



CathexisVision People Counting Document: Visible Light Camera Appnote

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1 Introduction

This document will detail the configuration of counting analytics, for both object counting using the Line Counter algorithm, and head counting using the Top down Head tracker algorithm.

Algorithm Requirements

There are two choices of algorithm for the standard TopDown analytics, available in CathexisVision. They are the free algorithm (which comes standard with CathexisVision), and the algorithm which is only made available by purchasing Analytics Suite III. The differences are listed in the table below.

<u>Free Algorithm</u>	<u>Licensed Algorithm</u>
Top down head counter. Counting lines are single lines only.	Top down head tracker. Counting lines may be set to single or double. A double line only counts when a person crosses both lines. This eliminates false counts that may occur when a person remains within a confined space around a line.
Line Counter and triggers are available. Add at least a trigger (a line trigger). Line triggers may be used to set up standard CathexisVision events which will trigger when a head is counted. It is possible to select the direction to trigger, i.e., according to the arrow indicated on the line (forward), against the arrow (reverse), or both (either).	
It is possible to add overlays to the counter to indicate the count. Add multiple counters per line. For example, add a forward counter and a reverse counter each with their own overlay.	
Masks are available to select and change the area that will be used by the algorithm to count heads.	

License Requirements

The following licenses will be required:

<u>License</u>	<u>Description</u>
CLIC license	This is the license required for each counter camera.
CNRP-1000	This is a base license, one per site.
CANA-3001	This is the Analytics license for each double line counter.
CNRP-1001	This is the counting license – one per direction

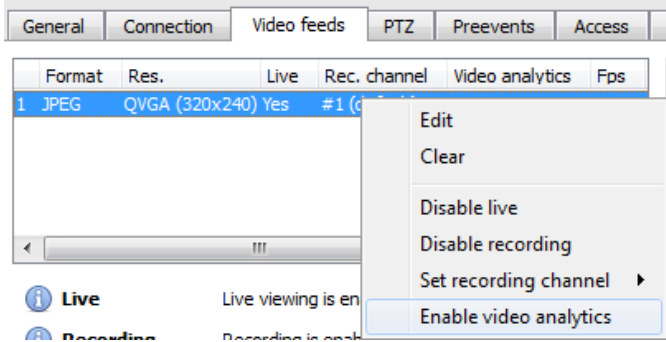
Note: There is one CNRP-1001 license required for each direction counted on a single counter. So, if counting in and out, two licenses are required.

If the choice is to opt for the licensed algorithm, then an additional CANA-3001 Analytics III license will be required, per camera.

2 Enable Video Analytics

Cameras Panel

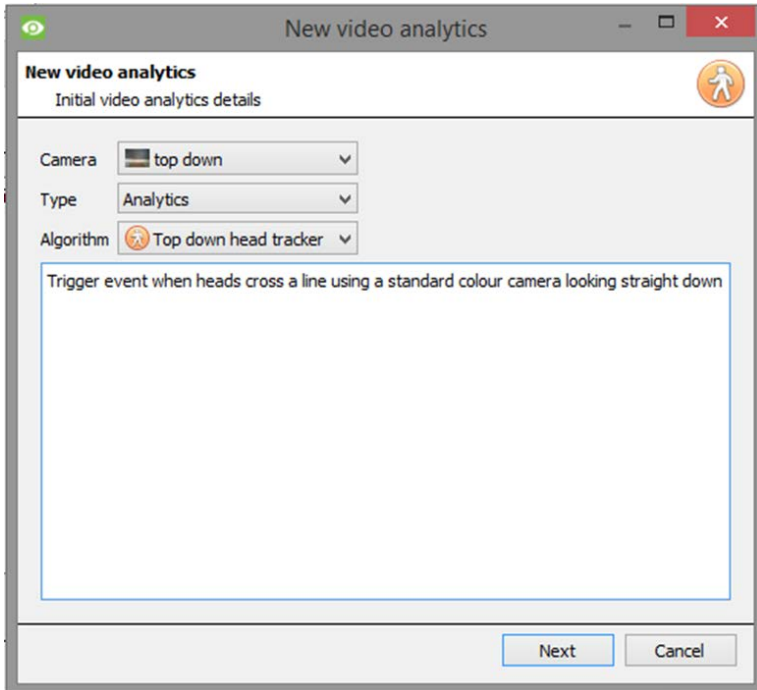
After a camera has been added (see Setup Manual), video analytics must be enabled on it. This may be done by either editing the camera, or enabling video analytics during the camera addition process.



In the **Video feeds**, right click on the available feed and select **Enable video analytics**.

Adding Video Analytics

Please ensure that a license is available for Analytics III to use the licensed algorithms, or, alternatively the free TopDown counter can be utilised.

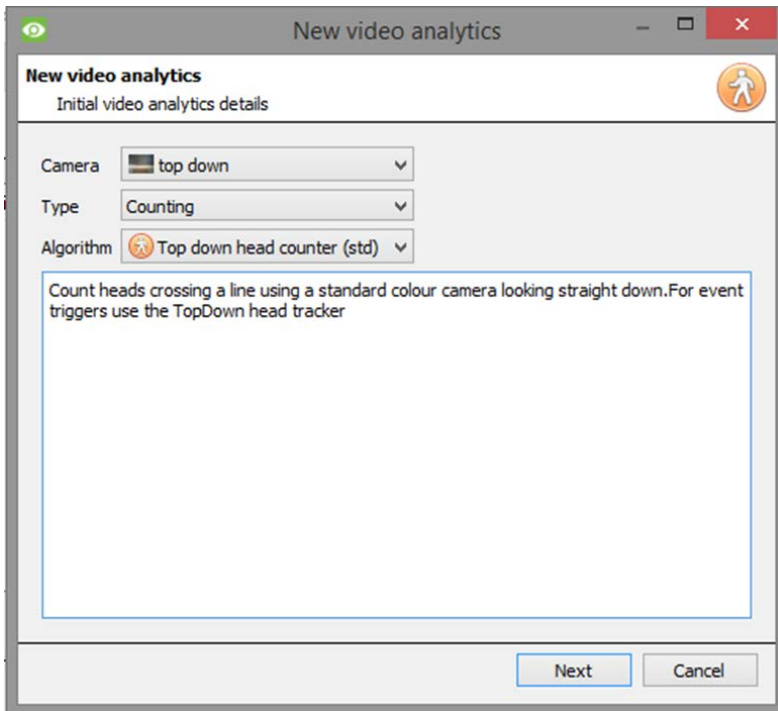


Select the **Camera** that requires analytics.

