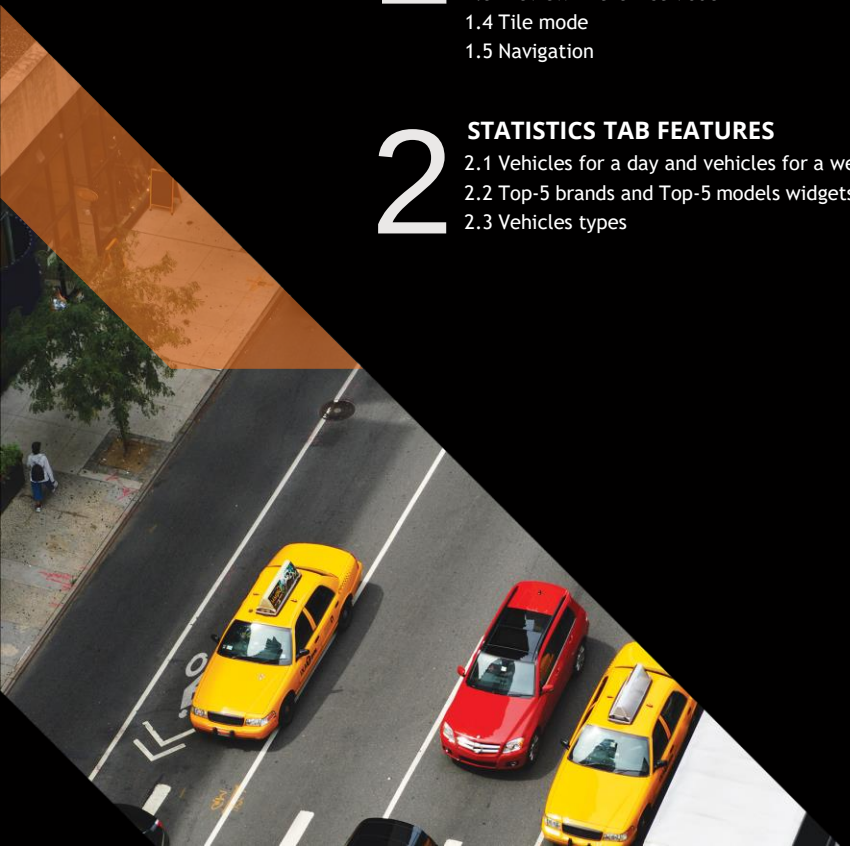
Hanwha Vision

Wisenet RoadAI application
USER GUIDE

CONTENTS



INTRO

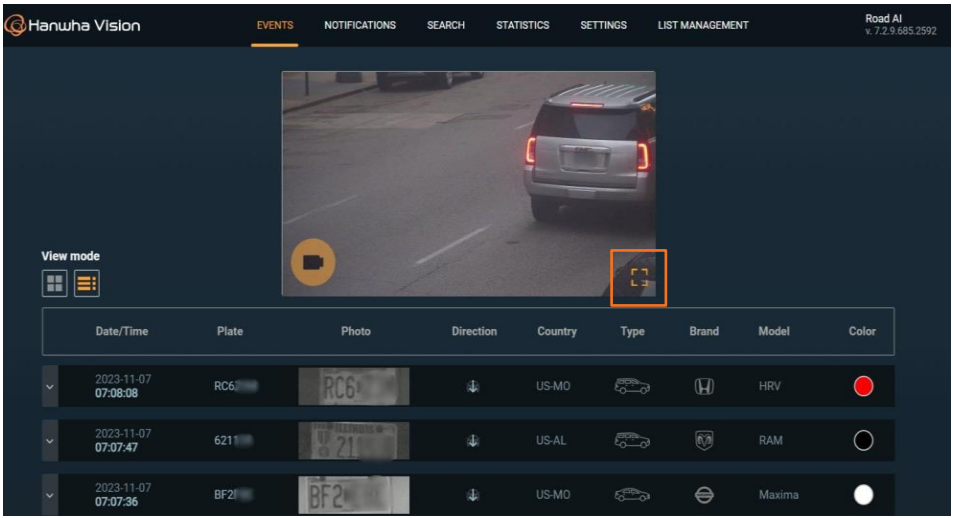
This document contains tips and recommendations on how to use Wisenet Road AI application running on Hanwha AI cameras.

This document describes the following application sections:

- Live view of the recognitions in the **Events** tab.
- Work with the **Notifications**.
- Look for the stored events in the **Search** tab.
- Review historical data in the **Statistics** tab.
- Configure the application in the **Settings** tab.
- Manage the black and white lists in the **List Management** tab.

1 EVENTS TAB FEATURES

1.1 Full Screen Mode / Window Mode

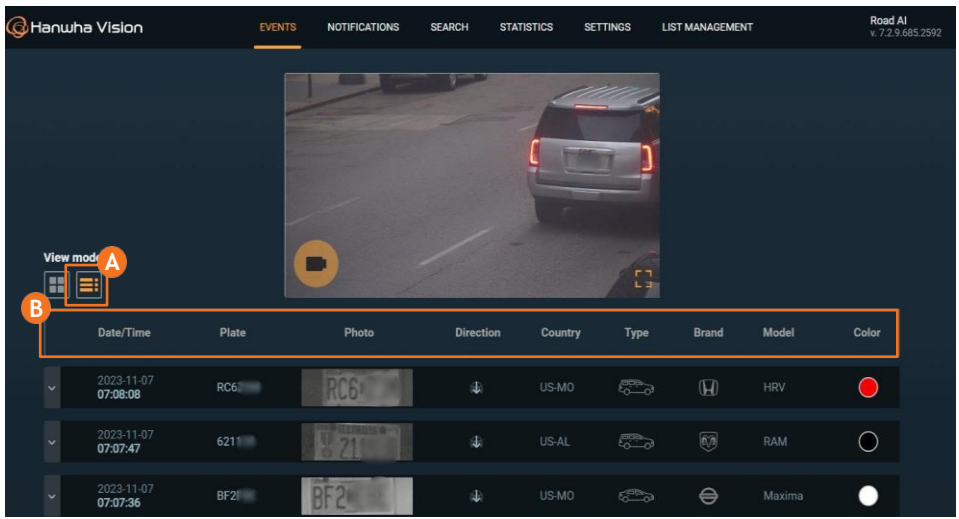


Full-screen mode allows using the entire screen area.

To view the live image from the camera in full screen mode, click the full screen mode icon.

To exit full screen mode, click anywhere on the screen.

1.2 List Mode

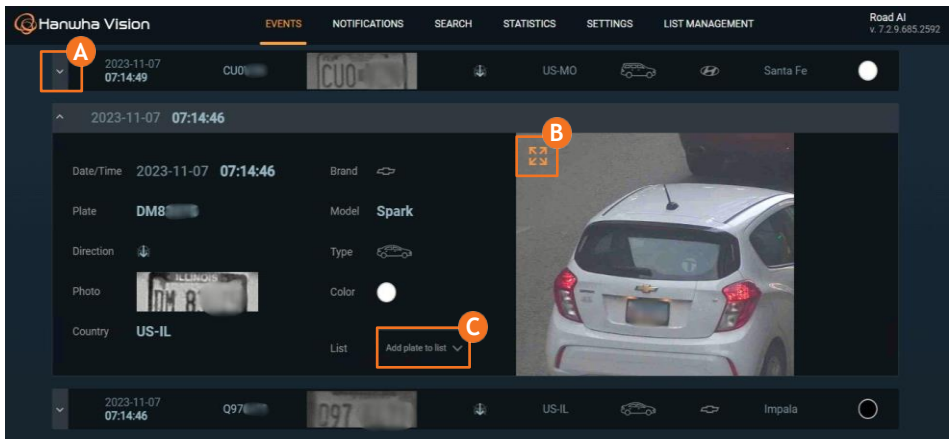


To enable the list display of events, click the A corresponding button. Event parameters B such as **Date/Time**, **Plate**, **Photo**, **Direction***, **Country**, **Type**, **Brand**, **Model** and **Color** are displayed as a table. The events are displayed in a list from the newest to the oldest.

After hovering the cursor over the **Country**, **Type**, and **Brand** fields, a hint with the field value pops up.

