

Smart Tracking

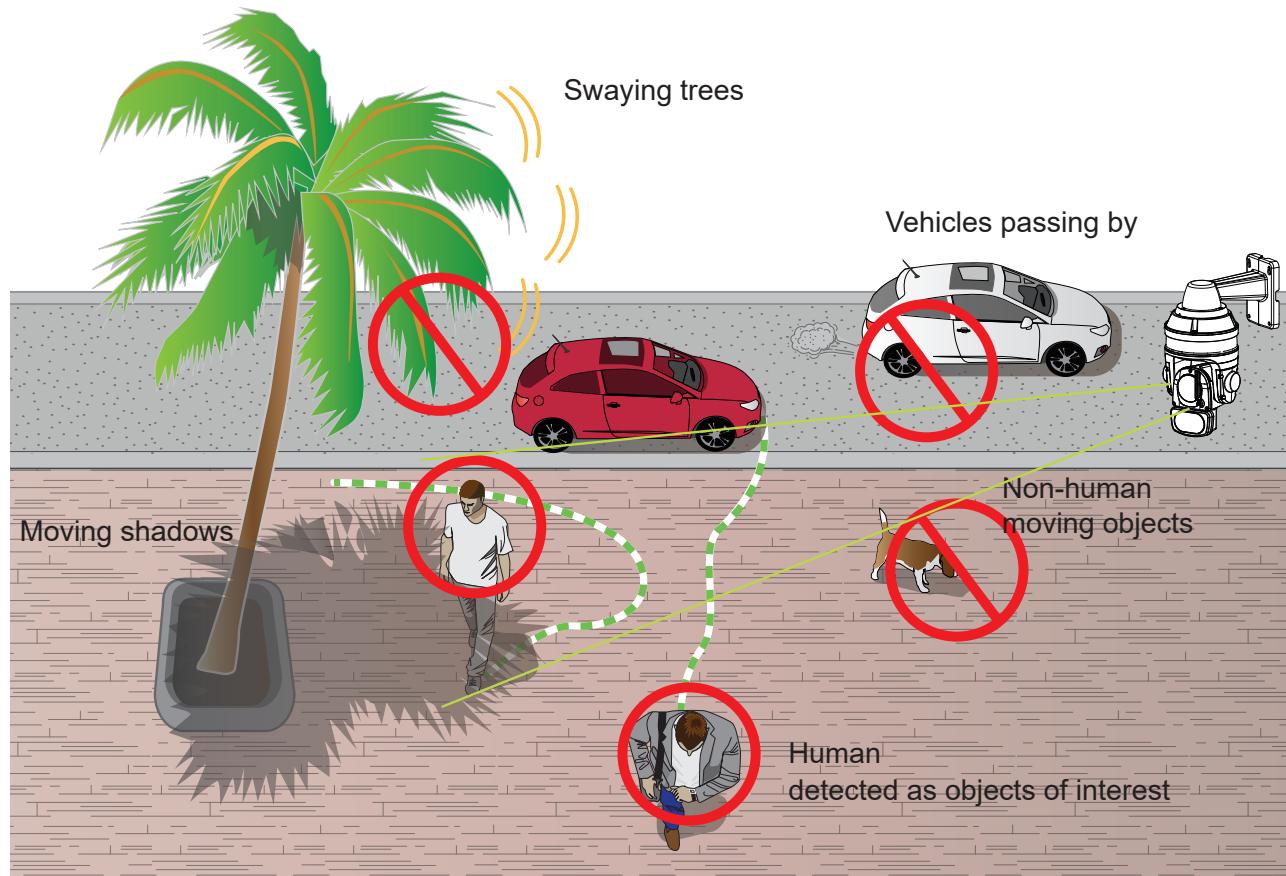
User Guide

Traditional motion detection or tracking relies heavily on the detection of pixel changes or motion vectors, and false alarms can be triggered by swaying trees, clouds floating by, or even the appearance of little animals. The Smart Tracking feature, with the detection of human silhouettes, can eliminate the defects of traditional detection and facilitate the configuration at a surveillance site.