Select the video analytics.

Select the Algorithm **License Required for:**

Analytics - Top down head tracker



Free:

Counting – Top down head counter (std)

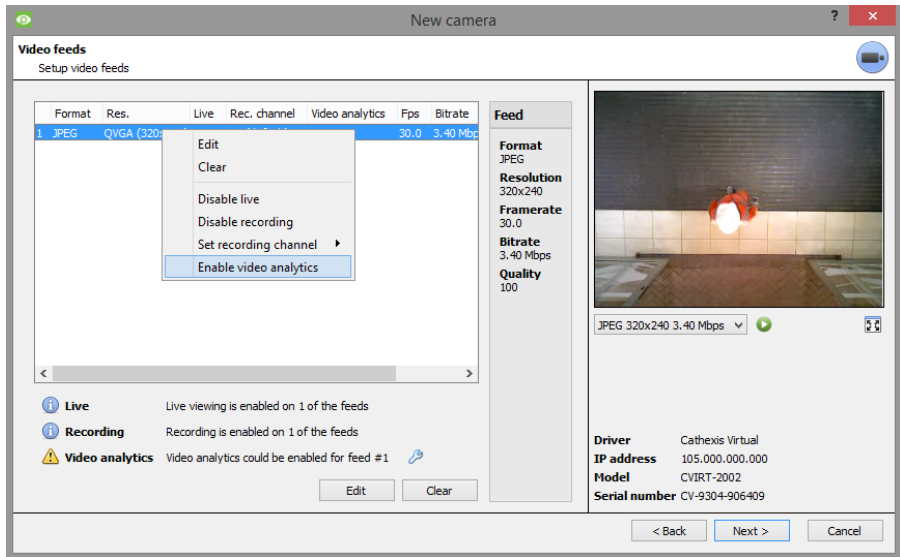
Select the **Camera** that requires analytics.

Select the video analytics.

If using the free option, the Top Down Head Counter is the only **Algorithm** available.

3 Configuring Analytics Basic Interface

The configuring video analytics basic interface is the same for both the free and licensed, Top Down Head Counter and Tracker. For more detailed information on video analytics, please consult the main Setup Manual.



Indicates configuration mode. Click to switch to **Running** to test video analytics settings.

Change the algorithm.

Save algorithm settings.

Load preconfigured algorithm settings.

Click for settings options to appear under camera image.

Add counting triggers and events.


Control video playback. Please consult main Setup Manual for more information.

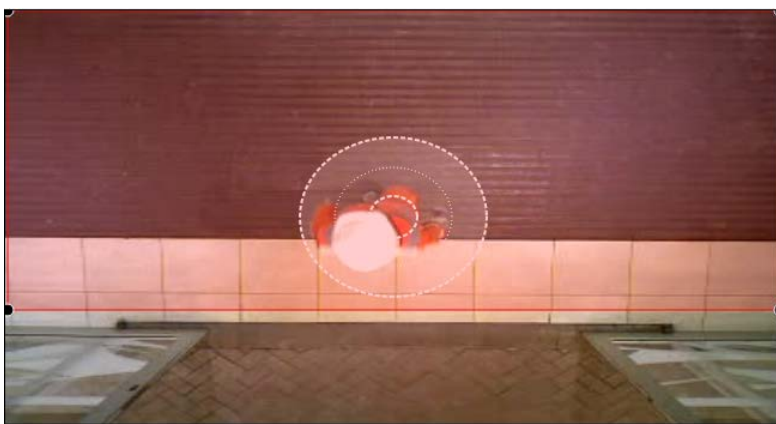
4 Configuring Top Down Head Counter Video Analytics

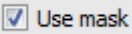
This section will detail configuring a TopDown head count for both the Free and Licensed video analytics.

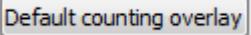
Free Algorithm

Settings Panel

In the left panel of the configuring video analytics window, select  **Settings**. This will bring up the following options underneath the camera image.



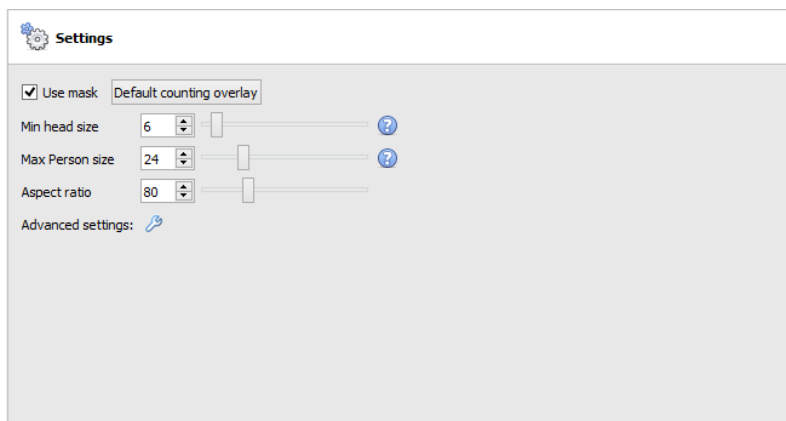
Check  **Use mask** to use a mask (in red) to apply the algorithm over a specific area.

Click  **Default counting overlay** to configure the way the head count number will appear as an overlay on the camera image.

Set the **Min head size** to eliminate counting of heads which are smaller than the inner circle.

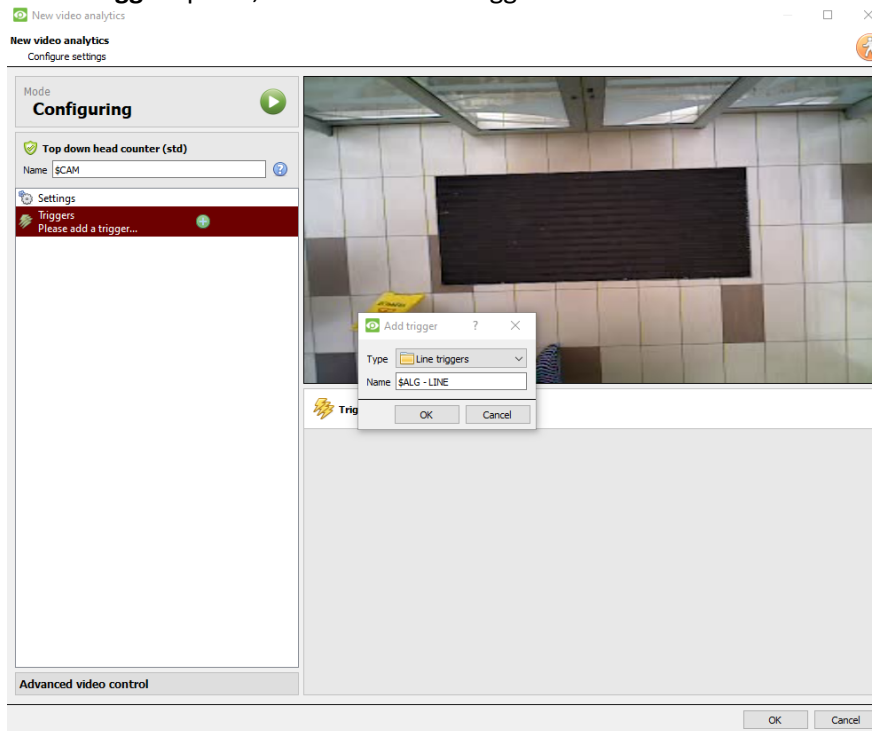
Set the **Max person size** value to split objects that are bigger than one person.