* Available in **High Performance mode** only

1.3 Preview in the List Mode

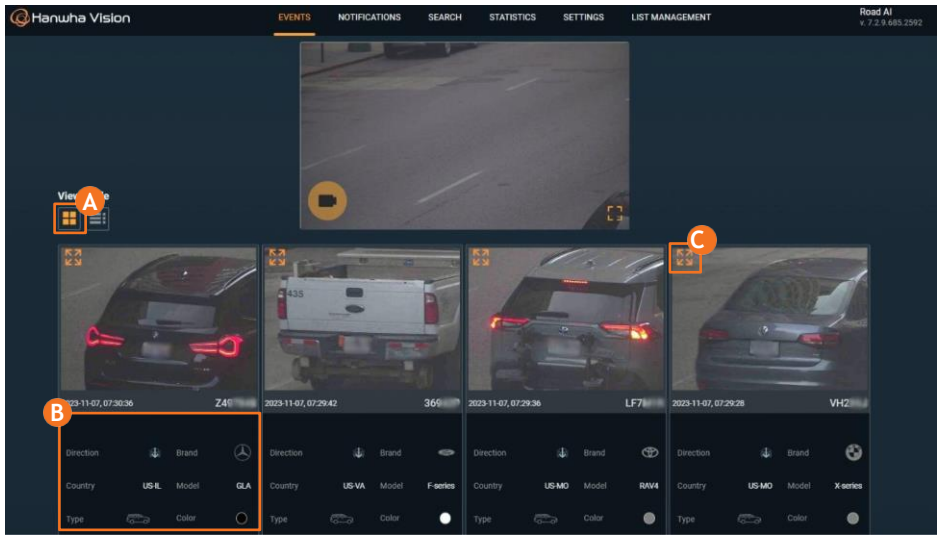


A To display full event data in the List mode, expand the selected event data.

This menu allows **viewing images in full screen mode** (click the **B** icon in the left upper corner of the preview), and **C adding or removing the selected plate number** to/from the white or black list.

The display of the new events will be paused until the list is collapsed. After collapsing, the list will be updated with the past events. If the list isn't collapsed manually, it will be collapsed and updated automatically in one minute.

1.4 Tile mode



To activate the display of the events as tiles, click A button. In this mode events and their parameters (**Date/Time, Plate, Direction*, Photo, Country, Type, Brand, Model** and **Color**) are displayed in tiles.

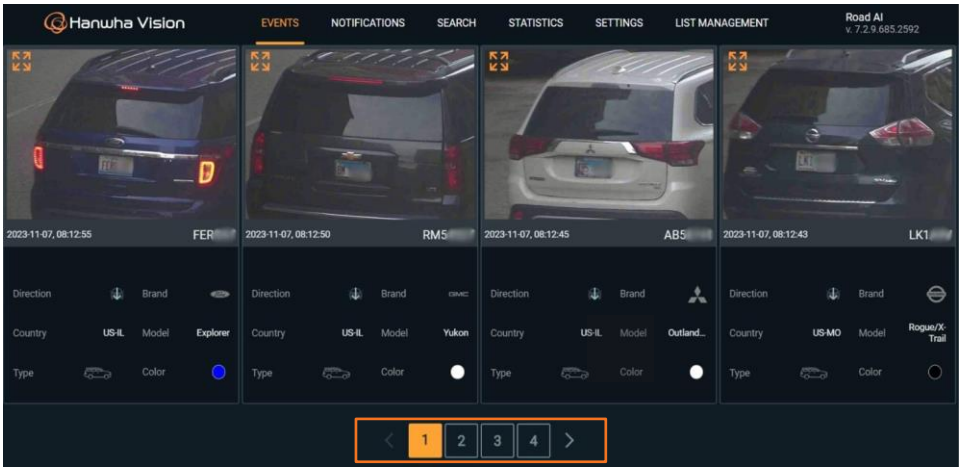
After hovering the cursor over the B **Country**, **Type** and **Brand** fields, a hint with the field value pops up.

This menu allows **viewing images in full screen mode** (click the C icon in the right bottom corner of the preview).

NOTE: ***Adding/removing the selected plate number*** *to/from the white or black list is only available in the list mode.*

* Available in **High Performance mode** only

1.5 Navigation

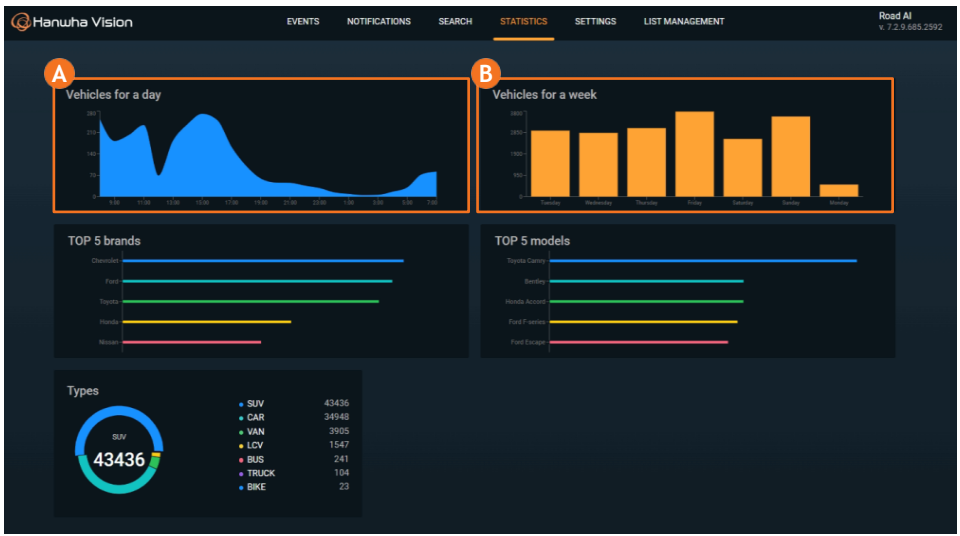


You can navigate through the events tab using left and right arrows or page buttons below the events list.

The events are displayed from the newest ones to the oldest ones.

2 STATISTICS TAB FEATURES

2.1 Vehicles for a day and vehicles for a week widgets



In the **Statistics** tab you can find dashboard with visualized statistics on different parameters.

A The **Vehicles widget** displays the statistics on the number of cars registered for the last 24 hours. Moving the cursor over a certain place on the widget, you can see the number of cars for the specified hour.

B The **Vehicles for a week widget** displays the statistics on the number of cars registered for the last week. Moving the cursor over a certain date on the widget, you can see the number of cars for the specified 24 hours.

Up to 100,000 latest cars are taken into account due to the limitation of the database size.

2.2 Top-5 brands, models and vehicle types widgets

A The **Top-5 brands widget** displays the car brands statistics.

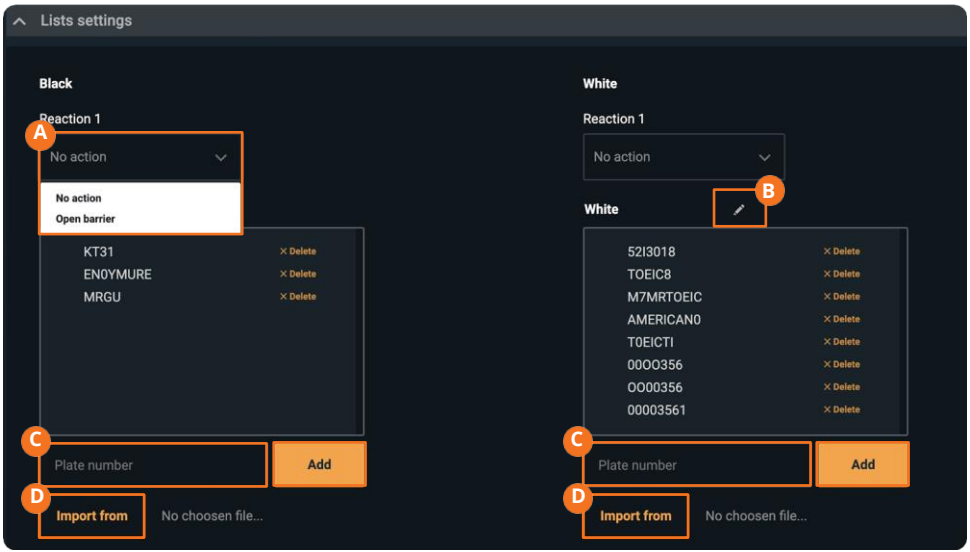
B The **Top-5 models widget** displays the car models statistics.

C The **Types widget** displays the vehicle types statistics.

Up to 100,000 latest cars are taken into account due to the limitation of the database size.

3 LIST MANAGEMENT TAB FEATURES

3.1 Black and white list management



In the **List settings** section you can set reactions to events from the white and black list.

