

# **VPAR SERVER**

User manual



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## Introduction

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VPAR SERVER is designed as a multiplatform license plate recognition server.

Its basic function is to recognize license plates from the images provided by the cameras and notify these.

The image capturing protocols supported to date are:

- RTSP
- GigeVision
- JPG
- MOTION JPEG (MJPEG)
- DIRECTSHOW
- AVI
- Image directory.
- Video directory.
- UEye IDS
- Milestone
- PointGrey

However, other protocols can be integrated on demand.

Initially the maximum number of cameras that may be connected to a single server is 16, although this limitation simply relates to the current processing capacity of the hardware.

The management of more than 16 cameras takes place through the use of various servers that work as a single solution.

## Architecture

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The system consists of

- Recognition server(s).
- "VPAR SERVER" software for each server.
- License for use for N cameras for the VPAR SERVER software.
- Sql Server/Sql Server Express database.
- N cameras connected through TCP/IP or DIRECTSHOW (USB, etc.) to the recognition server(s).

## Scenarios

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There are three different scenarios in which we may want to recognize license plates:

- STOP & GO
- FREE FLOW
- Hybrid of Stop&Go and Free Flow

Below we set out each of the possible scenarios in detail.

## Dimensioning of the Necessary Servers

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The dimensioning of the necessary servers depends on various factors, including:

- Number of cameras to process LPR.
- Size of images to process LPR.
- Scenario that we are going to encounter. This can be:
  - Stop & Go
    - ♣ Through movement detection
    - ♣ Through triggers
  - FREE FLOW
    - ♣ Using continuous processing
    - ♣ Using movement detection
  - Hybrid
- Speed of the vehicles circulating
- Intensity of the traffic

In order to simplify and appropriately address each of the scenarios, we use the tables shown below to determine the minimum requirements necessary for the servers.

## Determining Minimum Requirements

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### Speed of the Vehicle

You need to determine the maximum speed at which you want to carry out the license plate recognition and then apply the following table to find out how many processor cores will be needed to be able to read the license plates of the vehicles driving at this speed.

This table is independent of the number of cameras that you want to use in the recognition server, and allows the hardware requirements to be fine-tuned even further.

Calculation of the number of frames per second necessary to read the license plates of vehicles driving at X km/hour in continuous processing.

Km/ hour	Frames/second necessary	CPU cores for VGA/4CIF	CPU cores for MEGAPIXEL/HD
10	1	1	1
20	2	1	1
30	3	1	1
40	4	1	2
50	5	1	2
60	5	1	2
70	6	1	2
80	7	1	3
90	8	1	3
100	9	1	3
110	10	2	4
120	10	2	4
130	11	2	4
140	12	2	4
150	13	2	5
160	14	2	5
170	15	2	5
180	15	2	5
190	16	2	6
200	17	2	6
210	18	2	6
220	19	3	7
230	20	3	7
240	20	3	7
250	21	3	7

There are various default parameters that may be changed to fine-tune the requirements even further in specific situations. The current working assumptions are:

- The license plate on a vehicle is identifiable (It remains in focus throughout its journey in the scene, and the size of the characters on the license plate is at least 15 pixels).
- We expect to find the license plate of this vehicle in at least 3 different pictures so that we can choose the best of them and have a minimum margin for the reading.

## Scenario

The possible scenarios that could be found are of the STOP & GO type (parking, control of access points, etc.) or the FREE FLOW type (security, tolls, road offences, etc.).

### STOP & GO Scenario

In this scenario, we can use a trigger to capture images or alternatively enable the movement detection capability of the system. The requirements are different depending on which we use.

Using "Manual TRIGGER" to capture images, we obtain the following:

Number of cameras	Trigger type	Minimum CPU cores necessary
1	TRIGGER / Manual	1
2	TRIGGER / Manual	1
3	TRIGGER / Manual	1
4	TRIGGER / Manual	1
5	TRIGGER / Manual	2
6	TRIGGER / Manual	2
7	TRIGGER / Manual	2
8	TRIGGER / Manual	2
9	TRIGGER / Manual	3
10	TRIGGER / Manual	3
11	TRIGGER / Manual	3
12	TRIGGER / Manual	3
13	TRIGGER / Manual	4
14	TRIGGER / Manual	4
15	TRIGGER / Manual	4
16	TRIGGER / Manual	4

Using movement detection to capture the images:

Number of cameras	Trigger type	Minimum CPU cores necessary
1	Movement Detection	2
2	Movement Detection	2
3	Movement Detection	2
4	Movement Detection	3
5	Movement Detection	3
6	Movement Detection	3
7	Movement Detection	4
8	Movement Detection	4
9	Movement Detection	4
10	Movement Detection	5
11	Movement Detection	5
12	Movement Detection	5
13	Movement Detection	6
14	Movement Detection	6
15	Movement Detection	6
16	Movement Detection	7



## FREE FLOW Scenario

This scenario also offers two options for capturing and processing images. We can choose the continuous processing of all the images that arrive from the cameras or we can use the movement detection incorporated in the system. As in the STOP & GO scenario, the requirements are different in each case.

Continuous processing of all the images is not recommended unless there is a constant flow of vehicles. Normally there are long periods of time with no vehicles moving and continuous processing involves the intensive use of the CPU, regardless of whether there are any vehicles moving.

Using movement detection, and with the speed of the vehicles generally less than 100 km/hour (you must use double for vehicles travelling up to 200 km/hour or check the table of requirements for other speeds), the tables are as follows:

VGA cameras	Speed of the vehicles	Minimum CPU cores necessary
1	Normal	1
2	Normal	1
3	Normal	2
4	Normal	2
5	Normal	3
6	Normal	3
7	Normal	4
8	Normal	4
9	Normal	4
10	Normal	5
11	Normal	6
12	Normal	6
13	Normal	7
14	Normal	7
15	Normal	8
16	Normal	8

Megapixel cameras	Speed of the vehicles	Minimum CPU cores necessary
1	Normal	1
2	Normal	2
3	Normal	3
4	Normal	4
5	Normal	5
6	Normal	6
7	Normal	7
8	Normal	8
9	Normal	9
10	Normal	10
11	Normal	11
12	Normal	12
13	Normal	13
14	Normal	14
15	Normal	15
16	Normal	16

## Common Scenarios

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One of the key points of the "VPAR SERVER" is its ability to adapt to the different scenarios required by the end applications. Below we list some of these and the most appropriate configuration of the recognition server.

- Motorways
  - Toll roads
  - Calculation of velocity per section
- Petrol stations
- Car parks for cars/lorries
- Access control: residential areas, industrial parks, private neighborhoods, etc.
- Border controls
- Police vehicles
- Radar systems
- Ministry of Transport (MOT) test
- Detection of driving offences: jumping red lights, bus lane, peak and license plate (rush hour), etc.
- And more...

## Choice of Hardware

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Once you have determined the scenario and your server needs, you need to choose the most suitable hardware. At this point you need to take into account various aspects:

### Computers

- The processors should be as fast/powerful as possible. The processing of license plates requires great calculating power from the computers. Platforms designed to minimize consumption are not suitable (ATOM, CELERON, etc.)
- It is better to have individual processors than Hyper Threading (It only improves performance by 15% to 30% compared to a single core, according to Intel data and laboratory tests carried out with LPR processing).
- The RAM memory and the hard disk must be the fastest possible.

### Cameras

Initially the maximum number of cameras that may be connected to the server is 16, although this limitation simply relates to the current processing capacity of the hardware. Ideally, there is no limit to the number of cameras that we can connect as long as the hardware is capable of processing them.

The choice of camera must be made taking into account the environment in which it is going to be installed

- Outdoor cameras: Great variability in light conditions. The conditions can vary from very bright during the day to complete darkness at night.
- Indoor cameras: A much more controlled environment, the existing light or infrared lighting normally offer the same light conditions all the time.

### Communications Protocol and Broadband

It is important to be able to provide the system with the number of frames per second (FPS) necessary given the expected speed of the vehicles. It is therefore recommendable to use cameras that provide protocols for "streaming" of "rapid" images such as MOTION JPEG, GigE Vision or DIRECTSHOW, rather than slower ones such as JPEG.

The network infrastructure must be able to support a large volume of data, since the images generate a significant amount of information. Fiber optics are recommended in most cases. Wireless networks, WiMAX, 3G are not suitable for carrying large volumes of information.

## Infrared Lighting

Infrared radiation, or IR, is a type of electromagnetic radiation with wavelengths longer than those of visible light, but shorter than those of microwaves. Therefore, it has a lower frequency than visible light and a greater one than microwaves. The range of wavelengths for infrared radiation is from 780 nm to 1 mm.

This light is radiated by Infrared Light Emitting Diodes (LEDs), with a wavelength from 800 to 980 nm.

- It is invisible to the human eye, but visible to cameras with day/night.
- Because it is invisible, it does not cause any light contamination or over-saturation.
- Infrared light has a greater range than visible light because of its longer wavelength. (Approximately 350m).

The human eye is sensitive to a range of wavelengths from 380 to 780 nm. Although 850 nm is in the infrared spectrum, the human eye can detect a little red light if it looks directly at the LEDs. This does not happen with infrared light with a wavelength of 940 nm; in addition, it is more tolerant to sunlight. The disadvantage is that the lighting capacity is lower, and so the distance covered by light with this wavelength is approximately half of that for 850 nm. For example, if we have the same power and the same number of LEDs in two lights, one at 850 nm and the other at 940 nm, the one at 850 nm can manage to illuminate up to 320 m, while the one at 940 nm scarcely reaches 190 m.

Another issue to consider is that electronic day/night cameras are calibrated to "see" with light of a certain wavelength, so a camera with LEDs at 850 nm and adjusted for infrared light of 850 nm is not going to have good vision if the scene is illuminated with light at 940 nm, and vice versa.