Change the Head **Aspect Ratio** to resemble the head shapes on the feed.



Triggers Panel

In the **Triggers** panel, at least one line trigger must be added.

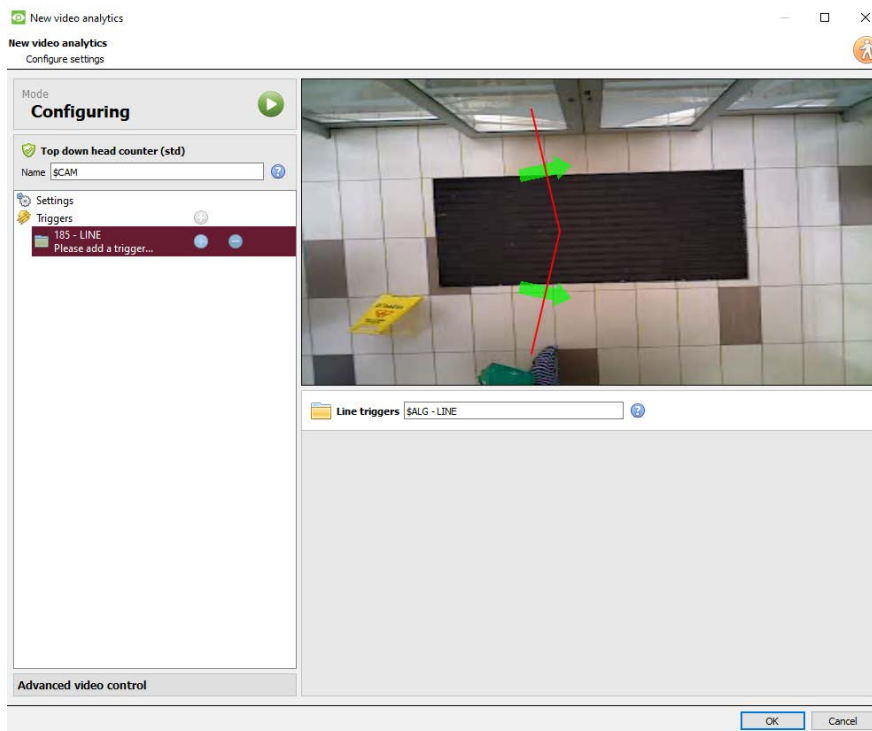


Click the  to add a line trigger.

Click .

The line will now be added to the camera image

- **Define the Counting Line**



Define the line so that it covers the area where the requirement for people crossing is.

Add nodes

CTRL-click the red line.

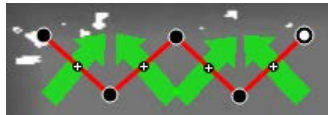
Remove nodes

Double-click on the node to be removed.

Move the Line

Click anywhere on the red line to drag the line to the desired position.

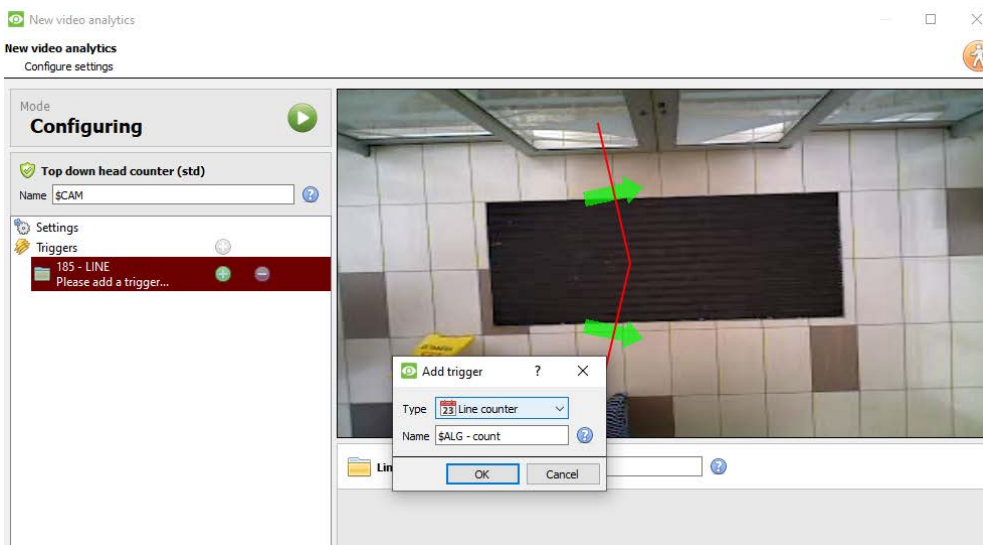
Angle the Line



Click on a node and drag it to the desired position

- **Add a Line Counter**

Adding a line counter will allow heads to be counted as they cross the line.



Select the newly added Line trigger.

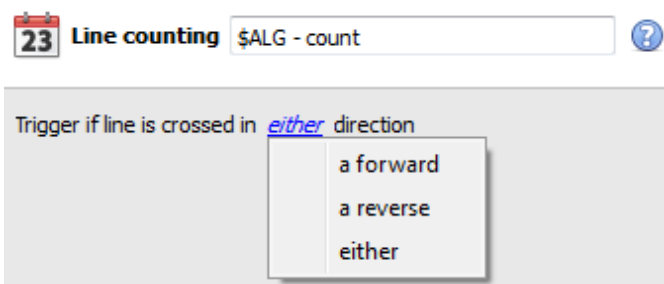
Click the to add a line counter.

Click .

Note: Multiple line counters may be added.