A To select a reaction, open the drop-down list. Two options are available: **No action** and **Open barrier**.

You can edit the title of the Black / White list by clicking B **Edit** icon on the top of the list.

C To add an item to the list, enter a number and then click the **Add** button.

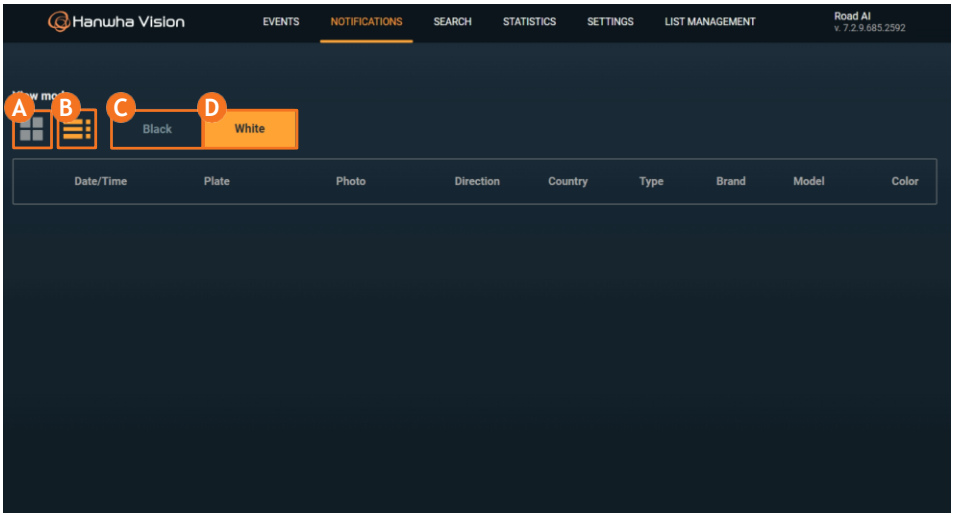
D Import the list in the .csv format

You can also add plate numbers to the white or black list from the expanded List menu in the Events tab.

NOTE: You may add up to 2000 plate numbers per list. Make sure there are no duplicated plate numbers in the imported list.

4 NOTIFICATIONS TAB FEATURES

4.1 Notifications feature



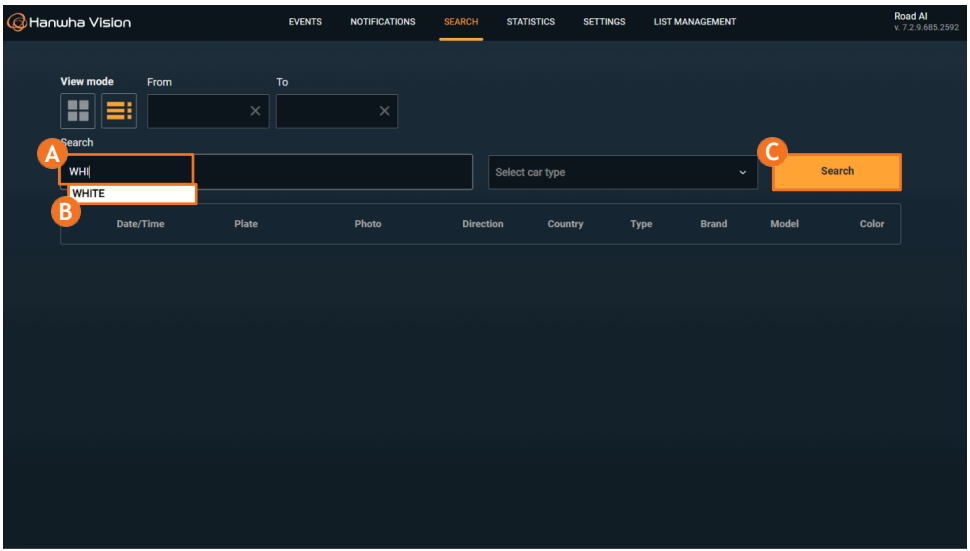
The **Notifications** tab allows to see the registered license plate numbers that were added either to the white or black list.

You can choose the display mode: Tile mode (A), List mode (B), similar to the Events tab.

You can switch between Black and White lists is using corresponding buttons (C, D).

5 SEARCH TAB FEATURES

5.1 Search by plate and color

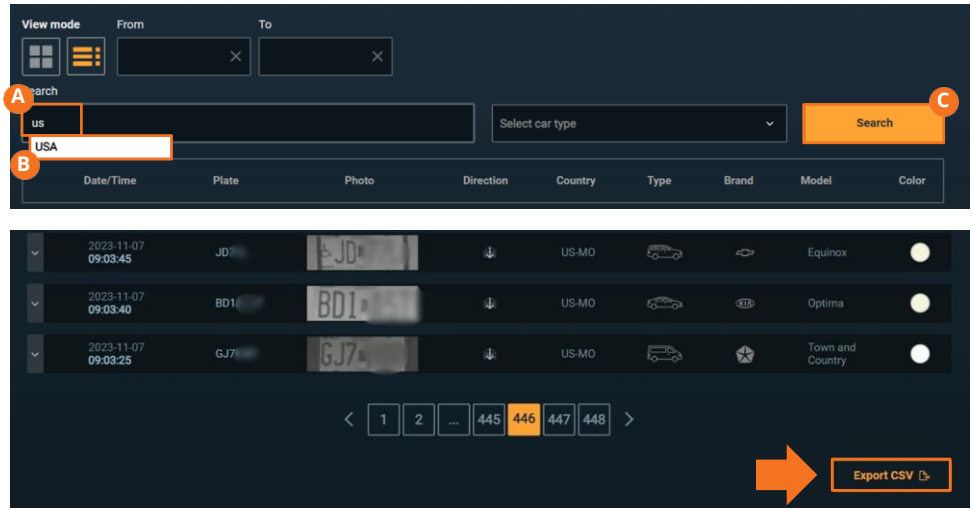


The **Search** tab allows searching by plate, country, make, model, color, date, car type and a combination of these criteria.

A **To search by color**, start entering the first letters. B Then select the desired color from the list and click C Search button.

You can search by partial plate number or any characters present on the plate.

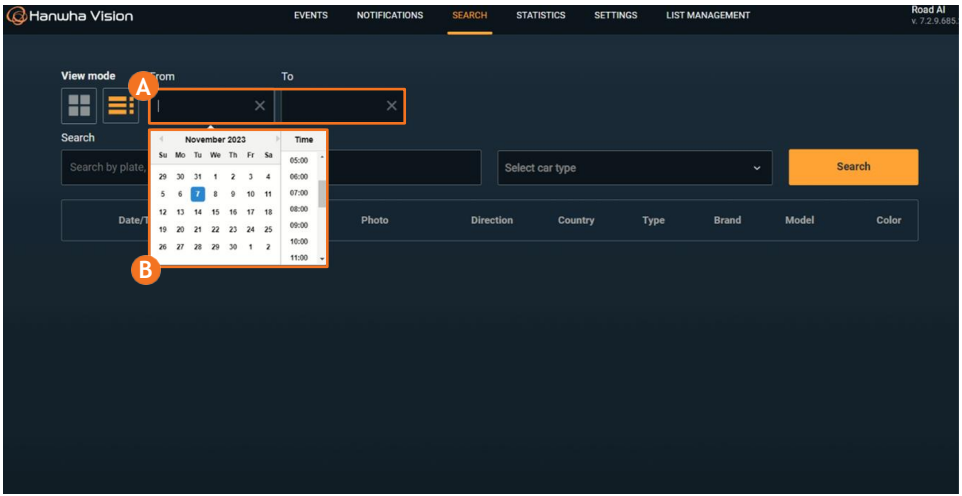
5.2 Search by country, make and model



A **To search by Country**, **Brand** or **Model**, start entering the first letters. **B** After that select the desired country, brand or model from the list and click **C** Search button.

Search results can be exported by clicking **Export CSV** button.

