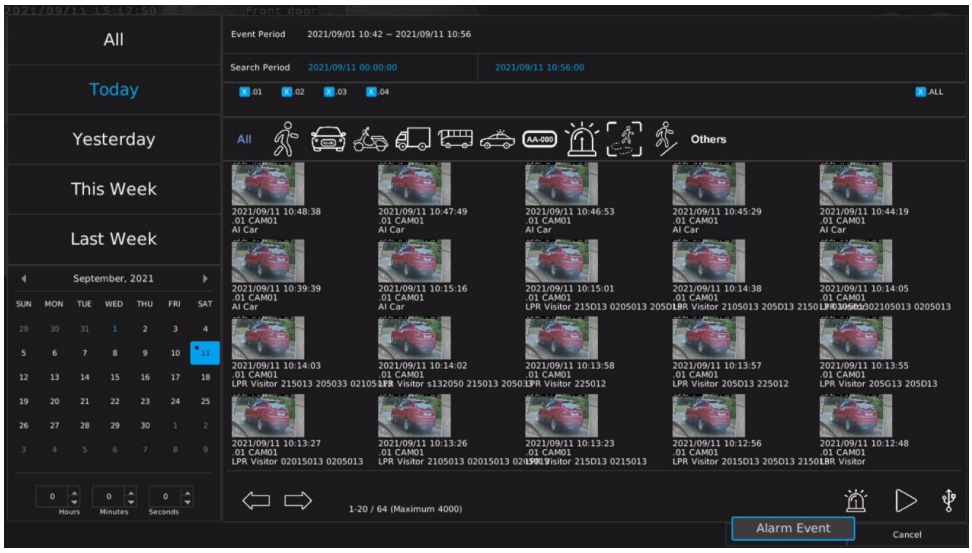
Chapter 11.2.3 Event Search

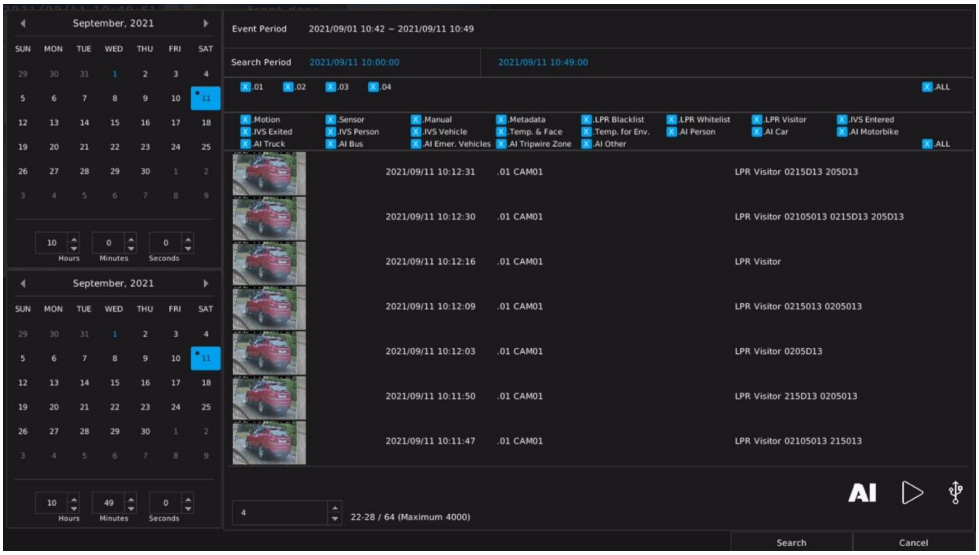
On the local NVR, click on the AI icon to enter the AI event search screen.



The default search time of the system will start at 00:00:00 of the current day, and end at the time user enter the search screen. To change the search time, click on the time on the lower left and adjust the search time. Due to limited system resources, the system can only provide screenshots of the most recent 4,000 events. The latest events will be listed on the first tab, and each tab will display up to 20 events. To switch the event page, click on the left and right arrow icons, or click the channel number and event icons as the search filter conditions.

To display all events list, click on the “alarm event” button. To return to AI event, please click on the AI icon.