Define Direction to Trigger a Count

Once added, the direction to trigger a count can be defined. The default direction is set to **Either**. Select the trigger in the left panel, and options will appear underneath the camera image.



Forward will trigger counts if people cross the line in the same direction as the arrow.

Reverse will trigger counts if people cross the line in the opposite direction as the arrow.

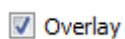
Either will trigger counts if people cross in either direction.

Note:

1. If multiple counters have been added, define the trigger directions for each counter.
2. A **CNRP-1001 license** is required for each direction being counted. Two **CNRP-1001 licenses** are required if using the default direction setting of *either*.

- **Configure Overlays**

This is applicable to the line counting trigger.

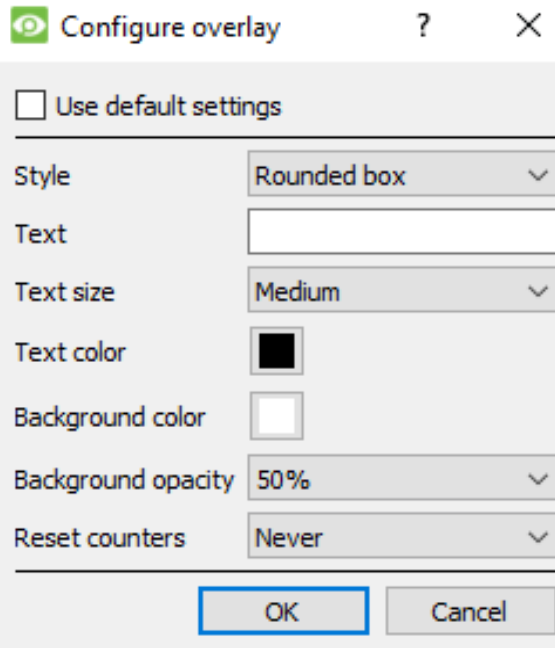


Overlay

Check the **Overlays** box for the head count of each line counter to be indicated on the camera image.



Click the settings icon to bring up the configure overlay dialogue window, below.



Check box to **Use default settings**.

Choose the **Style** of the count overlay.

Set **Text** to appear before the count number.

Select **Text size** and **colour**.

Select **Background colour** of the overlay.

Set the **Opacity of the background** colour.

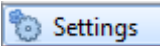
Decide when to **Reset counters**.

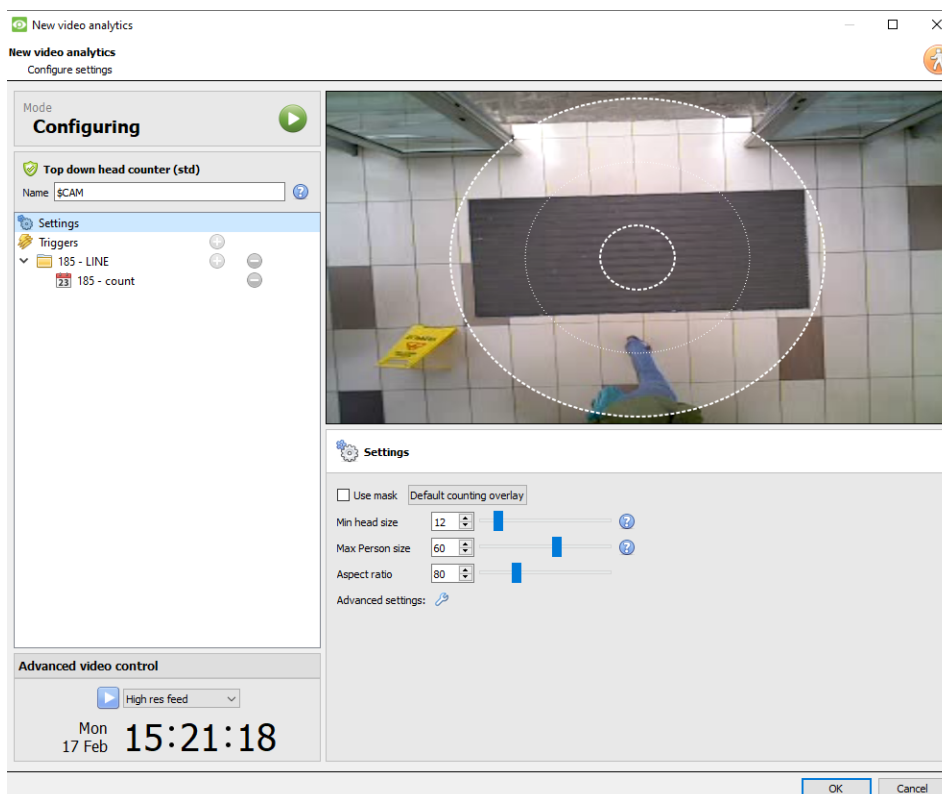
Click  when finished.

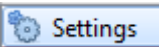
Licensed Algorithm

It is necessary to purchase and license the Analytics III suite in order to use this algorithm. Please also consult the license requirements at the beginning of this document for details on the specific licenses required.

Settings Panel

In the left panel of the configuring video analytics window, select . This will bring up the following options underneath the camera image.



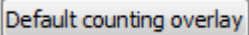
In the left panel of the configuring video analytics window, select . This will bring up the following options.

Mask → Mask can be checked to capture the area of the image where the algorithm works.

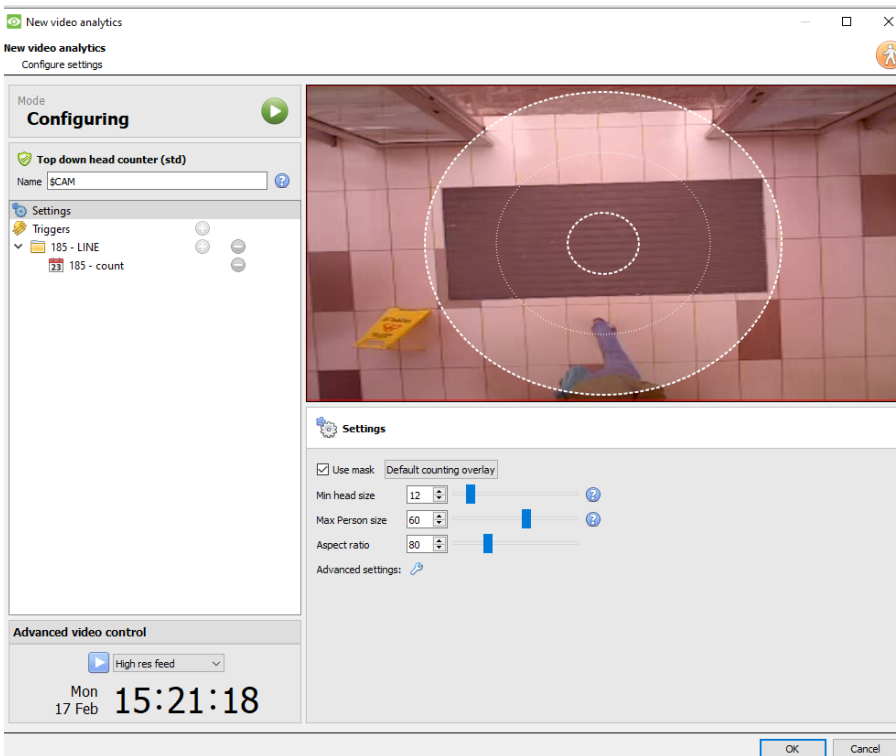
Min head size → Any moving object smaller than the min head size will be filtered out by the algorithm.