We are not saying that one type of infrared light is better than another, but rather that it completely depends on the application. To choose the wavelength of infrared light to be implemented in a closed circuit television system, it is necessary to define the specifications and requirements of the project in question and on that basis it is possible to recommend a specific wavelength for the infrared lighting.

Good IR lighting allows for much better recognition in any weather, light or vehicle speed conditions. The system must ALWAYS have IR lighting if it is to work properly.

## Camera TRIGGERS

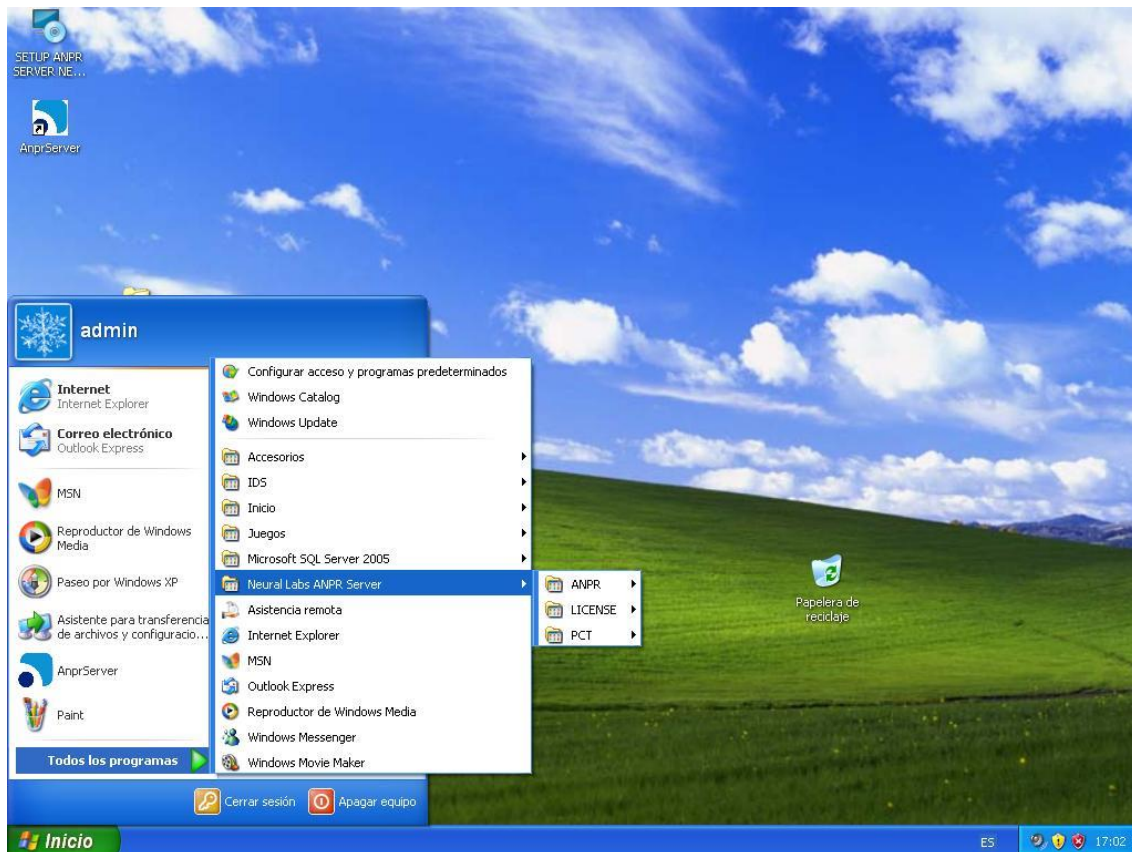
If the processing of images takes place through triggering, we need to provide the signal for the software through a system which will connect our trigger (induction loop, laser,

etc.) with the "VPAR SERVER" software waiting, normally a signal in a specific port (TCPIP). More details are provided below in the "Manual Trigger" section

# VPAR SERVER

## Initial Configuration

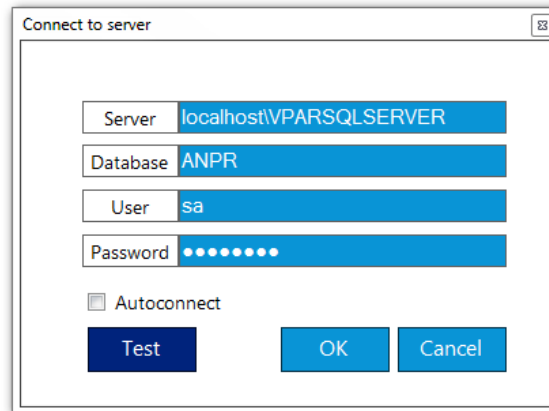
At the end of the installation process, a new folder “VPAR Server” will be created in the Windows Startup menu.



In this folder you will find the following options/programs:

- LICENSE->License Tool: Tool that allows you to manage the licenses on the Neural Labs USB keys.
- LICENSE->View License: Tool that allows you to see the active licenses on your computer.
- PCT->Distortion Correction Tool: Tool to calculate image correction parameters.
- VPARServer: Main VPAR SERVER application

In the first-time use, the initial step consists on SQL SERVER configuration menu:

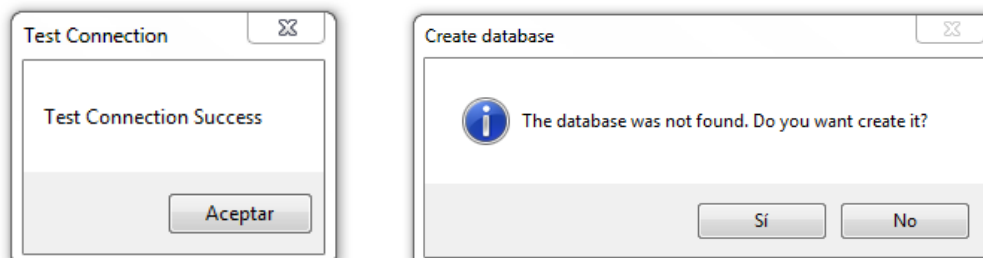


To do this you will be asked for the following information:

- **Server:** Name of the instance the SQL Server executes. If the database manager is installed on the same computer, it is enough to simply add “(local)\sqlexpress”. If there is a different instance name, replace sqlexpress with the relevant one.
- **Database:** Name of the database that supports the configuration of the VPAR SERVER application. We suggest the name "VPAR", but you can use anything you like.
- **User:** Username with which the application will be connected to the database manager to manage it. It must be a SQL Server “sysadmin” username. The default option is “sa” (SQL Server system administrator).
- **Password:** This is the user password defined in the previous point. You will need to use the password “VparAdmin01#” for “sa” if you have followed the instructions in the manual exactly.

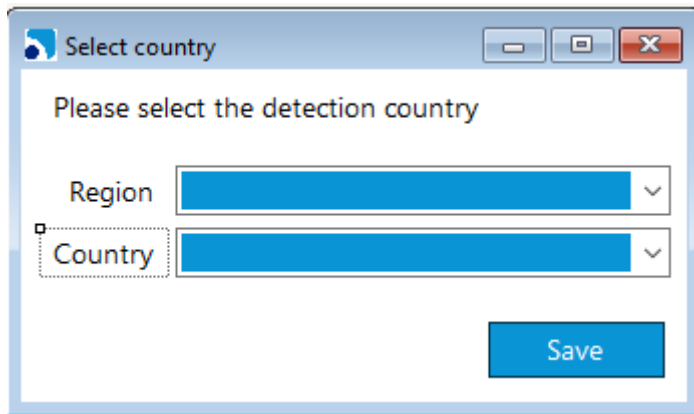
Once the details have been entered correctly, click on "OK" to continue. If there is an error, the message will be sufficiently clear to diagnose the problem. Generally it could be due to a problem with the network or an error of the name of instance or database type.

If it is the first time using the tool, it will automatically realise that the database has not been created and will propose its creation. You should confirm the operation by clicking on "yes":





In the first time the application is run the region and country must be selected:



Once the database configuration will be done, main screen will be shown:



This screen is divided into 7 tabs:

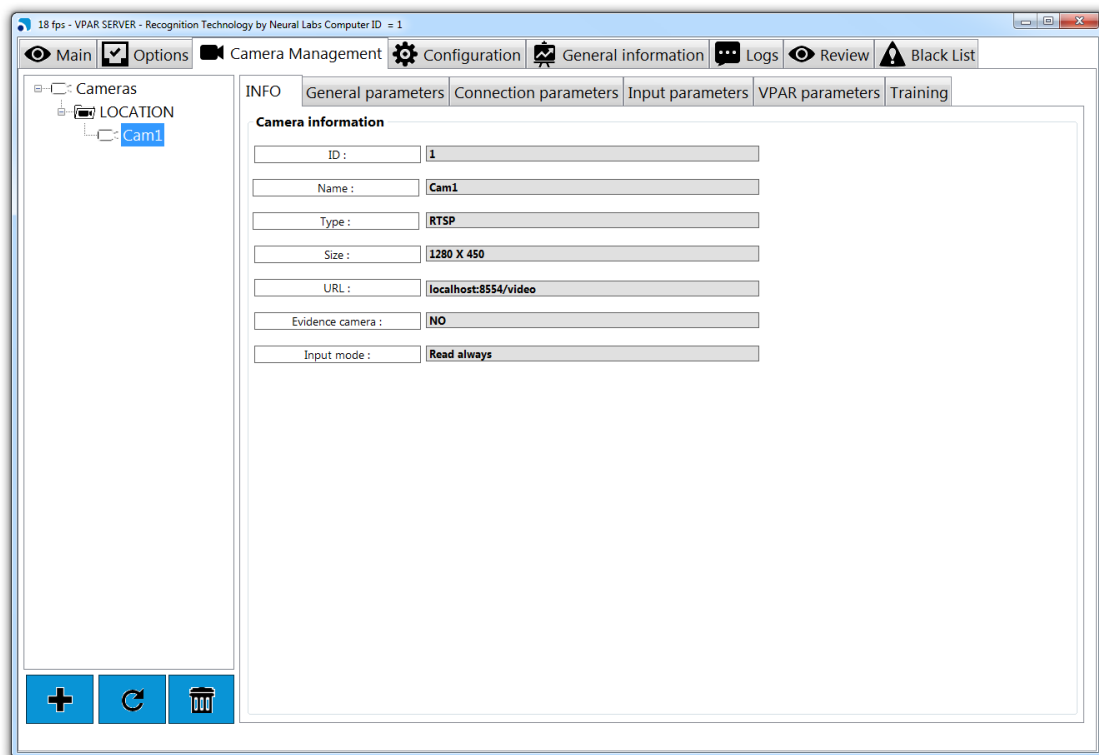
- Main: Screen where you can see the selected camera. The server will show also their last recognition.
- Options: Screen where the recognition configuration parameters are defined.
- Camera Management: Screen where the cameras for use in the service are added or modified.
- IO Management: It allows to define the behavior of the input-output modules.
- Configuration: Screen where the general parameters are defined.
- General Information: Screen where you can see statistics about the performance of the server.
- Logs: Screen to view the system logs.