A key feature in the Smart Tracking is the People detection. Based on a human silhouette database and the rapid responses via an artificial neural network technology, the Smart engine instantly recognizes human appearances in a video surveillance area. Since people are the objects of interest in the majority of video surveillance, the People detection feature enables users to quickly configure his installation.

With People detection, light changes or swaying vegetation, vehicles passing by, or animal activities in the scene are not taken as event triggers. Only human activities will trigger an event. This helps reduce false alarms and the time and efforts for a camera configuration.

Smart Tracking automatically detects, zooms in, and keeps track of moving personnel. It relieves the efforts of discovering, tracking, and zooming from an operator. The feature is suitable for PTZ cameras installed at low-traffic areas such as parking lots, or the monitoring of facilities during the off-office hours.



Revision History

- Rev. 1.0: Initial release



IMPORTANT:

Requirements for Running the Smart Tracking Feature:

1. The embedded video tracking and counting analysis requires a monitoring session on Microsoft IE 10 or IE 11 browser.
If you open a console with a non-IE browser, the Smart Motion stream must be configured to be streaming in MJPEG.
2. Lens cleanliness is also required because dust spots or smears on dirty lens can produce miscalculation of pixels, correlation, and movements.
3. For other installation concerns, please refer to page 3, Considerations.
4. Avoid glass and reflective materials, such as aluminum foils, in the field of view. If unavoidable, you can use the Exclusive area settings to get rid of the side effects.
5. Make sure the camera is installed appropriately above the area of your interest, e.g., an entrance to building. Installation at an extremely busy area, e.g., a square or cross road section with dozens of passengers per minute, may not apply.
6. Due to the system load, do not open two configuration web consoles at the same time.



NOTE:

1. The effectiveness of the Smart Tracking detection will diminish for objects lower than 130cm, such as children.
2. When using an HTTPS connection, you should stop and re-start the VCA after you upload a license.

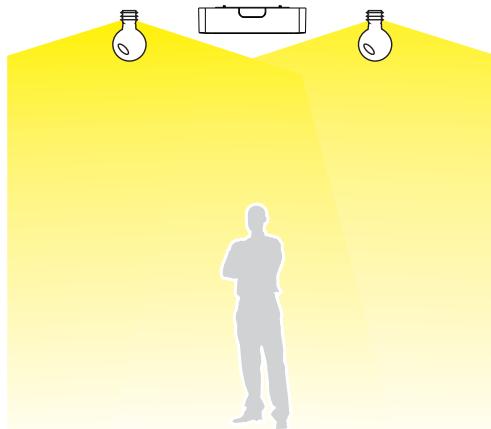
Applicable Cameras:

Please refer to VIVOTEK's VCA package and camera documentation on the website. This feature applies to Speed Dome PTZ cameras.