Max Person size → Moving objects larger than "Max person size" will be split into a smaller object.

Aspect ratio → Change this setting in order to better fit the "Min head size" and "Max Person size" overlays to the moving objects.

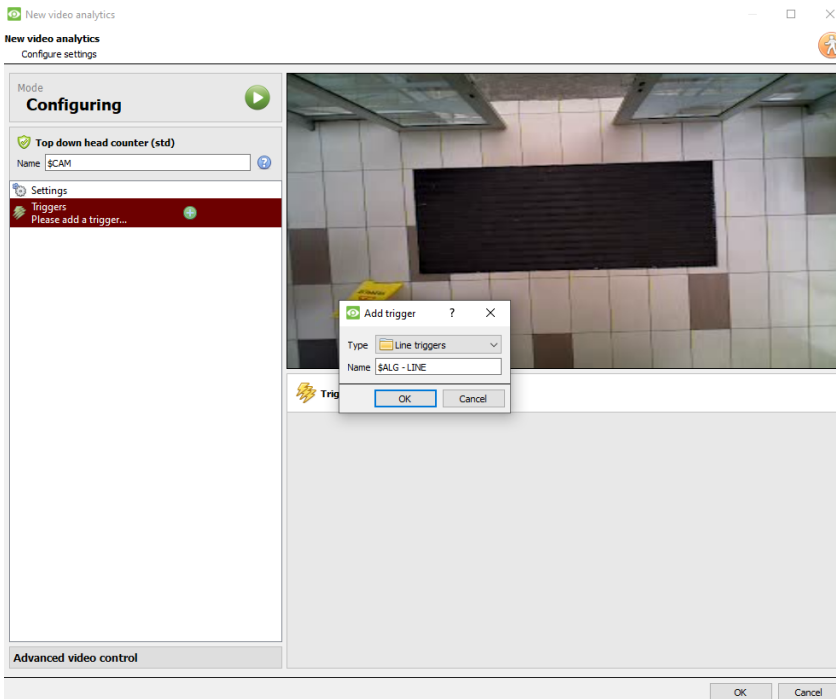
Default Counting Overlay → Click  to allow the visual display of tracking on the live and recorded data. This is useful to identify whether a head crossed a line, and how many times this occurred. These counts are also overlaid on the recorded footage. This setup allows resetting the head counter on an hourly or daily basis.

Triggers Panel



• Add a Counting Line

Add at least one line trigger.



Add at least one counting line.

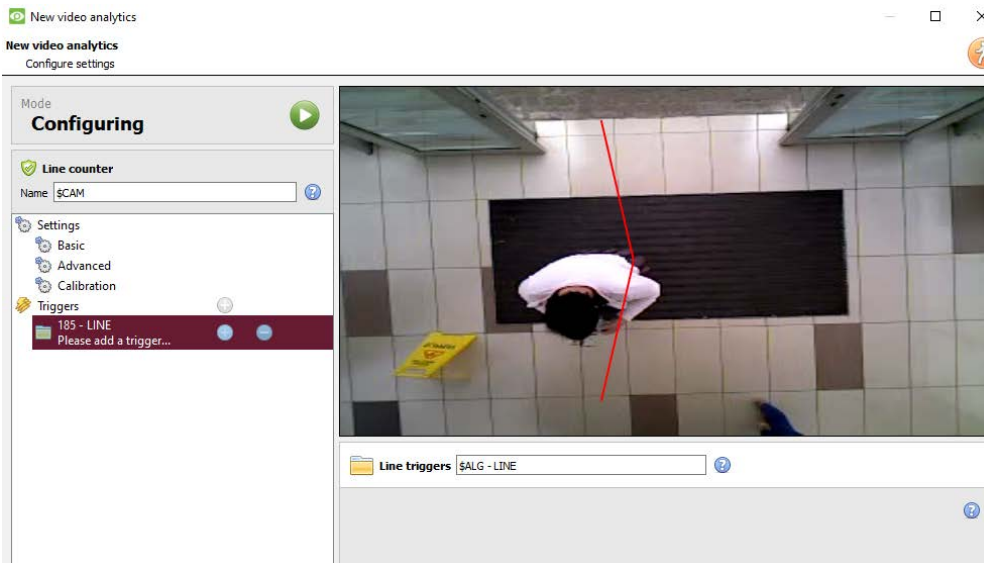
Click the  to add a counting line. Select **Line Triggers**.

Click .

The line will now be added to the camera image.

Choose Line Mode

Select the relevant line trigger in the Configuring Panel to define its line **Mode** underneath the camera image.



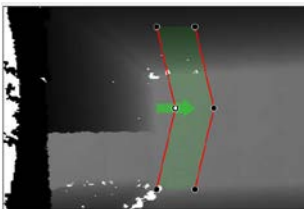
Single line will add a single line; people crossing this line will be counted.

Double line will add a double line; people will only be counted if they cross both lines.

Tip: Add a double line to eliminate false counts which may occur when a person remains within a confined space around a line.

Define the Counting Line

Note: This section will detail the definition of a **Double line**.



Define the line so that it covers the area in which to count people crossing.

Add nodes

Ctrl-click the red line.

Remove nodes

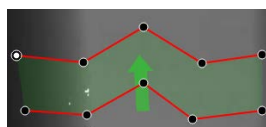
Double-click on the node to be removed.

Move the Line

Click anywhere on the red line to drag the counting line around.

Angle the Line

Click on a node and drag it to the desired position.