- Review: Screen with a simple historical of the detections (extended version).

The first step in VPAR SERVER configuration should be the camera configuration:

## Camera Management

In this tab you can configure the cameras to be used by the software.



To define new cameras we need to press the button:



## Camera configuration tabs

**INFO:** General camera visualization tab. This tab shows the most important parameters of the camera configuration. It is non editable.

**General Parameters:** General configuration parameters.

The screenshot displays the 'General parameters' configuration window. At the top, there are tabs for 'INFO', 'General parameters', 'Connection parameters', 'Input parameters', 'VPAR parameters', and 'Training'. The 'General parameters' tab is active. The configuration includes:

- ID Camera:** A text input field containing '1' and a 'Check ID' button.
- Name:** A text input field containing 'Cam1'.
- Location:** A dropdown menu showing 'LOCATION' and an 'Edit' button.
- FPS:** A spinner control set to '10'.
- Evidence Camera (Not processed frames):** An unchecked checkbox.
- Associated evidence camera:** A dropdown menu that is currently empty.
- Broadcast MJPEG port:** A text input field containing '0'.

At the bottom of the configuration area, there are two buttons: 'Apply and save' and 'Cancel edition'.

- **ID Camera:** Camera number. For internal use and should not be repeated.
- **Name:** Description of the camera.
- **Location:** Location of the camera. This information is important because the system allows you to group results using this criteria. For example, if there is a single entrance but it is wide enough to require more than one camera to cover it, the system can group these cameras so that it returns the best license plate read by this group of cameras. For this to happen, the locations for these cameras must be the same, and the parameter "Filter Location" for the VPAR SERVER must be activated. We can add or modify locations clicking on 'Edit' button:

The image shows a software dialog box titled "Longitude & Latitude". It has three input fields: "Name" containing "LOCATION", "Latitude" containing "0", and "Longitude" containing "0". Below the fields are two buttons: "Save" and "Cancel".

- FPS: Maximum frames per second to process.
- Evidence camera: It allows to define an evidence camera. This type of camera doesn't process results.
- Analytics: In this group we can activate vehicle analytics. In order for these analytics to work, the camera must be calibrated, calibrated in the "**Calibration**" tab.
  - Speed camera: Vpar server
  - Classification camera: Vpar server
  - Lane detection: Vpar server
- Dorlet camera: It allows the camera to communicate by dorlet protocol with a server of this protocol. The configuration will be done in the tab "Dorlet configuration".
- IO camera: It allows the camera to perform on a device input/output ports. The performance will be defined in the IO tab.
- Associated Camera: It allows to associate an evidence camera to this LPR camera.
- Broadcast MJPEG Port: If this option is active, the VPAR SERVER broadcasts a MPJEG stream at indicated port.

Connection parameters: Camera connection parameters. We will define here the camera input mode.

INFO	General parameters	Connection parameters	Input parameters	VPAR parameters	Training
<b>Connection parameters</b>					
Type	RTSP		ONVIF Wizard:	<input type="checkbox"/>	
URL	localhost:8554/video		<a href="#">Examples</a>		
Login	<input type="text"/>		Password	<input type="text"/>	
<b>RTSP parameters</b>					
RTSP Caching	1000		<a href="#">Test Camera</a>		
<a href="#">Apply and save</a>		<a href="#">Cancel edition</a>			

**Type:** This corresponds to the type of camera to be connected. It can be:

- MJPG: Motion JPEG
- JPG: JPG Protocol
- DS: DirectShow
- AVI: An AVI type file
- DIR: A folder with JPG images
- SDIR: A folder with JPG images that also contains more folders with JPG images.
- PATH: All the images in the folder indicated shall be processed, checking whether any more images are added in order to process them.
- AVIPATH: All videos in the folder shall be processed.
- RTSP: RTSP Protocol
- RTSP\_FFmpeg: RTSP protocol using FFmpeg libraries (with hardware acceleration)
- IDS: UEYE IDS cameras
- MIL: Milestone camera
- GIGE: GigE vision camera
- AVT: AVT camera
- PTG: Point Grey camera

URL: Corresponds to the address where the system will try to find the video signal according to the type of camera:

- MJPG: HTTP address where the camera will deliver the Motion JPEG streaming.
- JPG: HTTP address where the camera will deliver the JPG image.
- DS: Name of the DirectShow device.
- AVI: Access route and name of .AVI file. It is important to have the codec correctly installed in the server.
- DIR: Access route to the folder with JPG images.
- SDIR: Access route to the folder with JPG images that also contains more folders with JPG images.
- PATH: Access route to the folder with JPG images.
- AVIPATH: Access route to the folder with AVI videos.
- IDS: ID of the IDS camera.
- RTSP: HTTP access route to the RTSP streaming.
- MIL: Name of the camera in the Milestone server.
  - ♣ On entering a Milestone camera you must fill in the following fields:
    - Quality: Quality of the video to receive.
    - Second camera: (Optional) Name of the camera to which the alarms will also be sent.
- GIGE: IP of camera
- AVT: ID of camera
- PTG: Camera serial number

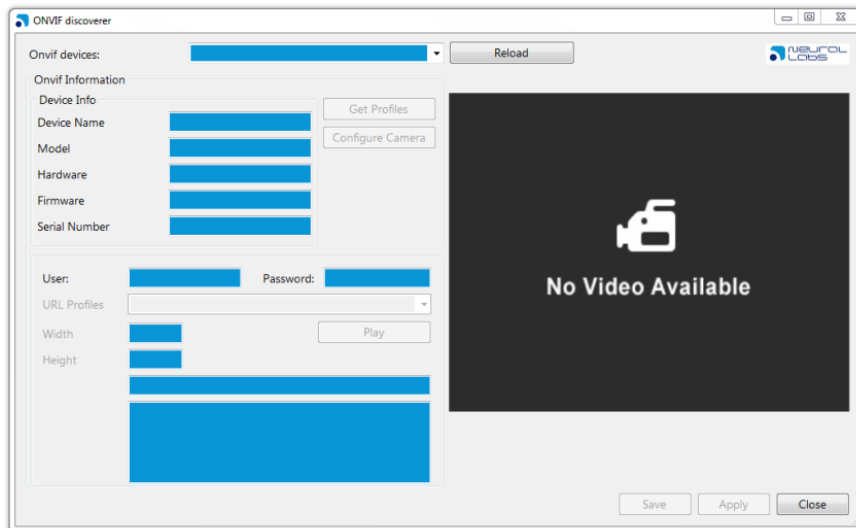
Login: Name of the user enabled to see the stream; only for MJPEG, JPG or RTSP.

Password: Password of the user from the previous point.

Onvif wizard: VPAR SERVER incorporates a simply ONVIF discoverer. It will allow to add ONVIF cameras in an automatic mode. To search ONVIF cameras in the local network, select the RTSP or RTSP\_FFmpeg protocol and press the ONVIF button:



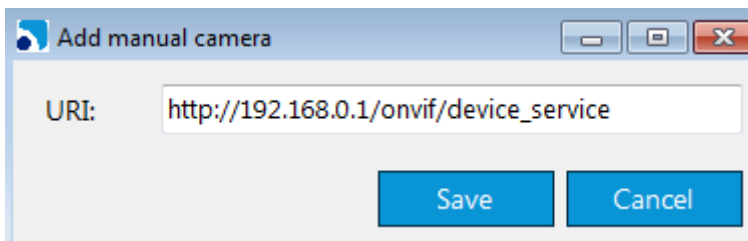
ONVIF wizard main screen is shown like this:



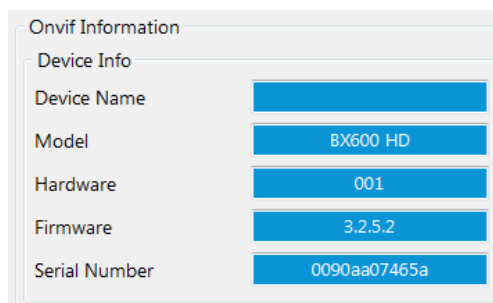
The system will start finding ONVIF devices automatically. In the combo box, we will see the discovered devices:



You can add manually a camera with the button “Add manual”.



By selecting the device, device info will be loaded automatically:



Next step is to get the URL stream profile of the camera. If we press the button 'Get profiles', available profiles will be shown. It is possible that authentication will be required:

The screenshot shows a configuration form with the following fields:

- User: Admin
- Password: 1234
- URL Profiles: A dropdown menu with a blue background and a downward arrow.
- Width: A text input field containing the URL `rtsp://192.168.1.222/h264`.
- Height: A text input field (partially visible).
- Play: A button (partially visible).