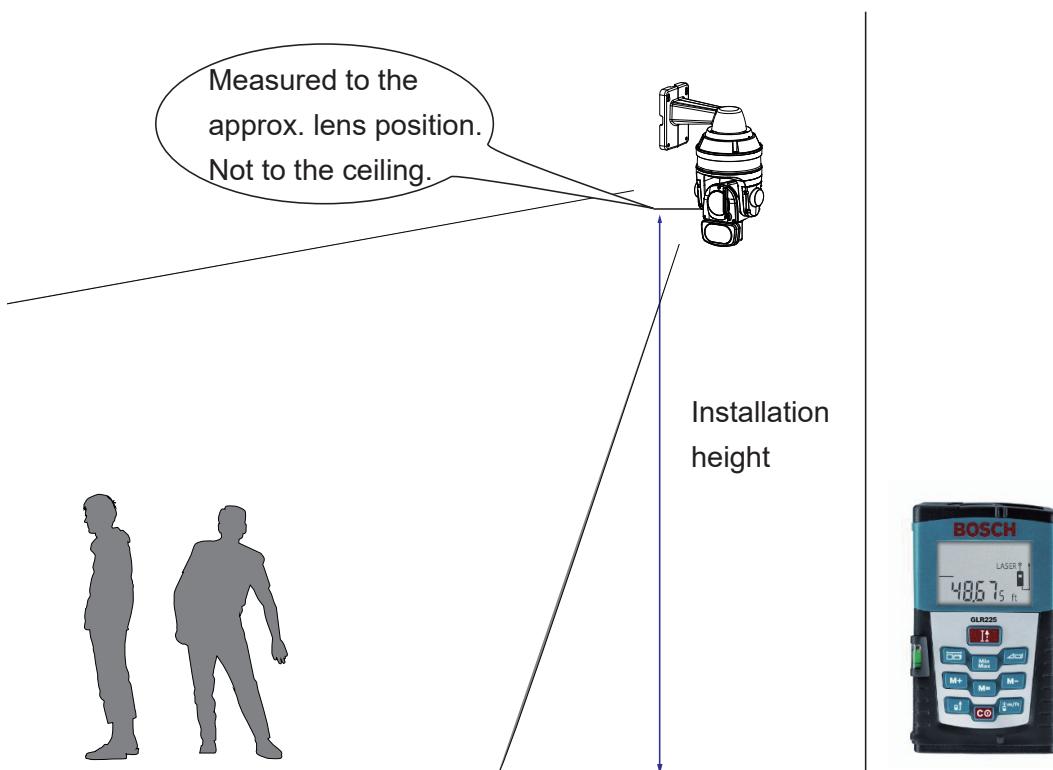
Considerations

Note the following when planning the camera installation:

1. The installation site must be adequately lighted for optimal accuracy with video detection.
2. In the night mode, configure a schedule profile for the different lighting condition. In the night mode, the Smart Tracking works if additional lighting is provided, e.g., using the on-board IR light.