5.3 Search by date and date range



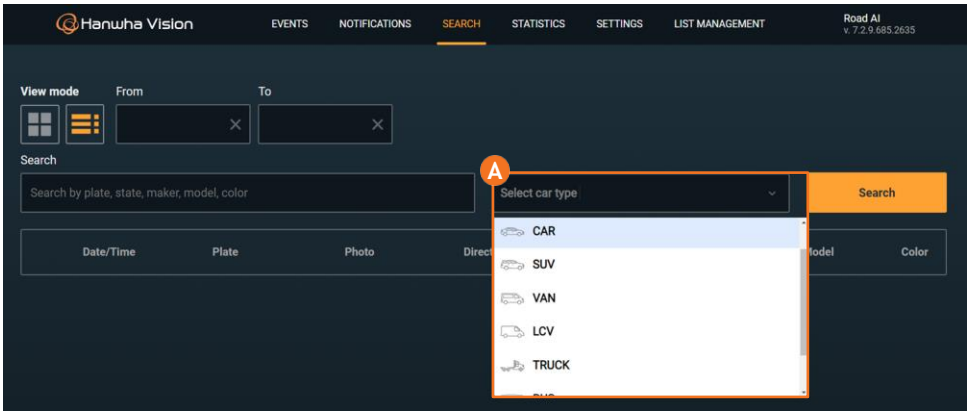
To search by date, A click **From** or **To** box and B select the start or end date of the search.

You can search the events within a date range. You can also combine search by date with search by license plate and other parameters.

The depth of the search results database is 100,000 events.

NOTE: In RAM mode, the event images are being stored in the camera memory for the optimized performance, so images for the latest 300~500 events would be available for the review.
We strongly recommend to set up the integration with the VMS to store all the events images history.

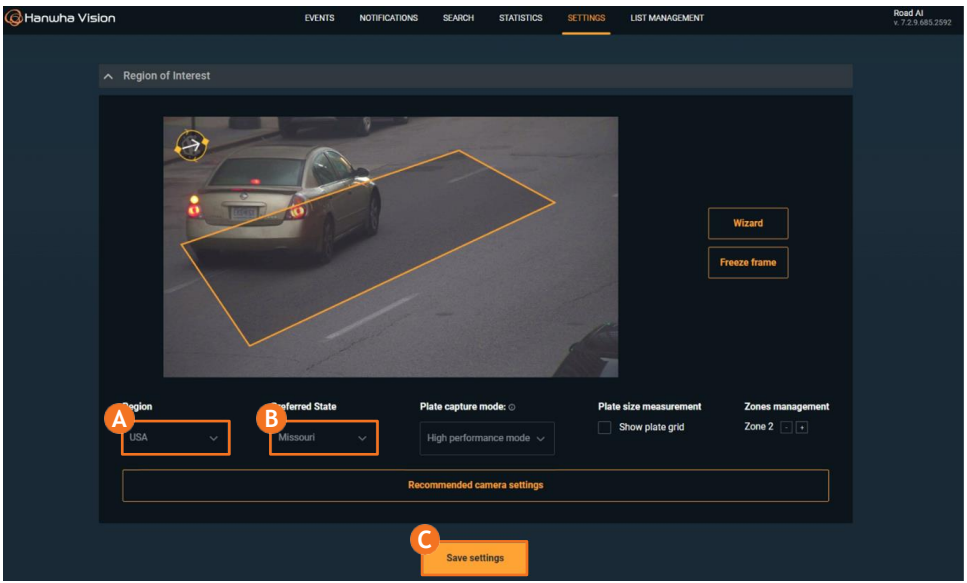
5.4 Search by car type



To search by car type, A click the tab to choose vehicle type. You can select multiple types to display results.

6 SETTINGS TAB FEATURES

6.1 Setting up Wisenet Road AI



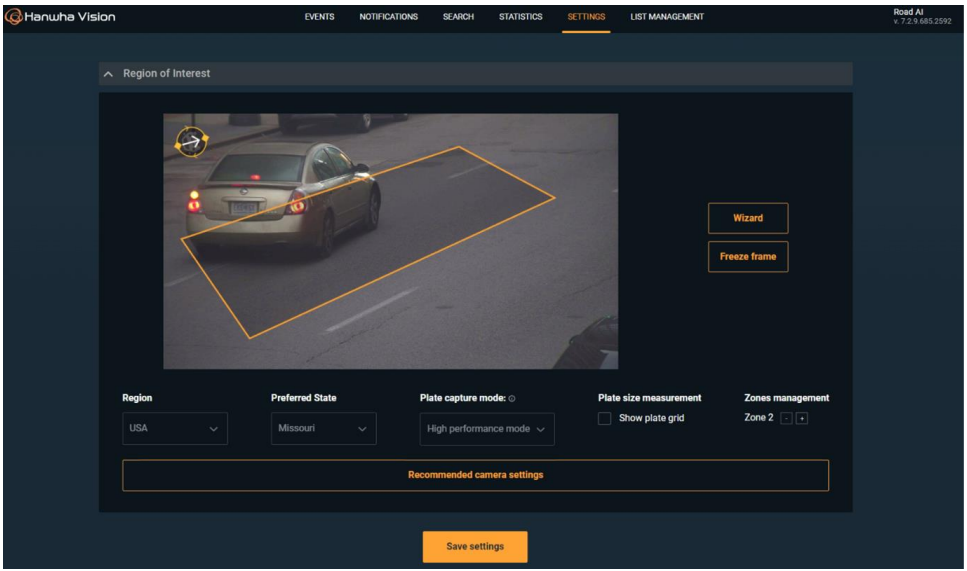
Ⓐ First, choose the **Region**.

1) Choose the correct region that matches your country/region (Europe is set by default).

For Europe/US region specify Ⓑ the **Preferred country/state** to improve the ANPR accuracy.

1) Save the settings. Click Ⓒ **Save settings**. The application will restart for the selected region to take effect. After clicking Reload, wait for several seconds and reload the browser page.

6.1 Setting up Wisenet Road AI (continued)

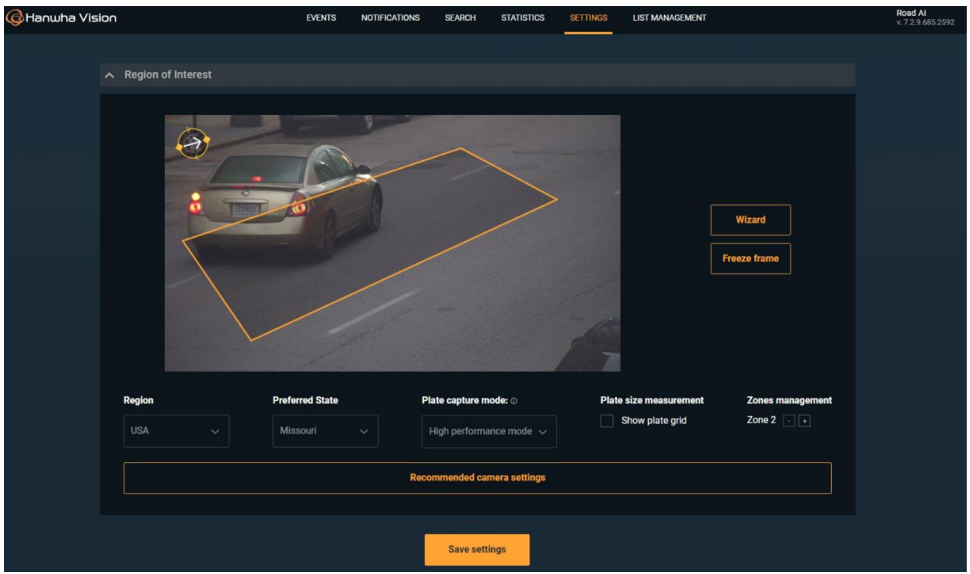


Set up the **Region of Interest** (ROI), a zone that frames the recognition zone.

Keep it tight to assure the best performance of the application.

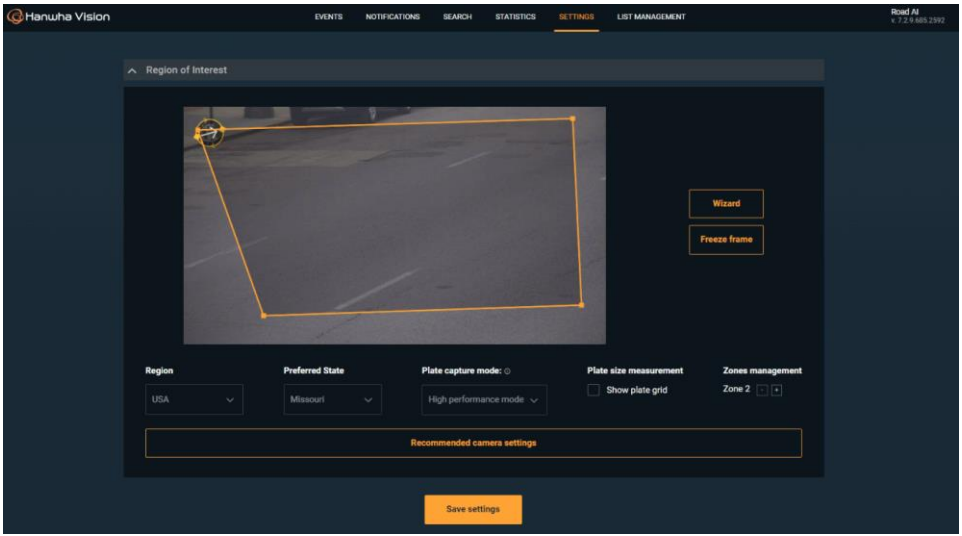
Please set the upper border of the recognition zone further from the edge of the frame. This allows vehicle being fully visible during detection and improves ANPR and MMR performance.