Once the profile is selected, the wizard will get automatically the height and the width of the stream. By pressing the 'Save' button, all the connection data will be loaded in the main configuration screen.




On this same screen you can select the camera relay you want to use in case of a detection.

The screenshot shows a configuration form with the following field:

- Relays: A dropdown menu with a blue background and a downward arrow, showing the selected relay `root.IOPort.I1.Output`.

Once you have finished adding the details you should click on the  button to save the changes.

If you have changed the details of a camera already registered, the same button  confirms the updating.

To delete cameras that are no longer used, use this option by first selecting the camera in question:





Input parameters: In this tab we will define the camera detection mode.

The screenshot shows the 'Input parameters' tab with the following configuration:

- Input Management:**
  - Read always
  - Use triggering
    - Triggering Options:**
      - Read seconds: 0
      - Read images: 20
  - Use motion detection
    - Motion Options:**
      - Sensibility: 1
      - Tolerance (%): 1.0
      - Use as trigger (ms): 0

Buttons: Apply and save, Cancel edition

There are three ways to process images arriving from the cameras:

- **MOTION DETECTION:** This option carries out a pre-process on the images arriving from the camera and only recognizes license plates when movement is detected.

**SENSIBILITY:** Sensibility of motion detection. If this value is low the sensibility of the motion increase.

**TOLERANCE:** Factor used to accept a change between images. If we define, for example, a 0.2 tolerance, the new image should be (at minimum) a 20% different from the previous one.

- **TRIGGERING:** Images will only be sent for license plate recognition when determined by the activation of a socket in the "VPAR SERVER" software, where the identifier "id\_camera" of the camera we want to capture the image will also be specified. This option is the one that consumes the least resources and is recommended in STOP & GO scenarios.

The main options are:

**READ SECONDS:** It will process all the images received from the moment of the trigger until the number of seconds specified here has passed.

**READ IMAGES:** This will process this number of images from the moment of the trigger.

- **READ ALWAYS:** This option will carry out license plate recognition on all the images arriving from the cameras. This is the option that needs the most resources (mostly processing) to be able to manage all the images arriving.

## How to generate a trigger to process images in a camera

If the processing of images takes place through triggering, we need to provide the signal to the software through a system that will connect our trigger (induction loop, laser, etc.) with the "VPAR SERVER" software that is waiting, normally a signal in a specific port (defined by the variable `io_port` in the DB Manager).

The message to be sent must comply with the XML standard and have the following format:

```

<?xml version="1.0" encoding="iso-8859-1"?>
<!DOCTYPE Alarm SYSTEM "version.file">
<Alarm>
  <Source>
    <IdSource>999</IdSource>
    <SourceName>Name of alarm source</SourceName>
    <SourceDescription>Brief description</SourceDescription>
    <SourceVersion>1.0.0.0</SourceVersion>
  </Source>
  <AlarmDetail>
    <AlarmType>Define Alarm type</AlarmType>
    <IdAlarm>1</IdAlarm>
    <AlarmDT>20120411160201.043</AlarmDT>
    <TimesSent>1</TimesSent>
  </AlarmDetail>
  <Device>
    <IdDevice>1</IdDevice>
    <DeviceType>Device type description</DeviceType>
    <DeviceName>Device name, computer or similar</DeviceName>
  </Device>
  <ExtraFields>
    <EF Name="CameraMask">65535</EF>
  </ExtraFields>
</AlarmDetail>
</Alarm>

```

Of all the fields described, only 1 is important:

- CameraMask : Defines in binary the cameras that have to be activated, for example
  - a. 1 (binary 01)= Just camera 1
  - b. 2 (binary 010)= Just camera 2
  - c. 3 (binary 011) = Cameras 1 and 2
  - d. 7 (binary 0111) = Cameras 1, 2 and 3
  - e. 65535 (binary 11111...)= All the cameras
  - f.

The configuration of how the software will respond when it receives this message is managed in the “I/O MANAGEMENT” tab

### Advanced: Different types of trigger

VPAR SERVER accepts different types of trigger, depending on the AlarmType field in the XML. The different types available are detailed below:

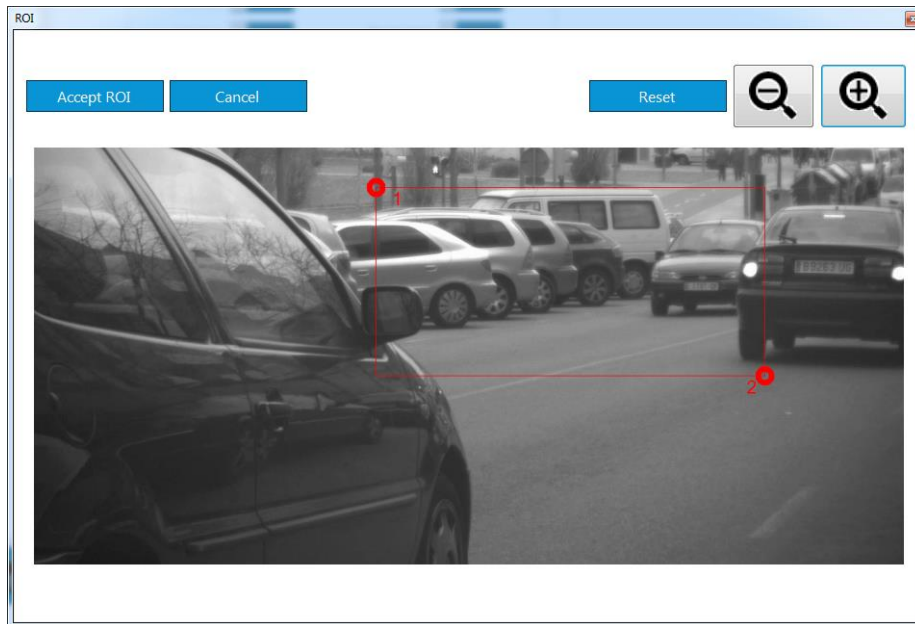
Name	ID con.	Comments
Trigger_Images	--	Basic trigger operating by image. Trigger stops if: <ul style="list-style-type: none"> <li>- A plate is detected</li> <li>- The end of the images is reached.</li> </ul> Returns NO_PLATE
Trigger_Seconds	--	Basic trigger operating by seconds. Trigger stops if: <ul style="list-style-type: none"> <li>- A plate is detected</li> <li>- We reach the end of the seconds</li> </ul> Returns NO_PLATE
Trigger_Start_Stop	10	Basic trigger start_stop operating. The trigger stops if: <ul style="list-style-type: none"> <li>- A plate is detected</li> <li>- We send a STOP (20) event</li> <li>- Returns the plate, or the NO_PLATE event if there isn't a detection.</li> <li>- If a STOP event isn't sent (20) it never stop (it has a very long timeout).</li> </ul>
Trigger_Start_Stop_Best_Simple_Plate	15	Trigger best plate: <ul style="list-style-type: none"> <li>- Detected plate is stored (it doesn't return)</li> <li>- When there are several NO_PLATE or when we send a STOP (20), it returns THE BEST result from the stored ones.</li> </ul>
Trigger_Start_Stop_No_KO_Response	30	Multi answer trigger without NO_PLATE answer: <ul style="list-style-type: none"> <li>- Trigger activates and starts returning results</li> <li>- Trigger doesn't stop until it receives a STOP</li> <li>- If there isn't a detection, it doesn't return NO_PLATE</li> </ul>
Trigger_Images_Multi_Resp	40	Multi answer trigger: <ul style="list-style-type: none"> <li>- Same operation as the basic trigger</li> <li>- It is multi answer: Keeps returning results until the final number of frames is reached.</li> </ul> Returns NO_PLATE when there isn't a detection
Trigger_Seconds_Multi_Resp	40	Multi answer trigger: <ul style="list-style-type: none"> <li>- Same operation as the basic trigger</li> <li>- It is multi answer: Keeps returning results until the final number of frames is reached.</li> </ul> Returns No_Plate si no hay ninguna detección
Trigger_IPARK	50	- All the installation operates in IPARK mode.

		<ul style="list-style-type: none"> <li>- When a plate is detected (it is always reading), we wait during N frames until we receive the address from the trigger.</li> <li>- If we receive an address, we store it along with the plate. If not, we store it without address.</li> <li>- If we receive an address but any plate is detected, we store NO_PLATE with the corresponding address in the database.</li> </ul>
<b>Trigger_Stop</b>	20	Trigger used to send STOP events.

**VPAR Parameters:** In this section, the operator will select the camera to be configured and will apply the following parameters:

The screenshot shows the 'VPAR parameters' configuration window. It features a tabbed interface with 'VPAR parameters' selected. The main area contains two sections: 'Define Correction' and 'Define Recognition Area'. The 'Define Correction' section includes a 'Correction Parameters' sub-section with eight sliders: Distance (0.00), Radial (0.00), Vertical (0.00), Horizontal (0.00), Vertical Skew (0.00), Horizontal Skew (0.00), Angle (0.00), and Scale (1.00). Below this is a 'Define Recognition Area' section with a 'Define ROI' button. At the bottom of the window are 'Apply and save' and 'Cancel edition' buttons.

- Define correction: Perspective correction in case the license plate isn't in the optimum position. We can use the utility "Correction Perspective Tool" to calculate its parameters.
- Define recognition area: This option allows us to define a recognition area in the image captured by the camera. If we click on the area definition button, a window will be shown in which to define the recognition area.



Speed and direction parameters: For speed configuration, please see the document “VPAR SERVER analytics calculation”.

Dorlet parameters: In this tab we will configure the settings for the dorlet sending of the specific camera.