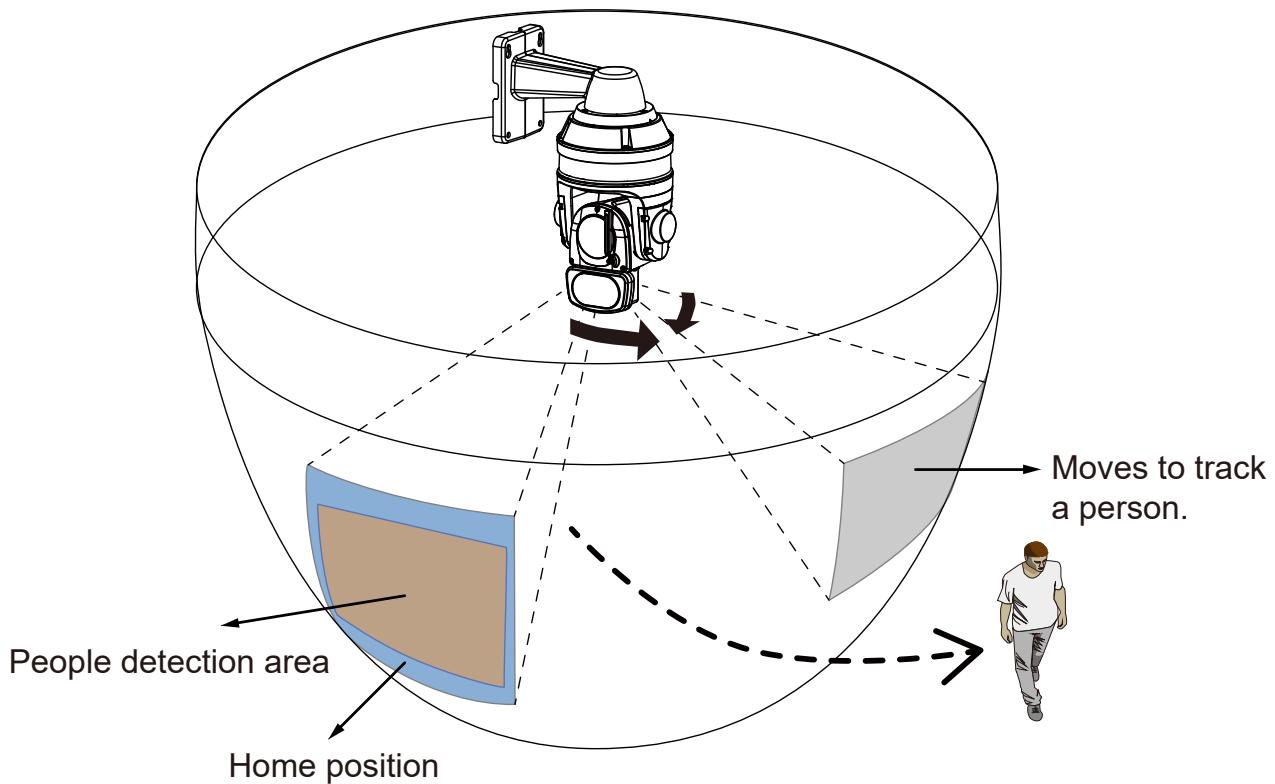


3. Make sure you measure the height of your camera. The height information is important for the accuracy of the video analytics results. Some of the other perspective information are automatically collected by the onboard S-sensor. The height information enables the horizontal and vertical keystone corrections of the field of view. Measure the distance between camera lens and the ground.



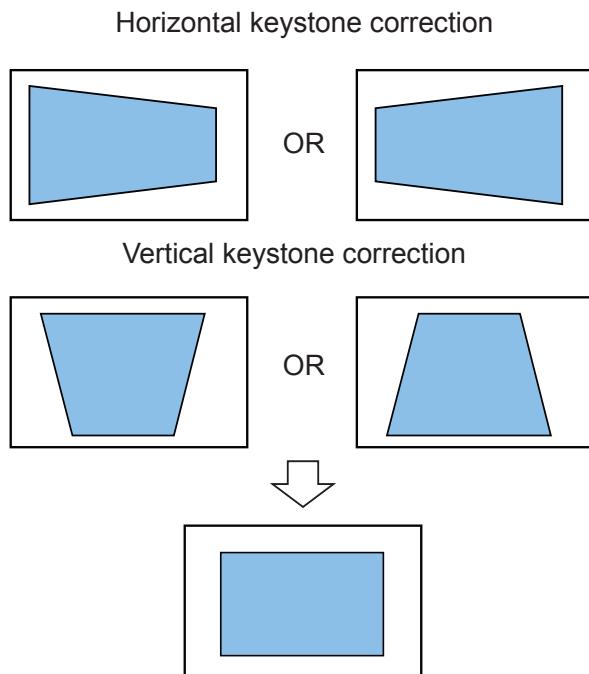
4. Below are some basic information for the Smart Tracking feature:

1. The detection takes place at the Home position.
2. The PTZ camera then moves its lens to track the object found until the object moves away from the scene, or enters a shelter (e.g., getting into a car). The PTZ camera may lose the track when the field of view is blocked by a building. The camera then loses the track.
3. The camera zooms in on the object when it is detected.
4. A person can not be detected when he is squatted, crawling, or riding on a scooter or bicycle since his body silhouette is merged or destroyed.
5. Once the camera stops tracking an object, the FOV will return to the Home position.
6. The maximum tracking range is 200 meters in radius.