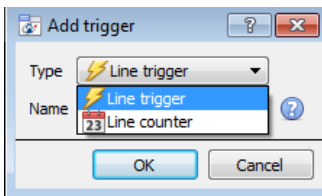


- **Add a Trigger or Counter**


If using the licensed algorithm, add either a line trigger or a line counter, or both.

Add a Trigger

Adding a trigger to the counting line will allow setting up CathesisVision events which will trigger when the line is crossed.



Select the newly added **TopDown 3D Counter - LINE**.

Click the  and select **Line trigger**.

Click .

Note: Multiple triggers may be added to a line.

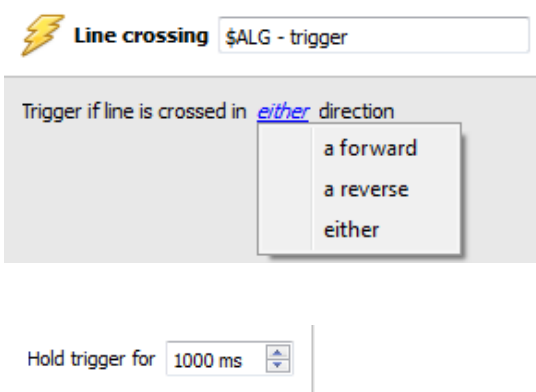
Define Direction of Trigger

Once added, define which directions will trigger a count. The default direction is set to **Either**. Select the trigger in the left panel, and options will appear underneath the camera image.

Note:

A **CNRP-1001 license** is required for each direction being counted. Two **CNRP-1001 licenses** are required if using the default direction setting of *either*.

Click the blue hyperlink.



Forward will trigger events if people cross the line in the same direction of the arrow.

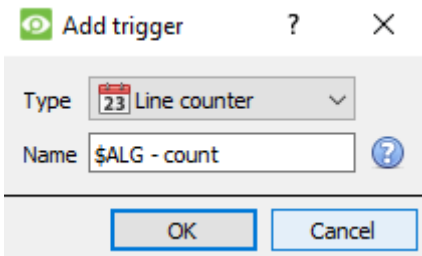
Reverse will trigger events if people cross the line in the opposite direction of the arrow.

Either will trigger events if people cross in either direction.


Set the **Hold trigger** time to extend the event by this amount after the trigger has terminated.

Note: If multiple triggers have been added, define the trigger directions for each trigger.

Add a Counter



Select the newly added **TopDown Counter - LINE**.

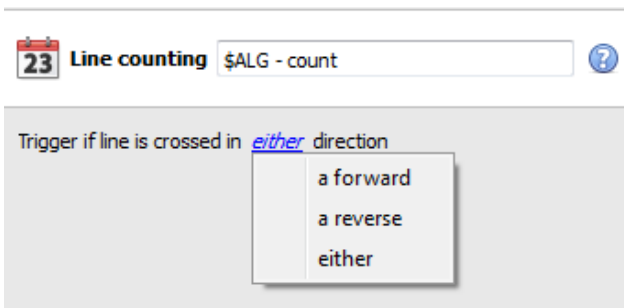
Click the  and select **Line counter**.

Click .

Note: It is possible to add multiple counters to a line.

Define Counter

Once added, define which directions will trigger a count. The default direction is set to **Either**. Select the counter in the left panel, and options will appear underneath the camera image.



Forward will trigger counts if people cross the line in the same direction of the arrow.


Reverse will trigger counts if people cross the line in the opposite direction of the arrow.

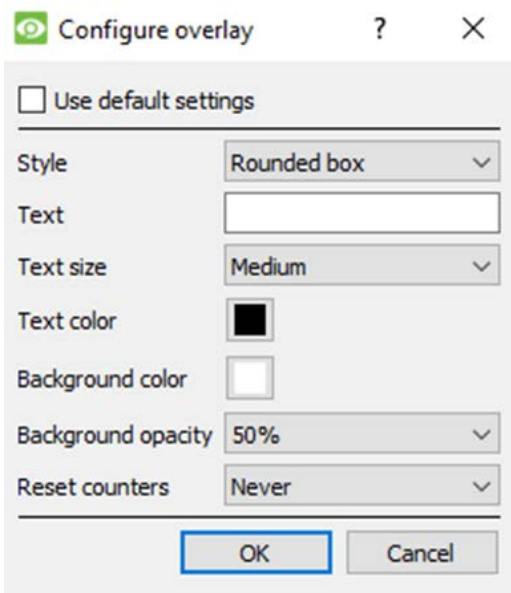
Either will trigger counts if people cross in either direction.

Note: Licenses are required for each direction being counted. Please consult the License Requirements section at the beginning of this document for details.

Configure Line Counting Overlays

Overlay Check the **Overlays** box for the overlays of the selected counter to be indicated on the camera image.

Click the  icon to bring up the count overlay settings dialogue.



Check box to **Use default settings**.

Choose the **Style** of the count overlay.

Set **Text** to appear before the count number.

Select **Text size** and **colour**.

Select **Background colour** of the overlay.

Set the **Opacity of the background** colour.

Decide when to **Reset counters**.