6.1 Setting up Wisenet Road AI (continued)



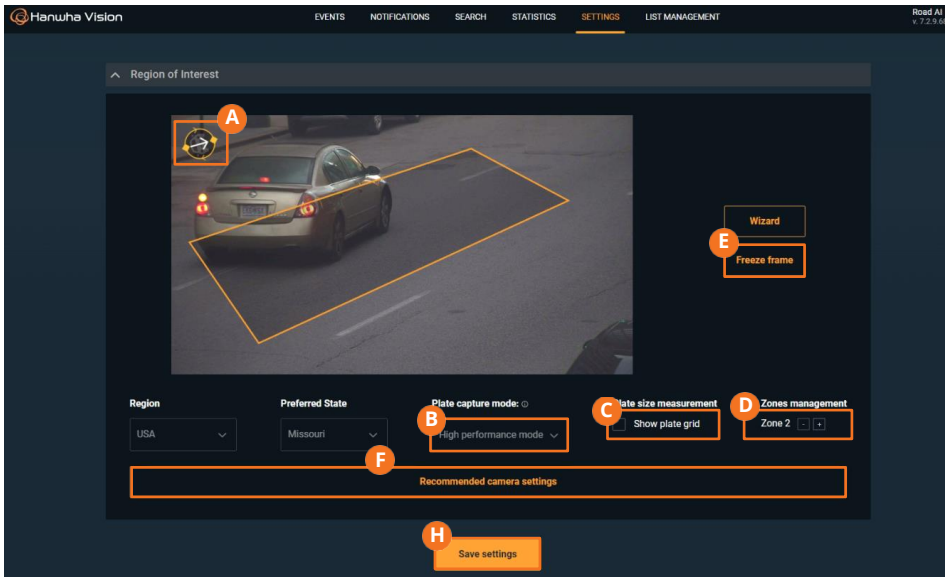
Example of correctly configured **Region Of Interest** (ROI).

6.1 Setting up Wisenet Road AI (continued)



Example of incorrectly configured **Region of Interest** (ROI).

6.1 Setting up Wisenet Road AI (continued)



A Set the **vehicle direction***: align the arrow in parallel to the vehicle direction vector, pointing the arrow towards the chosen standard vehicle direction.

B Select the Plate capture mode:
Low speed mode with 4K resolution.
High Performance mode with Full HD resolution.

C Show/hide the Plate size measurement tool.

D Add License Plate Recognition Zone.

E Freeze frame button.

F Apply the **Recommended camera settings**.

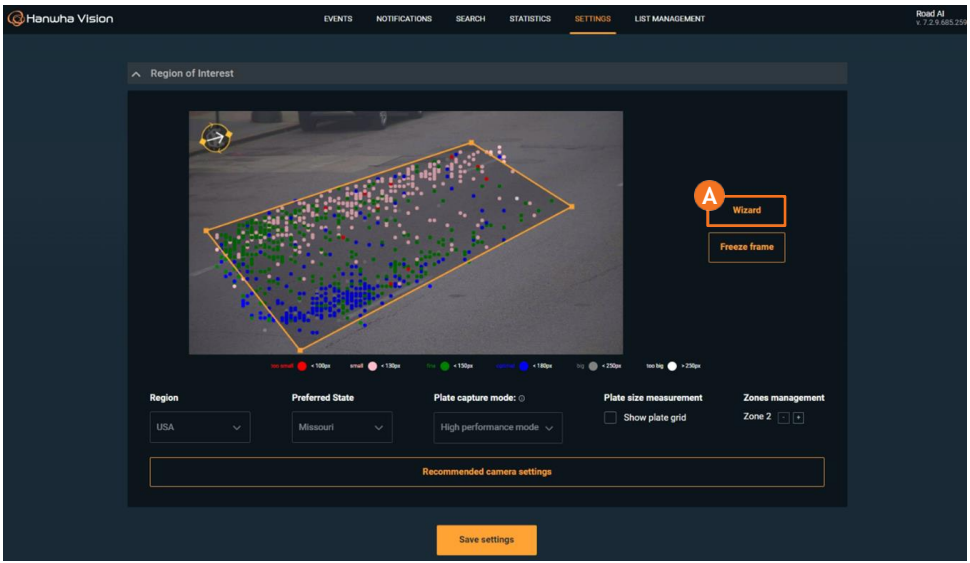
H Click **Save settings**.

*NOTE: The **Recommended camera settings** are a starting point for the camera setup. Please, adjust the settings up to your installation conditions.*

*Make sure the number plates are **well visible** both in **day and night**.*

* *Available in **High Performance mode only***

6.1 Setting up Wisenet Road AI (continued)



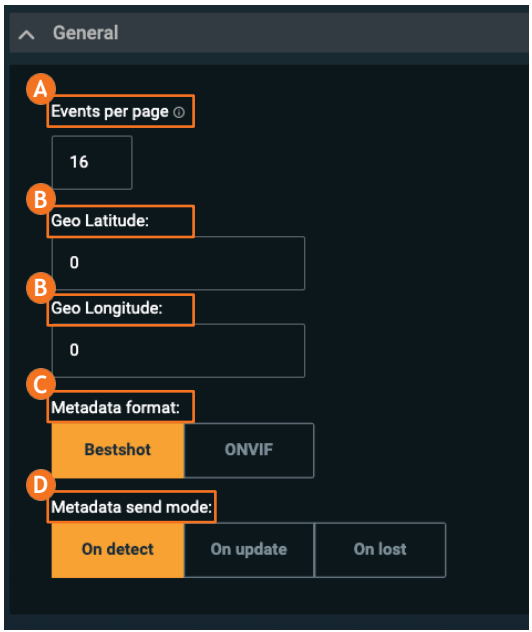
A **Wizard** tool displays the statistic on location and sizes of the latest **1,000** recognized plates.

Use it to adjust the camera zoom and the recognition zone.

Try to keep plates in **green** and **blue** range.

At least **100** plates should be registered to display the data.

6.2 General Settings



A In the Events settings, you can change the number of events displayed on a page (16 by default).

Changing this parameter will lead to changes in the **Events**, **Notifications** and **Search** tabs.

Event quantity per page should be between **8** to **100**.

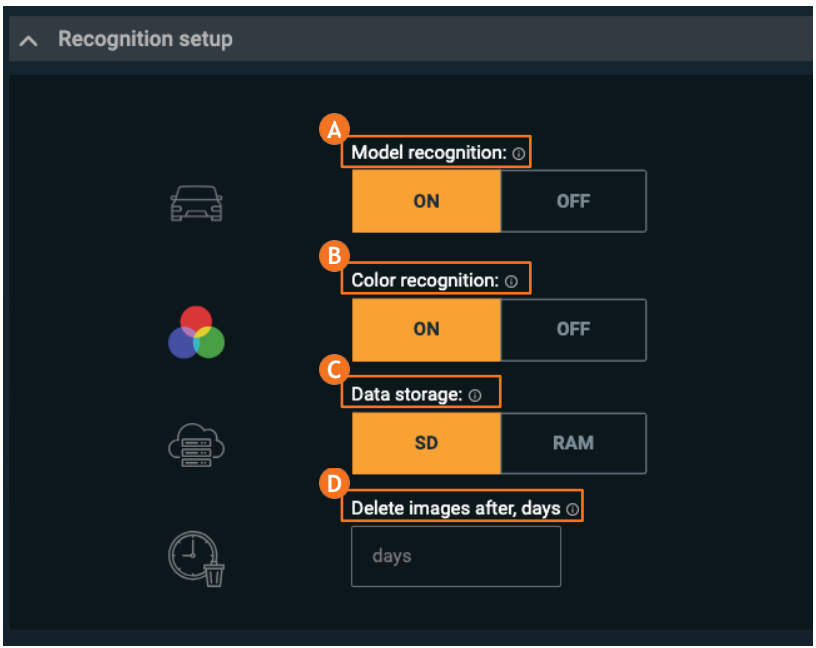
***NOTE**: The app will be restarted automatically after saving the settings.*

B You can indicate the camera location coordinates.