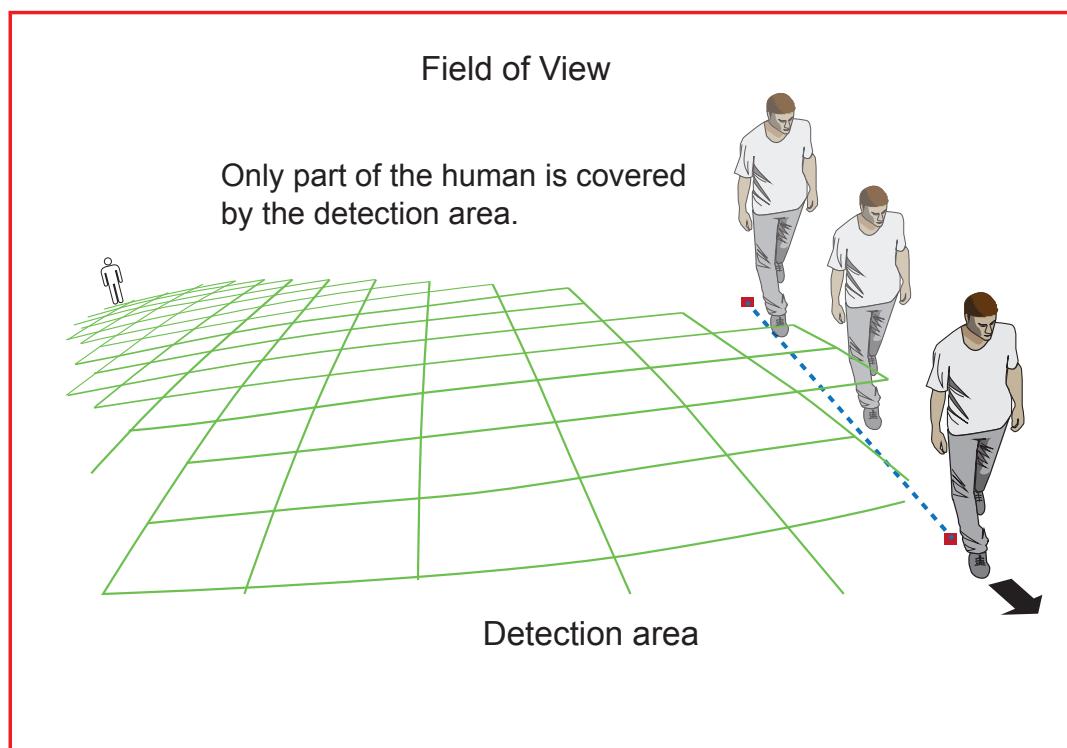


5. Because the horizontal and vertical keystone corrections are performed for an accurate detection, the height and tilt information of the camera must be correctly configured.

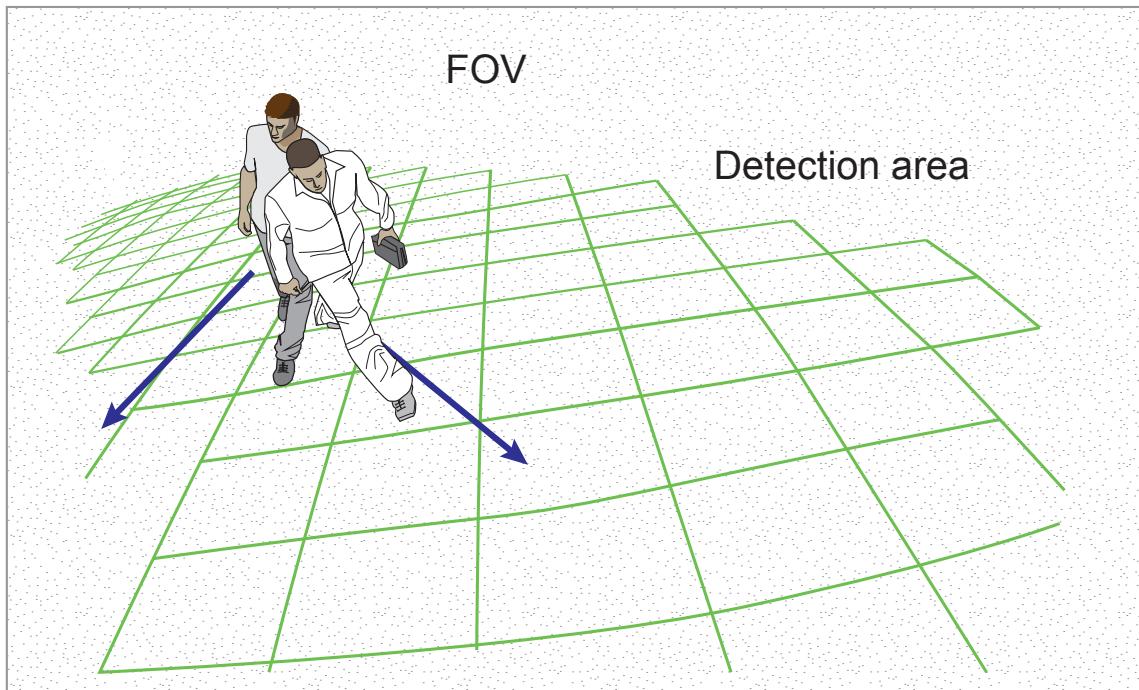
Use a laser distance meter to measure the installation height. The height information **MUST BE** correctly measured and entered in the camera's configuration page.