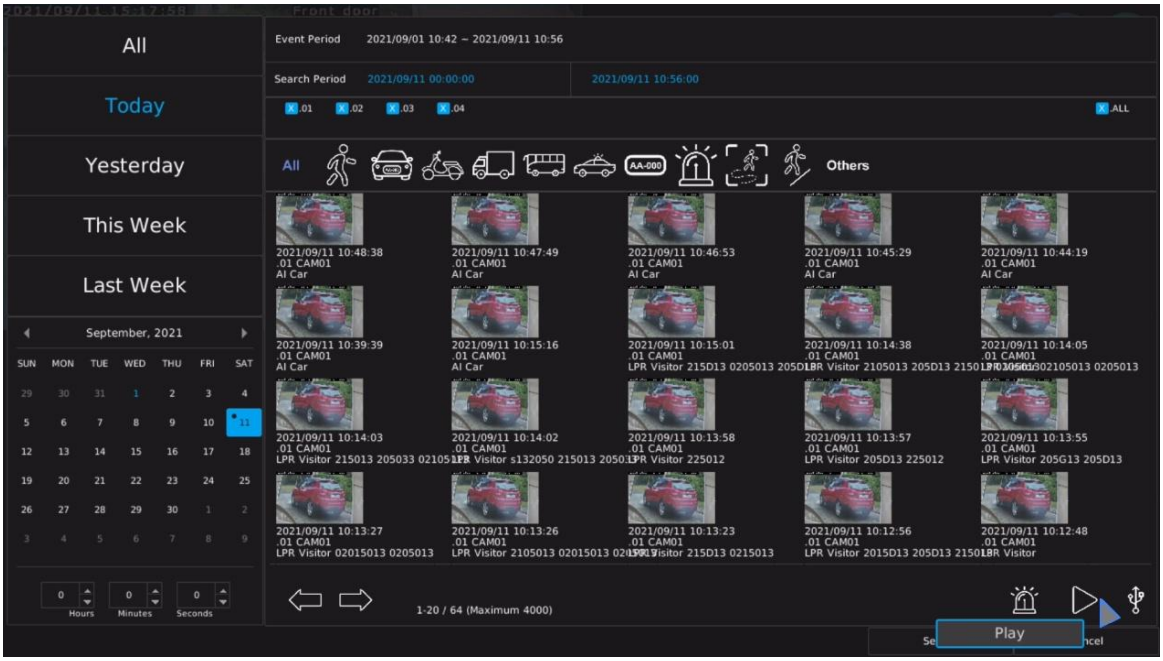


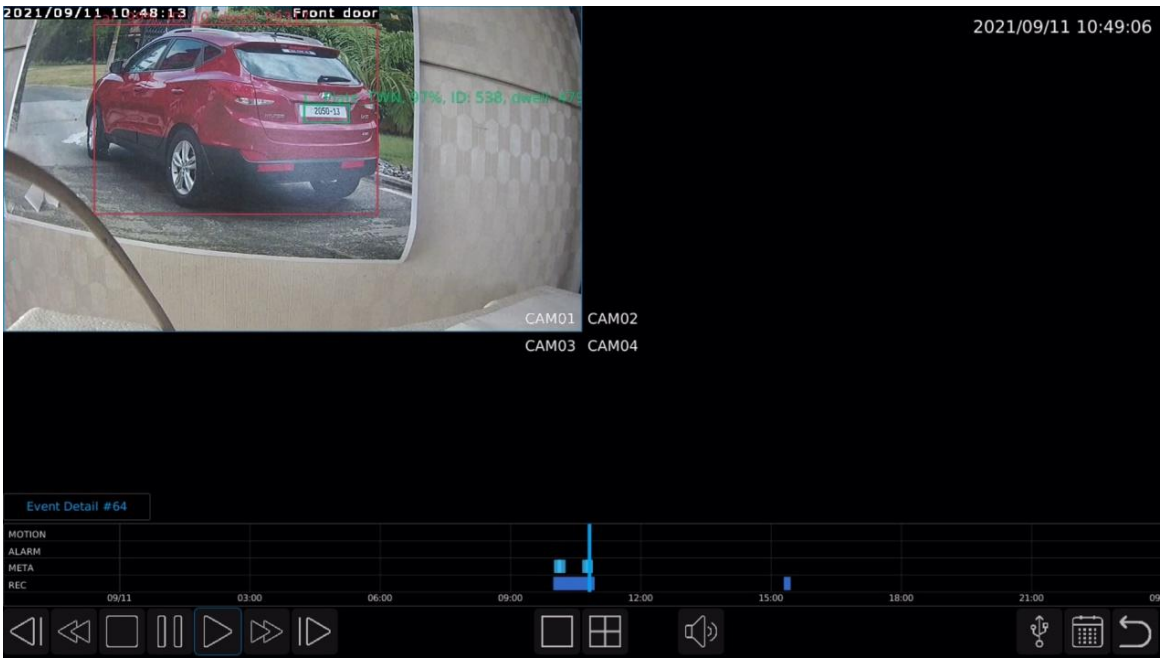


Event Search Filter Conditions					
	Person			License Plate
	Car			Sensor
	Motorbike			Detection Zone
	Truck			Tripwire
	Bus		Others	Others
	Emergency Vehicles			