Connection parameters | Input parameters | VPAR parameters | Speed & Direction | Dorlet Parameters

**Dorlet parameters**

Dorlet Ip  Dorlet Port  Dorlet Vial

Apply and save | Cancel edition

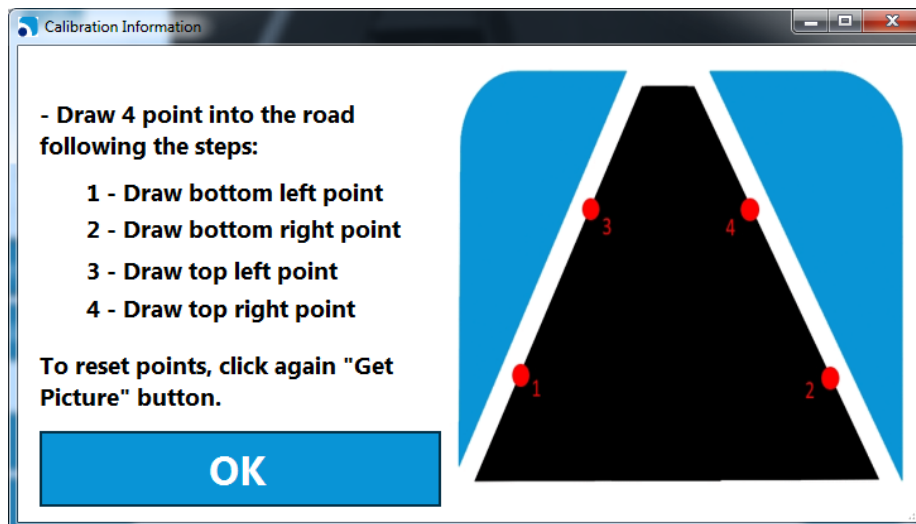
## Calibration

In this tab we can calibrate the camera for the use of analytics. We can also calibrate a camera that does not use analytics for a better fit in sense detection.

\* For a correct use of the analytics in VPAR SERVER please refer to the manual: Installation Guide for LPR cameras and Traffic Analytics

To calibrate the camera, we will follow the following steps:

1. Select the type camera
2. Select the type of lens used by the camera
3. We will enter the data of the installation:
  - a. To enter the width (lane width, pattern width, road width ...)
  - b. Enter one of the values:
    - i. Vertical pattern size. (The pattern must be a rectangle)
    - ii. Camera height.
4. Obtain the image for the calibration by pressing the button: "Get Picture". If we want to repaint the dots, we will press the button again.

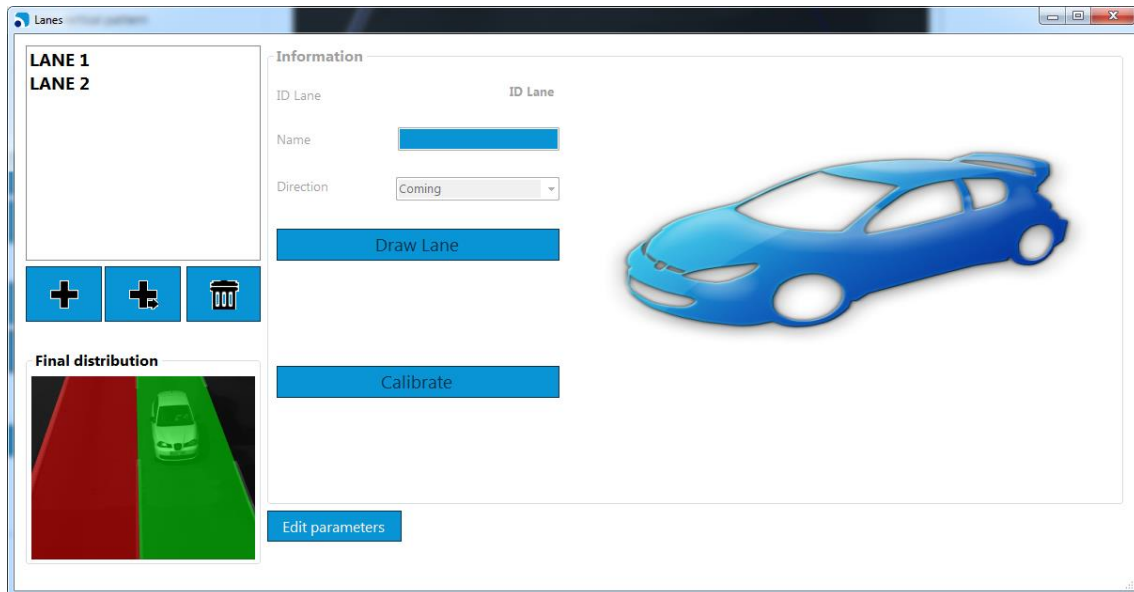


5. Click on the image the 4 points adjusting it to the defined pattern.
6. Once the assignment of the 4 points has been completed we will click on the "Calibrate" button. This will allow the camera to be calibrated.
7. If the calibration is correct, 2 lines will be drawn on the image that will correspond to the perspective of the pattern. If the calibration was incorrect we would repeat the process from point 4.


Once a first calibration is done, we will be able to consult it later with the "Show previous calibration" button.


## Management Lanes

Once the camera is calibrated, the user can define the lanes by clicking the "Lanes" button.



In this window we can define the rails of the road. To add a lane we can add it:

 Add a lane freely

 Add a lane next to the right.

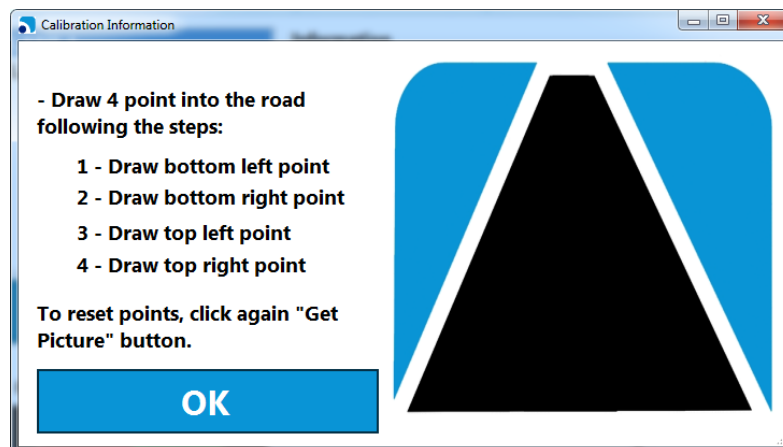
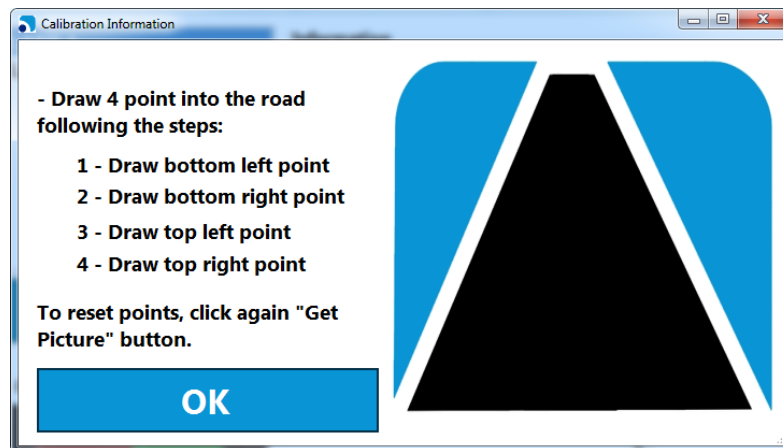
When adding a lane the user will define:

- Name: Name the lane
- Direction: Direction the lane
  - Coming: Direction towards camera
  - Going: Direction from camera
  - Two ways: Both directions

For the calibration of the lane we will follow the following steps:

1. Click the "Draw Lane" button to get the image to define the lane
  - a. If we have defined a free lane we will have to define the 4 points of the lane.
  - b. If we have defined a lane to the right we will have to define the 2 points of the right side of the new lane.

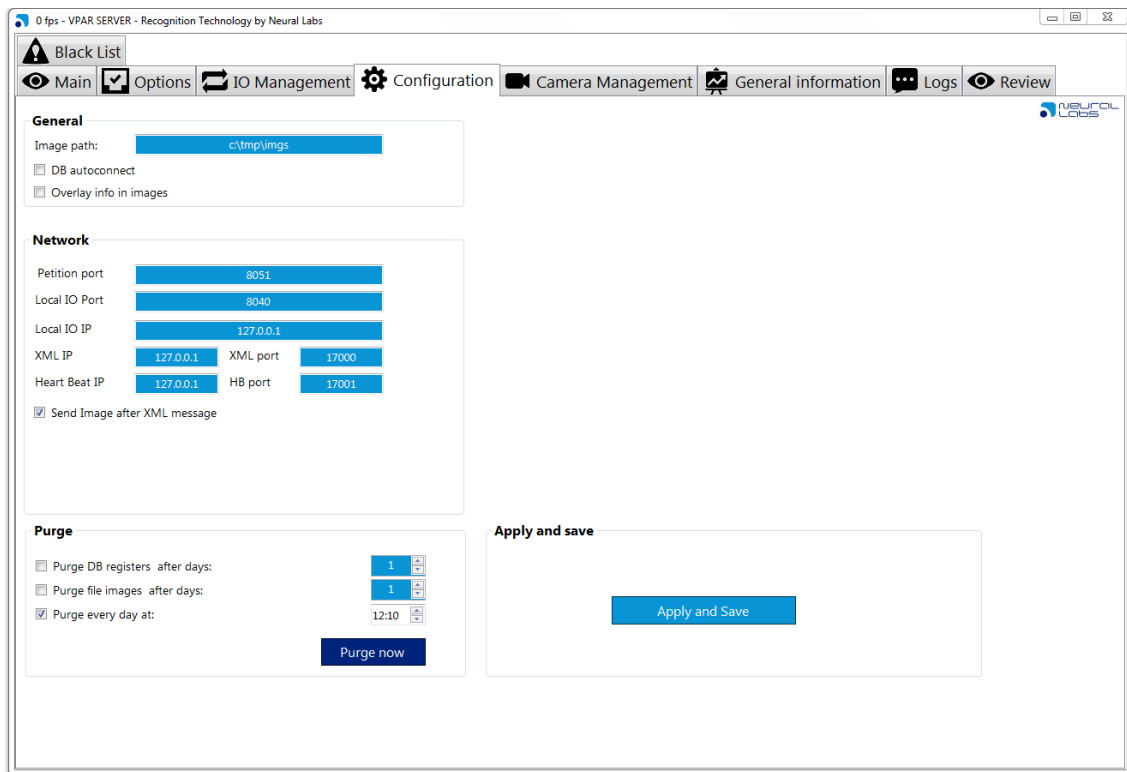




2. Once the points are drawn, the "Calibrate" button will be clicked
3. If the calibration is correct, the lane will be drawn on the image. If an error has occurred we will repeat from point 1.