C RoadAI application always sends metadata when operating. Metadata in Bestshot or ONVIF format is supported.

D You can specify moment of sending the metadata (see p.42).

6.3 Recognition Setup



A B You can enable/disable **model recognition** and **color recognition** features in the app.

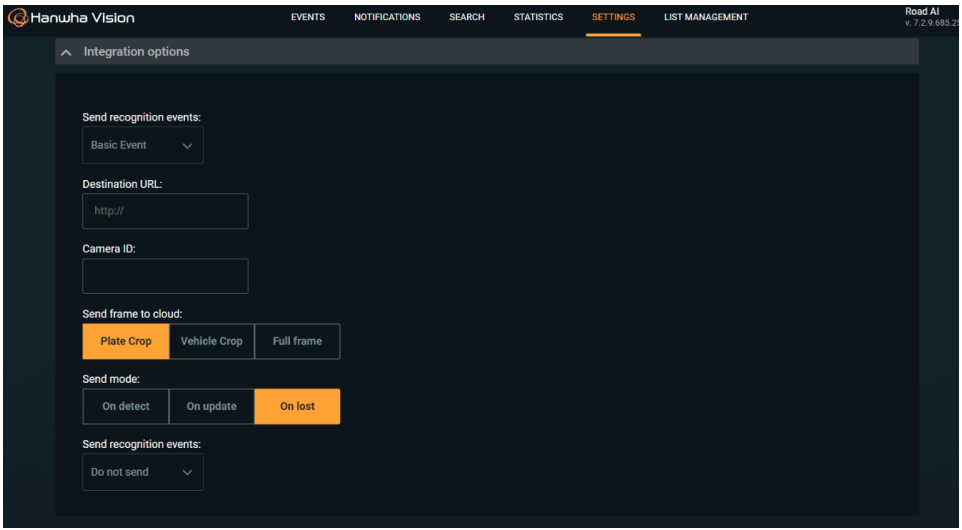
C RoadAI supports two modes of storing images:
SD card - a conventional mode, images are being overwritten when the SD card capacity is exhausted.
RAM - assures productivity with installations with high intensity traffic. Only images for the latest 300-500 events would be available for the review.

Please set up the integration with the data management system to store all the events images history.

After switching the file mode from SD to RAM, images for the previous events will not be seen. When back to SD mode, the images for the previous events written to SD mode become accessible for the events that are still in the database.

D You can limit on-camera events storage in time. The events and images will be deleted for those images older than the specified period (in days). To turn off the feature, indicate the 0 value.

6.4 Integration options

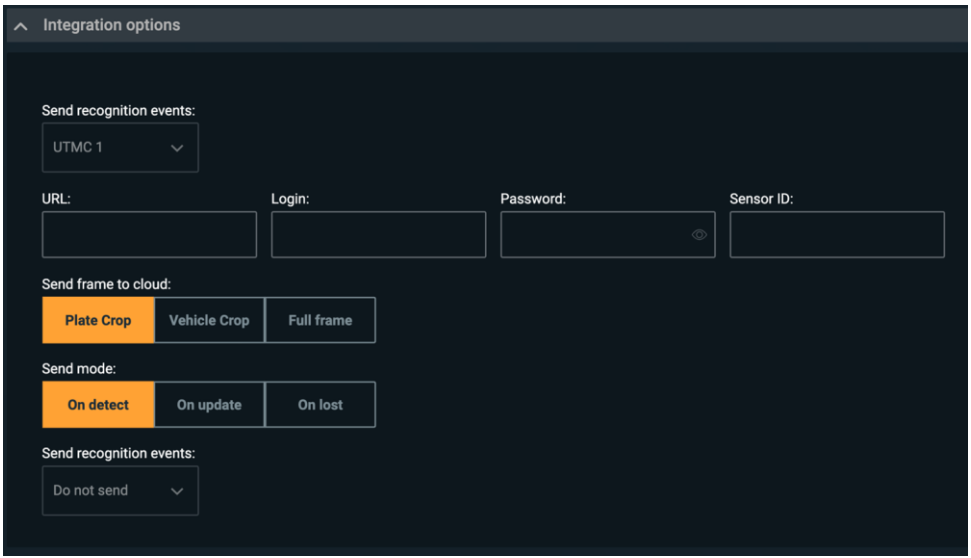


In the **Integration options** section, you can set up to two different integrations.

Available options are:
Basic Event (JSON over HTTP)

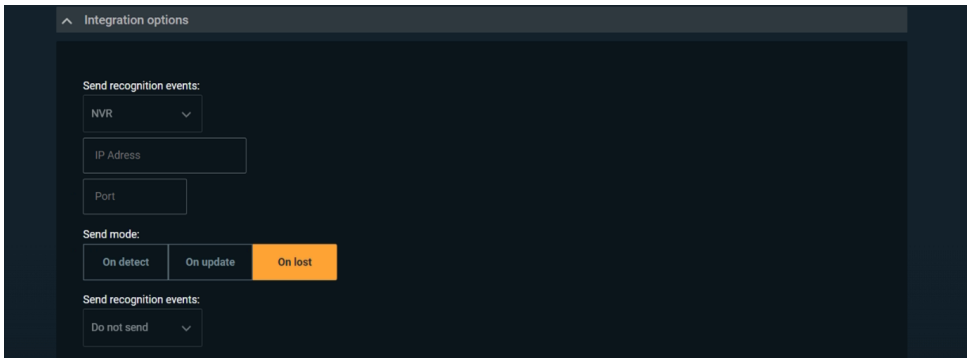
NOTE: *Learn more about On detect, On update and On lost settings on p.43.*

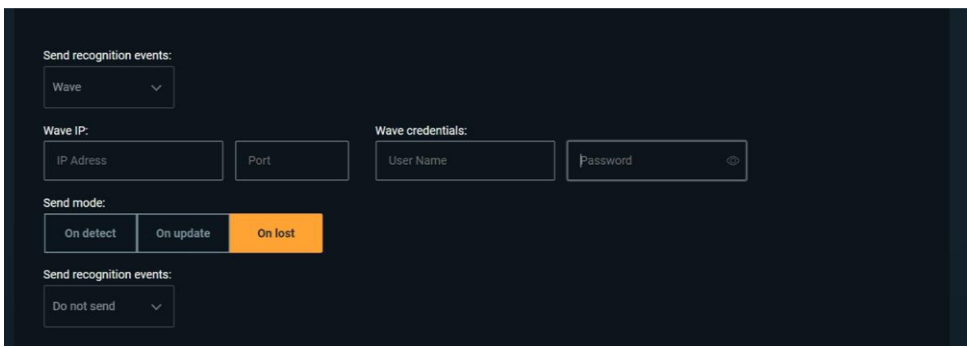
6.4 Integration options (continued)



UTMC 1 and UTMC 2

6.4 Integration options (continued)





NVR

On the NVR side, you need to configure the events to be received properly.

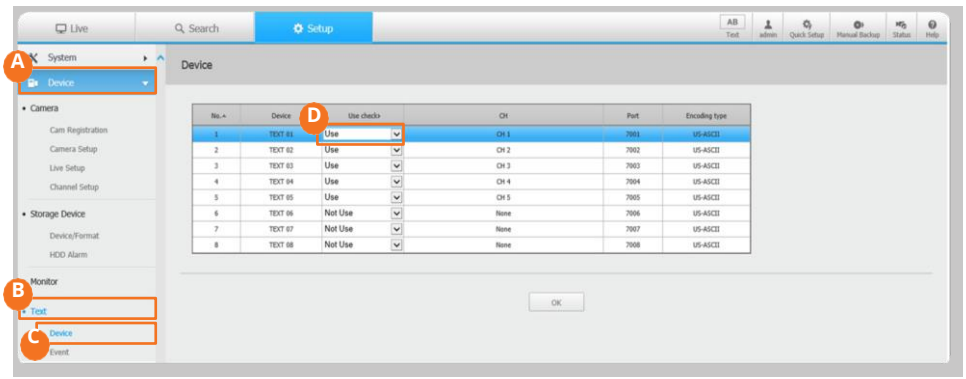
Refer to the additional guide on page 25 on the supported options and commands.