Chapter 11.2.4 Event Playback

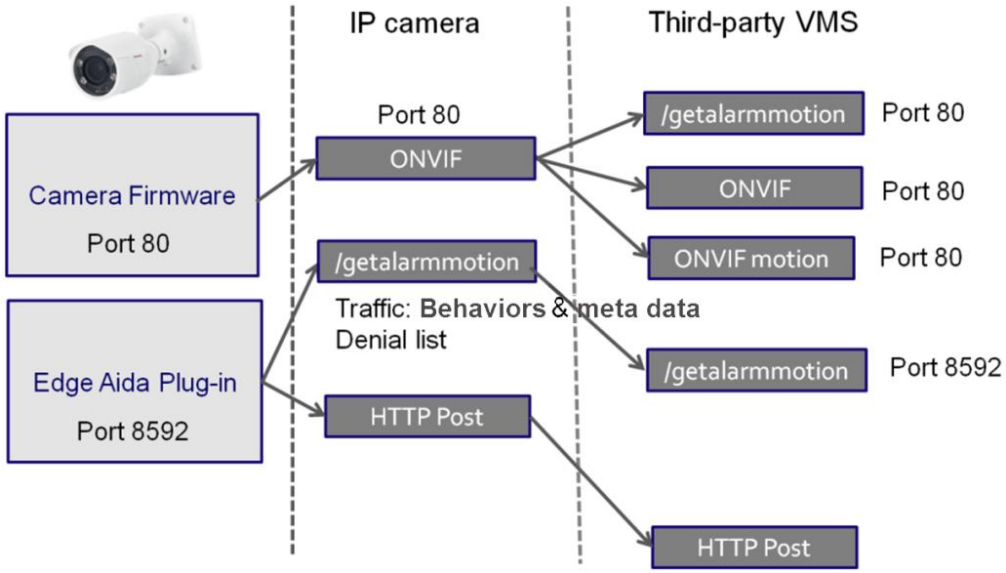
To playback the event, please double-click on the AI event or alarm event. Or single click on the event and then click the “Play” button.





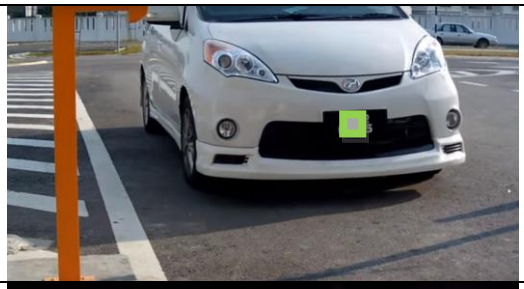
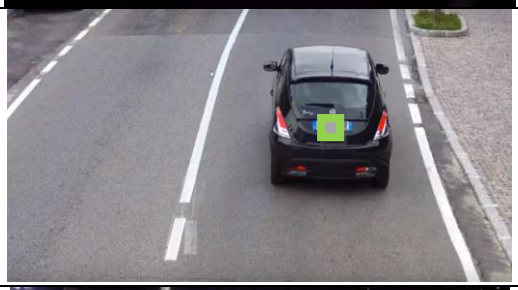
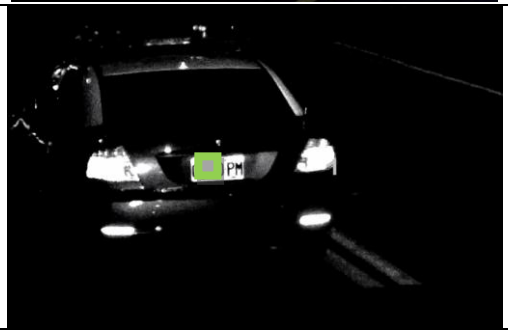
Chapter 12.0 The Integration SDK of Aida Plug-in

There are SDK available for interfacing LILIN Aida Plug-in via 8592 HTTP port. Basically, third party software is able to get (1) behaviors, (2) object names from the cameras port 8592. Visit LILIN AI SDK for more details.



Appendix: Recommended Camera Installation

Bad camera installation	Defect	Suggestion
	1. Illumination is not enough. 2. Number plate is too small. 3. Field of view is too wide. 	1. Increase the illumination: Add infrared illuminators. 2. Number plate too small: Change position of the camera. 3. Zoom in the camera.
	1. Field of view is too wide. 2. Camera faces the headlight. 	1. Increase the illumination: Add infrared illuminators. 2. Zoom in the camera.
	1. Field of view is too wide. 2. Camera facing the headlight 3. Unfocused 	1. Zoom in the camera. 2. Move the camera closer to the gate. 3. Adjust focus.
	1. Shutter speed too slow 	1. Increase shutter speed at night mode.
	1. Camera over exposure	1. One lane per camera

Good camera installation	Application
	Parking lot camera installation
	One lane camera installation
	Two lanes camera installation
	White light lighting installation.
	Two lanes street light installation
	Enhancing light with IR.

Aida Power Performance Requirement

Edge AI	Recognitions / Ch / Sec
License plate recognition (LPR), 2 AI weights	6 recognitions / Sec
LPR + Objects, 3 AI weights	5 recognitions / Sec
LPR + Objects + Car make, 4 AI weights	3 recognitions / Sec
Objects, 1 AI weight	8 recognitions / Sec