Once made the changes in the lane we will click on the "Apply and save" button to make them permanent.

## Defining General Parameters



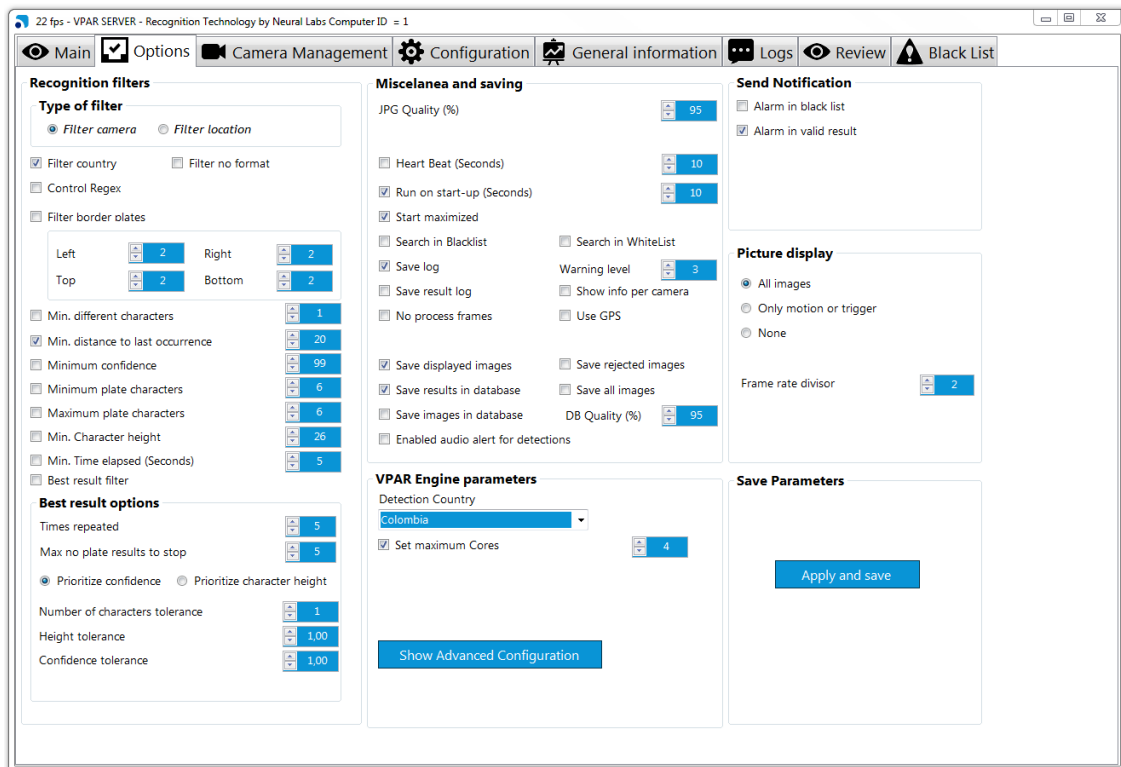
On this screen you can configure the specific parameters for the computer in question:

- **Image path:** This is the access route to the folder where the JPG images in which the VPAR SERVER found a license plate will be stored. It can be a local access route or an access route over the network.
- **All images path:** It is the access route to the folder where the images will be hosted in JPG in case VPAR SERVER didn't find a number plate or it discarded them. It can be a local access route or an access route via network.
- **Log path:** Route where the system logs will be saved.
- **Dorlet path:** Route where the images for the Dorlet system will be saved.
- **DB autoconnect:** If this option is activated, the software will try to connect to the database defined automatically by the user. If it cannot connect to it, the database configuration window will appear.
- **Overlay info in images:** VPAR SERVER will overlay the plate in the image.
- **Petition port:** Number of TCP port where the server can receive remote administration commands. Generally it is port 8051, but this can be changed.
- **Local I/O Port:** Number of TCP port where the server listens to activations of external Triggers when the system is configured to be used in this way. Generally it is port 8040, but this can be changed.
- **Local IP:** IP address of the card where you want to receive the commands from the external Triggers. If the computer has a single network card, it can be 127.0.0.1. If it has more than one network card, you must specify which IP will receive the Trigger messages.

- Standard Connection (Connection from VPAR SERVER towards an open port at the reception client):
  - XML IP: IP address where the system will send the XML notifications.
  - XML Port: TCP port where the system will send the XML notifications.
- Listen and send XML at Port: (Connection from the reception client towards a VPAR SERVER listening port) VPAR SERVER port where the reception notifications will be sent.
- Send image after XML message: The image of the recognition will be included in the XML message.
- Close connection after send: VPAR SERVER will end the connection with the client after sending the message.
- Heartbeat IP: IP address where the system will send a heartbeat XML trace every N seconds (configure in Options tab)
- Heartbeat Port: TCP port of the heartbeat trace.
  
- Configuration of Milestone:
  - Alarm detected plate text: Text sent to the Milestone server when a license plate has been detected.
  - Alarm plate in black list text: Text sent to the Milestone server when a license plate on the blacklist has been detected.
  - Alarm event type: Type of alarm sent to the server.
  - Milestone server connection: Connection to the Milestone server where:
    - ♣ Host: address of the Milestone server.
    - ♣ User: user of the connection.
    - ♣ Password: user password.
    - ♣ Mode: Connection mode (1: Windows user, 2: Milestone user).
  - Milestone alarm connection: If another server is used as the alarm receiver, complete this option as in the previous point. *If the same server is used to receive the alarms, leave this option blank.*
- Purge DB registers after days: Delete the registers older than the current date minus the days indicated. This option will be active if the checkbox is marked.
- Purge file Images after days: Delete the image files older than the current date minus the days indicated. This option will be active if the checkbox is marked.
- Purge every day at: This will purge every day at the time indicated.

The button "Apply and Save" allows you to update the changes.

## Configuration Options



In this screen you can configure all the data that affect the license plate recognition quality. All the fields are described:

### Recognition Filters

In the "RECOGNITION FILTERS" section we have options for filtering the results (which are used when it comes to determining whether a license plate recognized is valid or not) and configuration parameters for the recognition engine.

- **FILTER CAMERA/LOCATION:** Filters the license plate detected by camera or by location (a group of cameras operate as a single camera).
- **FILTER COUNTRY:** This filters (for the country selected) the format of the license plate read with the syntax of the license plates in the corresponding country. If the syntax is not the same the result is dismissed.
- **FILTER BORDER PLATES:** It applies a restriction depending on the position of the plate in the image. If it doesn't achieve the minimum distance (pixels) to the image borders, the result will be dismissed.
- **FILTER NO FORMAT:** The system will discard results with no format (that no pertain to any country).

- **CONTROL REGEX:** It allows to define a grammar of the detected plates. The plates not following this grammar will be dismissed.
- **MIN DIFFERENT CHARACTERS:** It checks whether this license plate looks like the last one recognized as valid (Number of characters different in accordance with the Levenshtein distance).
- **MIN DISTANCE TO LAST OCCURRENCE:** For a result to be considered valid, the last license plate read must not be among the last N recognized as valid. This filter is useful for traffic jams, where the cameras may be reading N license plates continually in a closed cycle.
- **MINIMUM CONFIDENCE:** Minimum reliability in the reading of a license plate to consider it valid. Reliability is a parameter returned by the engine for recognizing license plates (value of 1-100, where 100 is the most reliable).
- **MINIMUM PLATE CHARACTERS:** Minimum number of characters that a result must have to be considered valid.
- **MAXIMUM PLATE CHARACTERS:** Maximum number of characters that a result must have to be considered valid. If the country filter is selected this is a redundant parameter.
- **MIN CHARACTER HEIGHT:** Minimum character size. Very useful for cases where you want to ensure a minimum character size.
- **MIN TIME ELAPSED:** Minimum time elapsed from the detection of the same license plate to it being accepted again in the system.
- **BEST RESULT FILTER:** This filter choose the best plate in a range of X plates. The configuration of this filter is:
  - a. **Times repeated:** Define the number of the same plates in a range.
  - b. **Max no plate results to stop:** Define the number of results without a plate that we must obtain in order to extract a valid result from the stored values.
  - c. **Prioritize:**
    - i. **Confidence:** Prioritize confidence rate in the choose
    - ii. **Size:** Prioritize the closest size to 30 pixels
  - d. **Number of characters tolerance:** Number of different character to decide if two plates are equals.

- e. Height tolerance: Number of pixels to decide if the heights of plates are the same.
- f. Confidence tolerance: Number of rate to decide if the confidences of plates are the same.

## VPAR Engine Filters

- DETECTION COUNTRY: You have to select the country for which you want to recognize the license plates. For the change in this parameter to take effect, the application must be restarted. Remember to first save the configuration by clicking the “Apply and Save” button.
- SET MAXIMUM CORES: maximum number of cores that the VPAR engine will use.