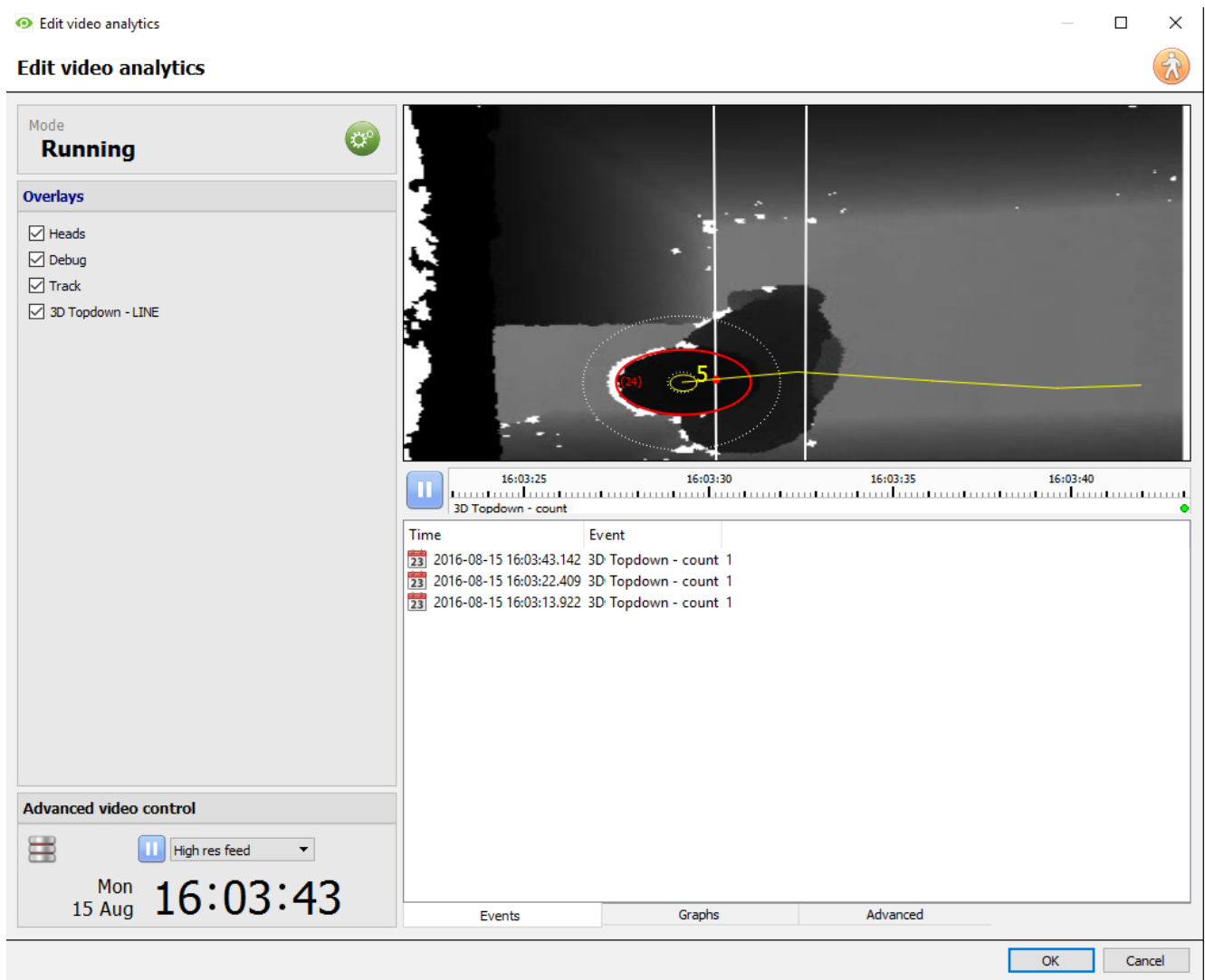
Click  when finished.

5 Testing Video Analytics

After the algorithm is set up, test how the algorithm runs before adding it to a camera.

In the configuration window, click  to switch to **Running**.

Click  to switch back to **Configuration** in order to adjust settings (if needed).



Edit video analytics

Mode: **Running**

Overlays

- Heads
- Debug
- Track
- 3D Topdown - LINE

Advanced video control

High res feed

Mon 15 Aug 16:03:43

Time	Event
2016-08-15 16:03:43.142	3D Topdown - count 1
2016-08-15 16:03:22.409	3D Topdown - count 1
2016-08-15 16:03:13.922	3D Topdown - count 1

Events Graphs Advanced

OK Cancel

Checking **Heads** will capture the head in red, and indicate the size, measured in pixels.

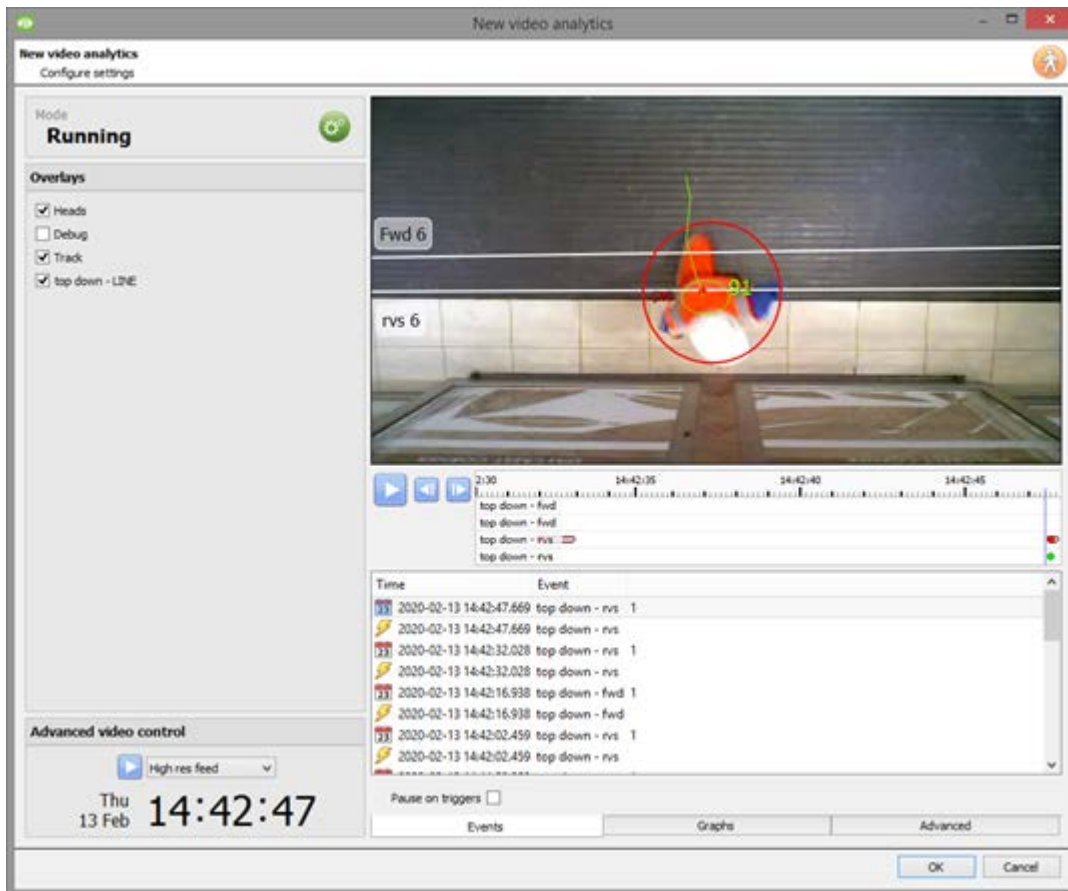
Checking **Debug** will display the head capture size circles set up in the configuration stage.

Checking **Track** will track the movement of the heads across the camera image with a line.

Checking any of the lines added will display them.

Events Panel

Counts and triggers which have been set up will appear in the **Events Panel**.




To view an event on the timeline and in the camera image, **pause the video**. From there, either select the event entry, or click on the event icon in the playback timeline.

Event icons

The triggers and counts set up in the previous section will be displayed on the playback timeline at the time of the count.