Wave

Configuring this will get you only the generic events in the Wave server. For full integration in to Wave with the metadata, use the Wave version that supports the full meta data.

NOTE: *To ensure the correct integration, fill in all the fields requested for selected option and save the changes.*

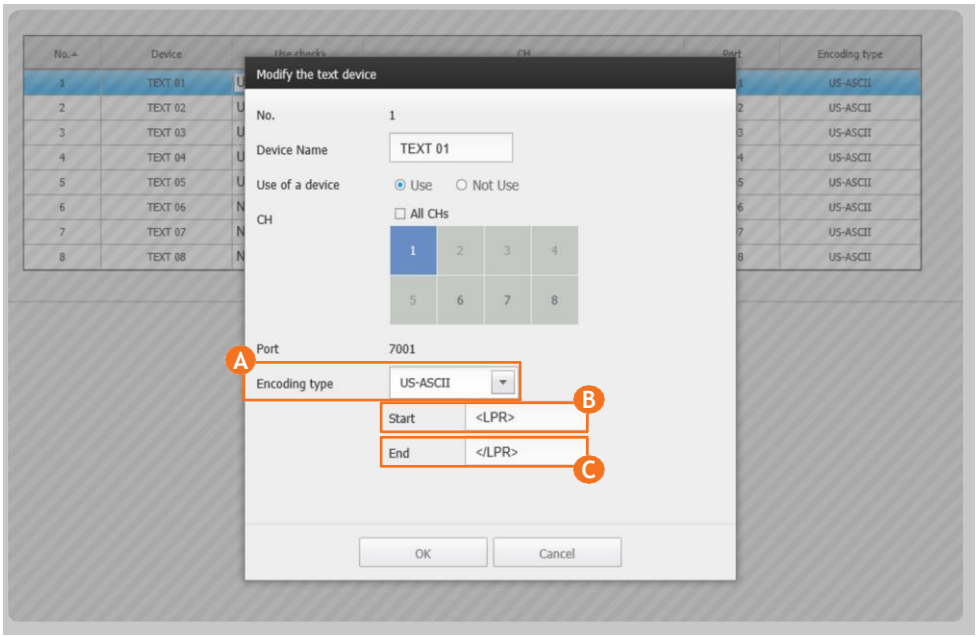
6.4 Integration options (continued)



Check the NVR settings to obtain corresponding Port number in **A Device**; **B** Text ; **C** Device setting (by default port 7001 for CH 1, 7002 for CH 2, etc.)

Set **D** Use per channels as appropriate.

6.4 Integration options (continued)



Click the channel row to open channel settings.

Set

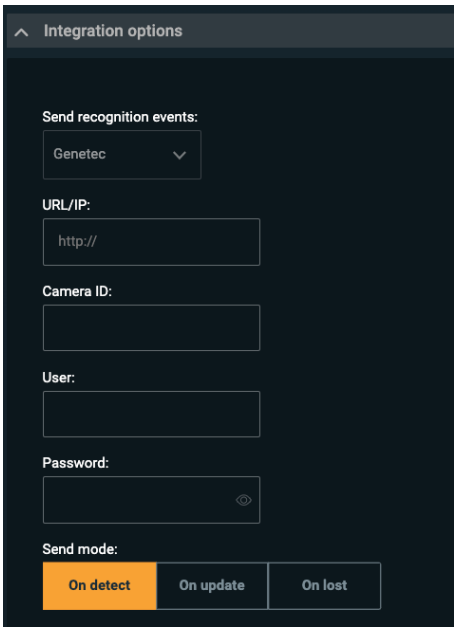
A Encoding type : **US-ASCII**

B Start string : **<LPR>**

C End string : **</LPR>**

NOTE: *NVR may not show LPR events if there is no video stream bound to the same channel.*

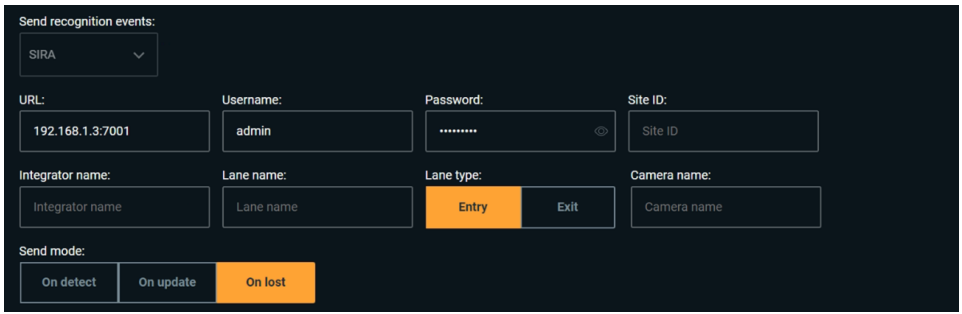
6.4 Integration options (continued)



Genetec

RoadAI supports integration with Genetec AutoVu plugin.

6.4 Integration options (continued)



SIRA*

ADMCC*

***NOTE**: Available only in GCC region.*

6.5 SD card and Backup

A **SD card status**

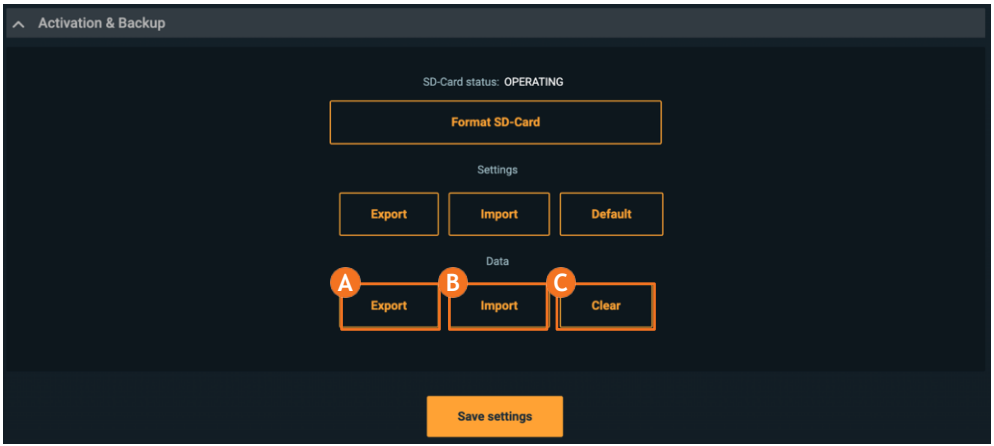
B **SD card formatting** option

Please keep in mind it will result in losing images in SD storage mode. Perform this action **only if necessary.** Formatting SD-card may take **few minutes** and will force the app to restart automatically.

C **Export**/**Import** buttons allow storing current configuration for later re-use.

D You can load default settings. RoadAI restarts afterwards.

6.6 DB Export & Import



Select A to export the database (DB) on device.

It is highly recommended to export DB after all of settings have been saved.

Select B to import DB and specify the file for importing. RoadAI restarts afterwards.

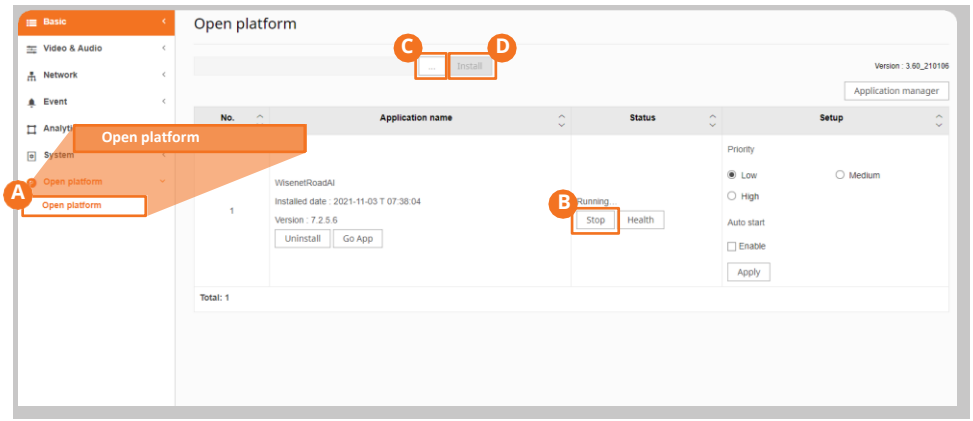
Select C to clear DB. RoadAI restarts afterwards.