## Miscellanea and Saving Parameters

The meaning of each of the fields is as follows:

- JPG QUALITY: Degree of compression used when saving the images recognized to the disk. The lower the value the more the images are compressed (a value of 100 indicates minimum compression). This value affects the space occupied on the disk.
- Heart Beat (seconds): It allows to activate or deactivate the heartbeat and define the sending frequency.
- SAVE LOG: Saves the system logs.
- WARNING LEVEL: If the above box is activated, here you can define, from 1 to 3 in the degree of severity, the types of warning that will be stored (3 is the minimum level).
- SAVE RESULT LOG: Saves the results log.
- SHOW INFO PER CAMERA: It shows the complete result of the detection (on the live view) from the camera that we have selected.
- SAVE DISPLAYED IMAGES: The recognition images that are produced are saved on the disk.
- SAVE REJECTED IMAGES: Discarded images will be saved in the system.

- **SAVE RESULTS IN DATABASE:** Saves the results being produced in the database.
- **SAVE ALL IMAGES:** Saves ALL the images arriving to the disk.
- **SAVE IMAGES IN DATABASE:** Saves the resulting images in the database.
- **SAVE ONLY PLATE IMAGES IN DATABASE:** Saves only the plate area (trim) in the database.
- **DB QUALITY (%):** Defines the quality of the images to be stored in the database.
- **ENABLE AUDIO ALERT FOR DETECTIONS:** The system will perform an acoustic “beep” signal with every detection.
- **OVERLAY INFO (saved images):** Prints additional info related to the recognition, on the saved image in the database.
- **OVERLAY INFO IN IMAGES:** Prints additional info related to the recognition on the picture sent via xml.

## Picture Display

In some occasions, we prefer not to show live images from the cameras, or we’ll want to limit the images to be shown. This will help to improve the system performance.

- **ALL IMAGES:** All the images received from the cameras are displayed, regardless of whether or not they are sent for license plate recognition processing.
- **ONLY MOTION OR TRIGGER:** Only displays the images in which movement has been detected, regardless of whether or not they are sent for license plate recognition processing. Only available when movement detection recognition is activated.
- **NONE:** No images from the cameras are displayed, regardless of whether or not they are sent for license plate recognition processing.
- **FRAME RATE DIVISOR:** Divisor applied to the image visualization. (Only affects the display, not the process)

## Main Screen



In this screen you can carry out the following operations:

- Real-time display of the cameras.
- Display of the last license plate read.
- Analysis of the detection of movement of each camera.

It is important to emphasize that displaying the images is a very costly process in terms of the use of the CPU, so it is recommended to disable the display of images in case you do not want to see them.

You can also achieve the same result if you click on any other tab on the screen. The program is designed so that if the tab is not the one for displaying cameras, it does not use processing power to display the images.

Live view provides information as follows:

- **Camera 1** Camera name
- **ANPR** Camera is active (green) or inactive.
- **Process** Camera is processing images (green)
- **4 fps** Frames per second received from the camera (green - receiving images, red - not receiving images)
- **55,07 px** Average character height of the last recognized plate. By double-clicking, a grid with a 25 px separated lines will appear. It can be useful for the

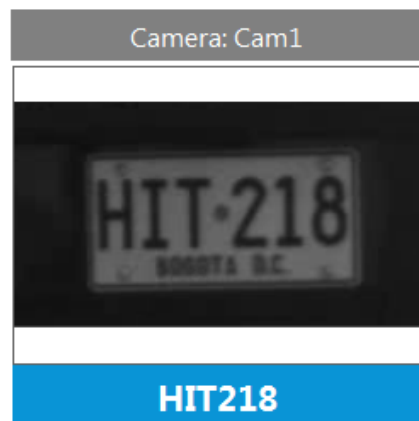


configuration step. Same thing when clicking the “Height configuration template”.

- **640 ms / 624 ms** Last recognition processing time/ Last image processing time.
- **Country** License plate country detected.

### Last License Plates Recognized

In the lower part, we have a small box showing the cropped image of the last license plate identified, as well as the camera that produced the image and the result of the license plate recognition.



## IO Management

The screenshot displays the IO Management interface. On the left, a tree view shows 'IO devices' with a sub-item 'IO\_1'. Below the tree are three buttons: a plus sign (+), a refresh icon, and a trash icon. The main panel has three tabs: 'INFO', 'General parameters', and 'Output ports'. The 'INFO' tab is active, showing 'IO information' with the following fields:

ID :	1
Name :	IO_1
Type :	ADAM 6060
URL :	127.0.0.1

In this tab we will manage the input-output devices that VPAR SERVER will operate with.

### Input-output configuration tabs:

INFO: Module general visualization tab. This tab shows the most important parameters of the module configuration. It is non-editable.

General Parameters: General configuration parameters:

**General parameters**

ID IO	<input type="text" value="1"/>	<input type="button" value="Check ID"/>
Name	<input type="text" value="IO_1"/>	
IP	<input type="text" value="127.0.0.1"/>	
Type IO	<input type="text" value="ADAM 6060"/>	
Input Ports	6	
Output Ports	6	

- ID IO: Input-output module only identifier.
- Name: Module identifiable name.
- IP: Input-output module IP.
- Type IO: Dropdown with the IO modules models accepted by VPAR SERVER.

**Output ports:** In this tab we will define the behavior of each port.

INFO	General parameters	Output ports
------	--------------------	--------------

**Output ports**

Port

Signal interval  ms

**Initial State**

High

Low

**No assigned cameras**

Camera 1

**Assigned cameras**

- Port: Port to be configured.
- Signal interval: Time (milliseconds) that the pulse will last.
- Initial State: Pulse initial state (High/Low)
- No assigned cameras – Assigned cameras: Camera assignment management for this port. Only the cameras with the “IO camera” setting activated, will be included.

## Log

5 fps - VPAR SERVER - Recognition Technology by Neural Labs Computer ID = 1

Main
  Options
  Camera Management
  Configuration
  General information
  Logs
  Review
  Black List

```

07/08/2015 10:51:05 : OK : Read License Plate : BGV953 ( Colombia ) Confidence : 99,98, Character height : 24,20,Format: 202 : Camera : Cam1
07/08/2015 10:51:05 : OK : Read License Plate : BGV882 ( Colombia ) Confidence : 84,33, Character height : 25,57,Format: 202 : Camera : Cam1
07/08/2015 10:51:05 : OK : Read License Plate : BGT944 ( Colombia ) Confidence : 99,45, Character height : 19,79,Format: 202 : Camera : Cam1
07/08/2015 10:51:05 : OK : Read License Plate : BGI647 ( Colombia ) Confidence : 93,87, Character height : 15,71,Format: 202 : Camera : Cam1
07/08/2015 10:51:04 : OK : Read License Plate : BGG404 ( Colombia ) Confidence : 99,99, Character height : 25,28,Format: 202 : Camera : Cam1
07/08/2015 10:51:04 : OK : Read License Plate : BGC386 ( Colombia ) Confidence : 76,67, Character height : 33,04,Format: 202 : Camera : Cam1
07/08/2015 10:51:04 : OK : Read License Plate : BFW816 ( Colombia ) Confidence : 90,91, Character height : 26,19,Format: 202 : Camera : Cam1
07/08/2015 10:51:03 : OK : Read License Plate : BFR824 ( Colombia ) Confidence : 98,67, Character height : 23,25,Format: 202 : Camera : Cam1
07/08/2015 10:51:03 : OK : Read License Plate : BFO017 ( Colombia ) Confidence : 76,80, Character height : 14,84,Format: 202 : Camera : Cam1
07/08/2015 10:51:03 : OK : Read License Plate : BEK991 ( Colombia ) Confidence : 85,44, Character height : 16,89,Format: 202 : Camera : Cam1
07/08/2015 10:51:03 : OK : Read License Plate : BEK980 ( Colombia ) Confidence : 97,56, Character height : 15,08,Format: 202 : Camera : Cam1
07/08/2015 10:51:02 : OK : Read License Plate : BDR596 ( Colombia ) Confidence : 73,79, Character height : 20,69,Format: 202 : Camera : Cam1
07/08/2015 10:51:02 : OK : Read License Plate : BDO767 ( Colombia ) Confidence : 83,51,Character height : 26,56,Format: 202 : Camera : Cam1
07/08/2015 10:51:02 : OK : Read License Plate : BCI060 ( Colombia ) Confidence : 95,70, Character height : 27,55,Format: 202 : Camera : Cam1
07/08/2015 10:51:02 : OK : Read License Plate : BCD69D ( Colombia ) Confidence : 69,68,Character height : 17,89,Format: 202 : Camera : Cam1
07/08/2015 10:51:02 : OK : Read License Plate : RLR312 ( Colombia ) Confidence : 86,19, Character height : 19,66,Format: 202 : Camera : Cam1
07/08/2015 10:51:01 : OK : Read License Plate : BCA930 ( Colombia ) Confidence : 99,30, Character height : 15,75,Format: 202 : Camera : Cam1
07/08/2015 10:51:01 : OK : Read License Plate : BBV66 ( Colombia ) Confidence : 67,66,Character height : 23,44,Format: 202 : Camera : Cam1
07/08/2015 10:51:01 : OK : Read License Plate : BBT505 ( Colombia ) Confidence : 86,38, Character height : 18,74,Format: 202 : Camera : Cam1
07/08/2015 10:51:00 : OK : Read License Plate : BBR278 ( Colombia ) Confidence : 99,99, Character height : 25,88,Format: 202 : Camera : Cam1
07/08/2015 10:51:00 : OK : Read License Plate : BBJ982 ( Colombia ) Confidence : 83,35, Character height : 31,24,Format: 202 : Camera : Cam1
07/08/2015 10:51:00 : OK : Read License Plate : BBI512 ( Colombia ) Confidence : 77,45, Character height : 15,48,Format: 202 : Camera : Cam1
07/08/2015 10:51:00 : OK : Read License Plate : NBX361 ( Colombia ) Confidence : 62,37, Character height : 15,22,Format: 202 : Camera : Cam1
07/08/2015 10:50:59 : OK : Read License Plate : BAY190 ( Colombia ) Confidence : 80,81, Character height : 19,29,Format: 202 : Camera : Cam1
07/08/2015 10:50:59 : OK : Read License Plate : BAV632 ( Colombia ) Confidence : 99,32, Character height : 31,70,Format: 202 : Camera : Cam1
07/08/2015 10:50:59 : OK : Read License Plate : BAS292 ( Colombia ) Confidence : 84,63, Character height : 20,53,Format: 202 : Camera : Cam1
07/08/2015 10:50:59 : OK : Read License Plate : BAQ085 ( Colombia ) Confidence : 82,68, Character height : 18,04,Format: 202 : Camera : Cam1
07/08/2015 10:50:58 : OK : Read License Plate : BTL688 ( Colombia ) Confidence : 91,90, Character height : 24,99,Format: 202 : Camera : Cam1
07/08/2015 10:50:58 : OK : Read License Plate : BAF27D ( Colombia ) Confidence : 74,26, Character height : 21,50,Format: 202 : Camera : Cam1
07/08/2015 10:50:58 : OK : Read License Plate : AZX02D ( Colombia ) Confidence : 91,21, Character height : 21,23,Format: 202 : Camera : Cam1
07/08/2015 10:50:58 : OK : Read License Plate : AZO37D ( Colombia ) Confidence : 85,15, Character height : 25,65,Format: 202 : Camera : Cam1
07/08/2015 10:50:57 : OK : Read License Plate : AZN498 ( Colombia ) Confidence : 76,55, Character height : 16,46,Format: 202 : Camera : Cam1
07/08/2015 10:50:57 : OK : Read License Plate : AZE62D ( Colombia ) Confidence : 76,39, Character height : 17,22,Format: 202 : Camera : Cam1
07/08/2015 10:50:57 : OK : Read License Plate : AYI14D ( Colombia ) Confidence : 85,13, Character height : 26,09,Format: 202 : Camera : Cam1
07/08/2015 10:50:56 : OK : Read License Plate : AXT93D ( Colombia ) Confidence : 95,51, Character height : 24,44,Format: 202 : Camera : Cam1
07/08/2015 10:50:56 : OK : Read License Plate : VDV179 ( Colombia ) Confidence : 80,03, Character height : 31,60,Format: 202 : Camera : Cam1
07/08/2015 10:50:56 : OK : Read License Plate : VES219 ( Colombia ) Confidence : 84,08, Character height : 20,05,Format: 202 : Camera : Cam1
07/08/2015 10:50:55 : OK : Read License Plate : AXC66D ( Colombia ) Confidence : 86,84, Character height : 15,14,Format: 202 : Camera : Cam1
07/08/2015 10:50:55 : OK : Read License Plate : AVX36D ( Colombia ) Confidence : 82,56, Character height : 22,96,Format: 202 : Camera : Cam1
  