This is the trigger icon. The length of the icon will change depending on the trigger hold time setup during configuration phase. I.e., this trigger is set to hold for 1000ms, but if set

to hold for 300ms it would look like this: 



This is the count icon. It will appear only to denote that a head has been counted.

Graphs Panel

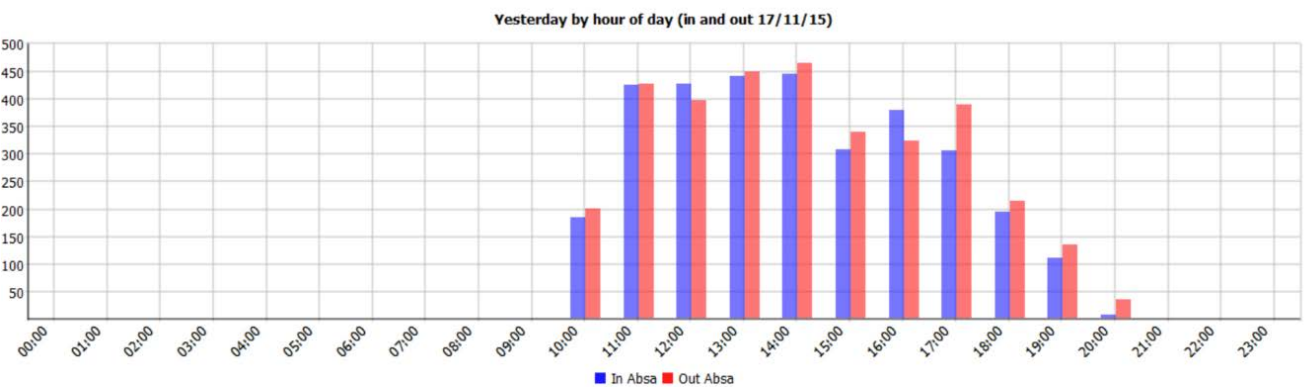
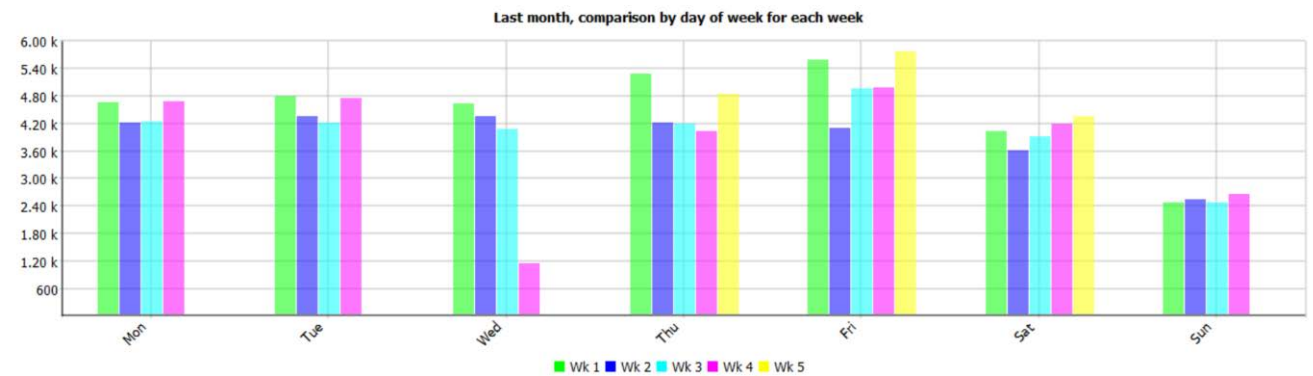
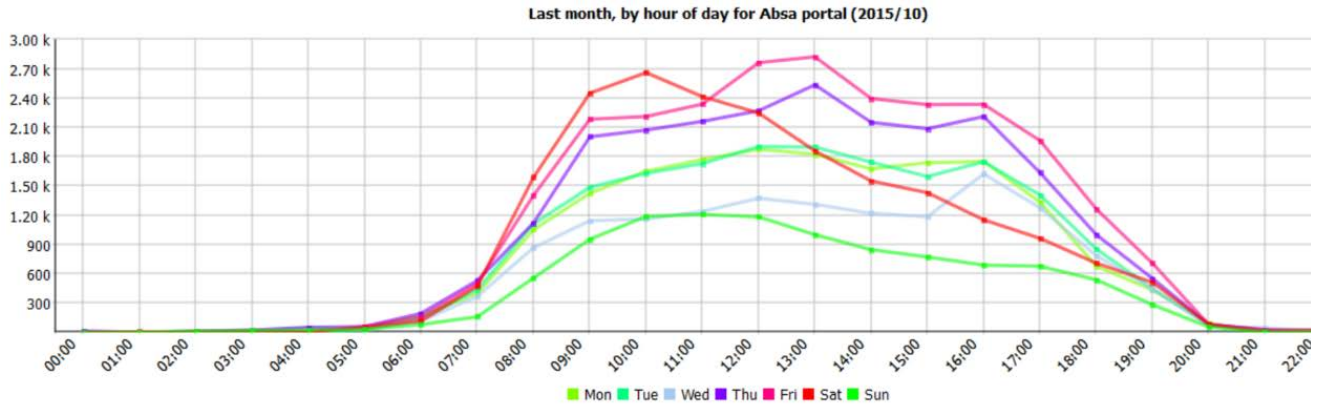
The graphs panel is not used by this algorithm. For information on creating graphs and reports, please see the **Reports Section**.

6 Reports

Currently, counting reports are generated by Cathexis and supplied to the client. In order to generate a report of counts over a specific time period, please contact support@cat.co.za with specific reporting requirements.

Report Examples

Below are some examples of the kind of reports that can be generated for the user:



Yesterday by hour of day (in and out 17/11/15)		
When	In Absa	Out Absa
00:00	0	0
01:00	0	0
02:00	0	0
03:00	0	0
04:00	0	0
05:00	0	0
06:00	0	0
07:00	0	0
08:00	0	0
09:00	0	0
10:00	190	206
11:00	430	431
12:00	432	402
13:00	445	454
14:00	450	470
15:00	313	344
16:00	384	328
17:00	311	393
18:00	199	219
19:00	116	139
20:00	12	41
21:00	0	0
22:00	0	0
23:00	0	0
Total	3.28 k	3.42 k

7 Conclusion

Please remember that this appnote was designed to deal specifically with this integration. For further information about the CathesisVision software please consult the main manual (<http://cathesisvideo.com/>).

For support please contact support@cat.co.za.