NOTE: *Please be aware that database does not contain event images.*

Please, do not edit the database file manually, as it will be corrupted.

6.7 Updating the App

To update the App, go to the camera web viewer.



A Go to **Open platform** section in camera web viewer.

B Click **Stop** box to stop Wisenet Road AI App **It is very important process to stop App before updating App**.

C Click **"...."** box to select App file to update.

D Click **Install** box to update the App.

TROUBLESHOOTING

How to install the application

You will have Wisenet Road AI application pre-installed. In case you need to manually install or update the app, you may find it at the Hanwha Vision website.

If you are upgrading the existing application, it is recommended to stop the app before installing the newer version. Check the compatible firmware version and upgrade the camera if necessary. Make sure your camera model is supported: PNO-A9081RLP, PNV-A9081RLP, PNB-A9001LP, PNO-A9311RLP

Please keep in mind that the latest firmware version support could come in some time, so do not rush to upgrade the camera without confirmation of compatibility.

Application restarts from time to time - is that normal?

Both your camera and the application have protective mechanisms to avoid crashes and stalling. Those watchdogs could restart the application. Please contact the support if the situation happens too often.

Check that built-in video-analytics is disabled, as it consumes the camera resources and affects application performance; micro SD card health; camera's firmware version is compatible.

Do I need a micro SD-card?

The micro SD-card is needed to store the images of the events. Also, it is mandatory to have micro SD-card installed and operating to send data via HTTP(s) integration and store the application logs.

Your camera have an micro SD-card (32Gb) pre-inserted. In case you need to change it, please select a compatible option (32Gb at least, class 10, U3).

TROUBLESHOOTING (CONTINUED)

● **I do not see event images in the application**

Please check the following:

- Micro SD-card is inserted in the camera
- Micro SD-card status is OPERATING in the Settings tab
- Micro SD-card is class 10 and above

Try to restart the camera to re-initialize the microSD-card if all the above is OK.

● **How to obtain logs?**

In some cases additional information needed to check the issues with the application. There are two types of logs: 1) in-camera, 2) in-application ones.

In-camera logs are accessible through camera configuration in System>Log section.

In-application logs could be downloaded via your browser by following the addresses below.

Keep in mind that micro SD-card is needed to store and download logs.

TROUBLESHOOTING (CONTINUED)

- **How to obtain logs? (continued)**

  Accessing camera logs:
  http://<CameraIP>/home/setup/opensdk/html/WisenetRoadAI/logs/AppLog.log
  Turning on the app logs Ctrl+Alt+Shift+7
  Turning off the app logs Ctrl+Alt+Shift+1
  High-level log:
  http://<CameraIP>/home/setup/opensdk/html/WisenetRoadAI/logs/AppErrors.log

  Useful links to check application status:
  http://<CameraIP>/home/setup/opensdk/apps/WisenetRoadAI/AppConfig.json
  The application configuration is stored here
  http://<CameraIP>/stw-cgi/opensdk.cgi?msubmenu=metaframeschema&action=view
  Check the latest integration event
  http://<CameraIP>/home/setup/opensdk/html/WisenetRoadAI/metadata.log
  Check the latest integration event
  http://<CameraIP>/home/setup/opensdk/html/WisenetRoadAI/lschema.log
  Check if integration with VMS (SSM, Milestone, Genetec) is enabled
  http://<CameraIP>/stw-cgi/debugcgi?msubmenu=data&action=view
  Check internal camera debug information

- **How can I delete all Number Plates from the SD Card to have an empty database?**

  You can format the micro SD-card after removing it from a camera. That will remove stored images without removing the events from the database. Also, you can import an empty database in the Settings tab to clear it.

TROUBLESHOOTING (CONTINUED)

- **How many events can be stored?**
  The application stores up to 100,000 events in the camera. You can store more events by saving them on the back-end side via different integration types available.

- **Bad recognition at night. How to fix that?**

  This might be result of:

  1. Improper focusing. Consider that the area with sharp details varies during daytime and nighttime. You can even configure two setups for day and night recognition with different focus.
  2. AGC (automatic gain control) is set to Normal or High, which results in noise and affects recognition performance.
  3. Shutter speed is low (slower than recommended minimum 1/700)
  4. IR power is not configured properly (either a vehicle is too far and IR does not illuminate enough, or is too close that plates are over-exposed; also the closer the plate to the frame borders, the stronger is a vignette effect). Consider using external IR for longer distances or higher vehicle speeds.
  5. Camera does not switch to the B/W mode during nighttime, as in case of high illumination it can stay in Color mode, but the conditions would be poor for plates reading and IR would not affect the image.
  6. Application does not perform Make, Model and Color recognition at night. This is normal. With the help of IR, it can only read the plate numbers. Occasionally it gives the make and model but it may not be the exact match due to poor lighting conditions.

TROUBLESHOOTING (CONTINUED)

Do I need to activate the application after installation?

You do not need to activate the application in any way - you can install it on any of the supported camera models and use it right away.

Application does not recognize licence plates, vehicle models

Check if the application is installed. Follow the installation guides to configure the whole setup properly.
Check if application is running.
Check the image requirements in case you have a video in a preview, but do not have recognition.
Make sure your browser is supported.
Use Plate Size checker and Freeze Frame tools in the settings tab to check if the plate size, tilt angle, positioning are valid. Adjust the plate size with the camera zoom.

Make sure to start the application and opt-in the “Enable Auto Start” setting.

If you go in to the Wisenet Road AI app without actually starting the app, you only get a dark screen with the logo.

Image requirements

Plates should fit the following restrictions for better recognition :

- Clearly visible and readable by human
- Plate tilt angle is less than 5˚
- Plate width should be in range of 130-350 pixels on a frame
- Plate vertical and horizontal angles are less than 30˚

Check the Installation Guide for details.

TROUBLESHOOTING (CONTINUED)

- **Recommended browsers**
  We recommend using Chrome, Firefox, Safari. Check the details in the Installation Guide, section Camera Settings > Important note on web browsers

- **False recognitions: grass / asphalt / textures detected**
  1. Configure the Region of Interest in the Settings tab to avoid appearance of unnecessary texture and limit it only to plates appearance zone.
  2. Use manual focusing in camera settings and adjust focus to provide a sharp picture of license plates in the area they appear.

- **False recognition: low picture quality**
  Try improving picture quality through camera settings: sharpness, focus, exposure

- **False recognition: small objects detected**
  Change Region of Interest in the Settings tab to avoid detecting small plates. Use zoom or in-app resolution to adjust.

- **Can't see video in browser**
  1. Check whether you use supported browser if you are in the same network with camera.
  2. Port 6162 from camera should be forwarded through router to view video from remote network.

- **Recommended Settings do not apply**
  Some of the camera settings are interconnected. Try to reset Video settings to default and use Recommended Settings button, or just follow the Installation Guide to set the camera manually.

TROUBLESHOOTING (CONTINUED)

- **Region selection, resolution selection does not apply**
  Changing region and resolution will apply to GUI firstly. You need to restart the application in the Open Platform section of camera setting to fully apply changes.

- **How can I integrate with Milestone/Genetec**
  Please use Hanwha Vision AI plug-ins for your VMS to obtain vehicle recognition events from Wisenet RoadAI. No additional settings needed on the application side.

- **What happens if I reset the camera**
  You will not lose the application setup or data if you reset camera keeping Network & OpenPlatform parameters. Otherwise, the application will be removed with only event images stored on the SD-card. The only way to obtain images is to remove card from the camera in that case.

- We strongly recommend exporting application settings and database in the Settings tab prior reset or application reinstallation/update.
  If you hard reset the camera through the physical reset button, you have to re-install the application.

TROUBLESHOOTING (CONTINUED)

What is On detect, On update, and On lost

When Wisenet Road AI performs recognition of a vehicle, it actually performs several recognitions, tracking the vehicle path through the time, and refining the number plate recognition result.

There are three milestones of the vehicle recognition:
New - first detected event
Update - second detected event, issued if the country, license plate text, or a vehicle direction has been refined
Lost - last detected event of a given vehicle in the camera view.

During each recognition cycle, Wisenet Road AI refines the recognition result. On detect - is the fastest way to get the recognition results, with On lost setting the recognition result would be the most refined.

There are three milestones of the vehicle recognition:
On detect - only *New* events are being sent
On update - both new and updated events would be sent
On lost - only the latest registered update (or new if there were not updates) event would be sent.

For more information visit us at

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