```

In this tab we can see the log in real time.

We can also access the log edited in notepad by clicking the button.

Any messages or errors produced are saved in a LOG file generated in the temporary directory of the computer %TEMP%.

The format of the messages/errors is:

DATE: STATUS: Message

The status can be:

- OK
- ERROR
- WARNING

Under normal conditions there should be no ERROR messages in the LOG file. If one does appear, you must report the message to determine if it is an anomaly or a problem with the system (failure in communications, etc.).

WARNING messages will only appear if you have configured the WARNING LEVEL to be higher than zero.

## General Information Display

On this screen we can see the performance and the sub processes being carried out in the computer and we have information relating to the use of the processor cores and the results of the recognitions.

4 fps - VPAR SERVER - Recognition Technology by Neural Labs

Black List

Main Options IO Management Configuration Camera Management General information Logs Review

**Cameras Information**

Camera Camera 1, 1920 x 1080 Pixels, Format24bppRgb, 3069 Frames, 4 fps, frame time 217, inter frame time 37, IR discard 0 f:

**Thread Information**

Thread\_Start\_Listening 8051, 0 ms  
 Thread\_Start\_Listening 8040, 0 ms  
 Thread\_ShowGeneralInfo, 2584 ms  
 Thread\_HeartBeat, 0 ms  
 Thread\_Read\_Socket\_Results, 0 ms  
 Thread\_ReportCamerasStatus, 174 ms  
 Thread\_Send\_Images\_To\_VPAR, 0 ms  
 Camera : Camera 1 : RTSPCamera.NewFrame  
 Camera : Camera 1 : RTSPCamera.VideoSourceError  
 Camera : Camera 1 : RTSPCamera.PlayingFinished

Process files queue size: 0  
 Anpr queue size: 2  
 Cores used: 1  
 Last confidence Value: 91,66 %  
 Average Char Height: 55,07 pix  
 Image Processing time: 546,00 ms (156)  
 Images sent to Anpr 3048  
 Total Images: 3152  
 FPS processed: 4 Max: 6 Avg: 4  
 FPS discarded: 0 Max: 0 Avg: 0  
 Camera Frames per second: 4 fps  
 ANPR Results: 825  
 Elapsed Time: 0 d 1 h 41 m 31 s  
 Available results to display:  
 Active cameras: 1  
 Saved results: 818  
 ANPR size: 0  
 Result queue size: 0  
 Camera queue size: 0  
 Num licensed cameras: 10  
 Time Callback: 0  
 Webservice queue:

Reload Clear

Discard cores: 1  
 Discard Queue: 0  
 Discard Free cores: 1  
 Discard Real Time Cores 1  
 Discard Result Queue 0

## Camera Information

We can see information on how each camera is operating.

### Cameras Information

Camera Camera 1, 1920 x 1080 Pixels, Format24bppRgb, 3069 Frames, 4 fps, frame time 217, inter frame time 37, IR discard 0 fps, Filter discard 0 fps, RTSP Queue 0,

- Name of the camera
- Size of the image in pixels
- Format in number of colors of the image
- Total number of images received
- Number of frames per second currently being received
- Time taken to process each image
- Time taken to receive a new image from the camera

## Thread Information

Information on the main sub processes being run

### Thread Information

```
Thread_Start_Listening 8051, 0 ms
Thread_Start_Listening 8040, 0 ms
Thread_ShowGeneralInfo, 2073 ms
Thread_HeartBeat, 0 ms
Thread_Read_Socket_Results, 0 ms
Thread_ReportCamerasStatus, 137 ms
Thread_Send_Images_To_VPAR, 0 ms
Camera : Camera 1 : RTSPCamera.NewFrame
Camera : Camera 1 : RTSPCamera.VideoSourceError
Camera : Camera 1 : RTSPCamera.PlayingFinished
```

- Name of the sub process
- Time taken to execute each iteration
- For each camera it also shows the main event handlers being run.

## Other Information

This provides a summary of the most important information being produced.

```
Anpr queue size: 0
Result queue size: 0
Cores used: 0
Last confidence Value: 99.99 %
Average Char Height: 71.33 pix
Image Processing time: 328.00 ms
Images sent to Anpr 599
Total Images: 612
In use images: 0
Trackers: 8
Camera Frames per second: 4 fps
ANPR Results: 4
Elapsed Time: 0 d 0 h 3 m 25 s
Available results to display:
Active cameras: 4
Saved results: 0
Fps processed: 8
Fps dismissed in real time mode: 0
```

- VPAR queue size: Size of the queue of images awaiting processing by the LPR engine.
- Result queue size: Size of the queue of images being processed.

- Cores used: Number of cores in the computer being used.
- Last confidence value: Confidence value of the last recognition.
- Average char height: Average height of the letters in the last recognition.
- Image processing time: Time taken for processing by the last LPR processing.
- Images sent to VPAR: Total number of images processed by the LPR.
- Total images: Total number of images received from the cameras.
- In use images: Not implemented.
- Trackers: Number of licensed cameras.
- Camera frames per second: Number of frames per second, including all the cameras connected to the computer.
- VPAR results: Total number of images in which license plates were recognized.
- Elapsed time: Time since processing started.
- Available results to display: Not implemented.
- Active cameras: Number of active cameras.
- Saved results: Not implemented.
- FPS processed: Number of frames per second being processed by LPR.
- FPS dismissed in real time mode: Number of frames per second being dismissed due to working in real time.

## Retaining and Backing Up Information

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The database and images generated need to be cleared, and this process must be carried out regularly.

Once the purpose of the data generated has been determined, along with the length of time for which they must be retained, you need to prepare a maintenance plan to prevent the disks from increasing in size indefinitely.

Similarly, you must plan a system to back up the information to ensure that it can be restored if there is any failure in the disk.

These maintenance and contingency plans are not supported by this program.



## FAQ

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### **I can see the cameras in the VPAR SERVER but processing does not start.**

Check:

- That the Neural Labs USB key is in place.
- That the red light on the key is on.
- Check whether there are any error messages when processing starts.

### **I can't see images from the cameras in the VPAR SERVER.**

Check:

- That the VPAR SERVER and the cameras are connected.
- That there is no connection error.
- Check that the option "Picture display -> None" has not been enabled.

### **What is the minimum requirement in pixels for recognition?**

It varies according to the country. However, in general the minimum acceptable size is 15 pixels. At a smaller size many characters can be mixed up ("O", "Q", "D"; "T", "I", etc.).

The ideal value is between 20 and 25 pixels.

### **How many lanes can I cover with a 4CIF camera and with an HD camera?**

A camera with a 4CIF sensor can cover one lane of an urban street, and an HD camera can cover 2 lanes of an urban street or 1 high-speed lane (motorway).

### **The images are correct but it is not recognizing license plates.**

Check that the height of the characters of the license plate correspond to the predefined range, that the country chosen is correct and that the reading filters are not incorrectly defined.

## Change Log

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Author	Date	Change
LL	19/1/2017	Initial translation
MA	22/02/17	ONVIF manual camera
EF	09/03/2017	Review
MO	24/3/2017	Update default password for sa sql user