6. For People detection, as long as a human silhouette is detected in the field of view, and his feet travelled through the People detection area, he can be detected. Due to the visual perspective of lens, sometimes the entire body may not be covered by the detection area.



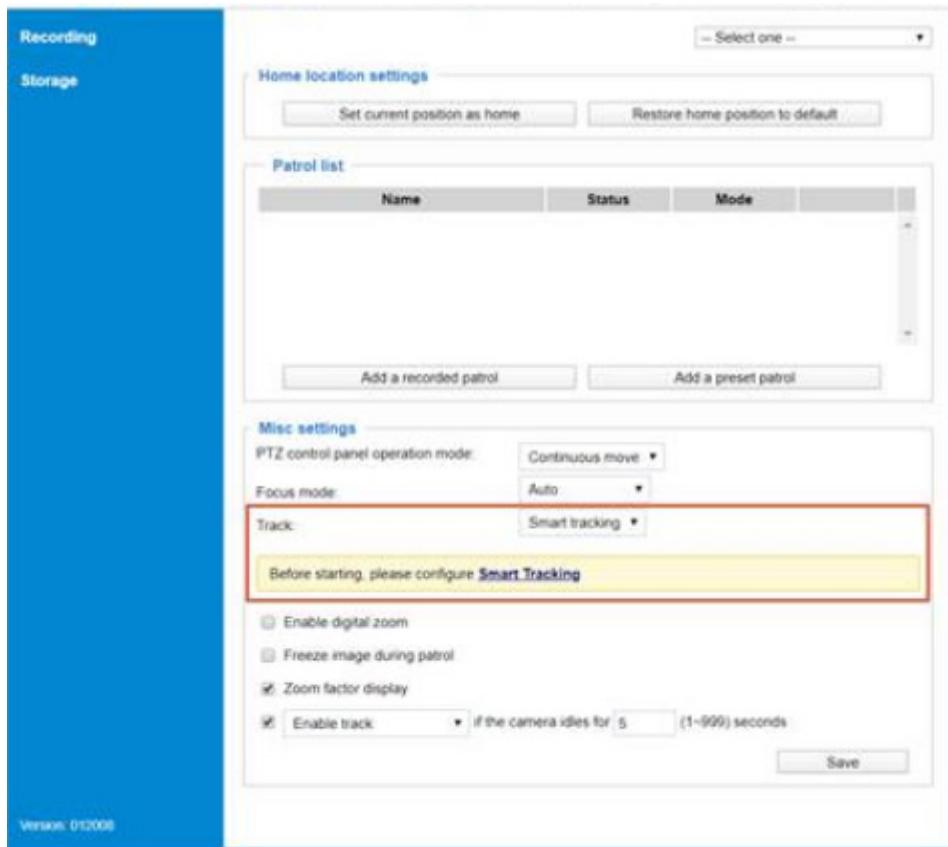
- Due to the optic concave characteristics of a lens, men can be temporarily blocked behind other men. When a man's head-shoulder feature is concealed, he may not be detected for the short moment.



7. A man sitting, squatted, or men lying on the floor may not be detected as a human, because his silhouette has been destroyed. Detection may also be affected when a human form is changed, e.g., a man's body is hidden behind a counter, or a man showing only the upper half of his body by leaning on a desk.

Configuration:

1. Open a web console to the camera. Enter the **Configuration > PTZ settings** page. Use the pull-down menu in **Misc settings > Track** to select **Smart tracking**. Click Save to preserve your settings.



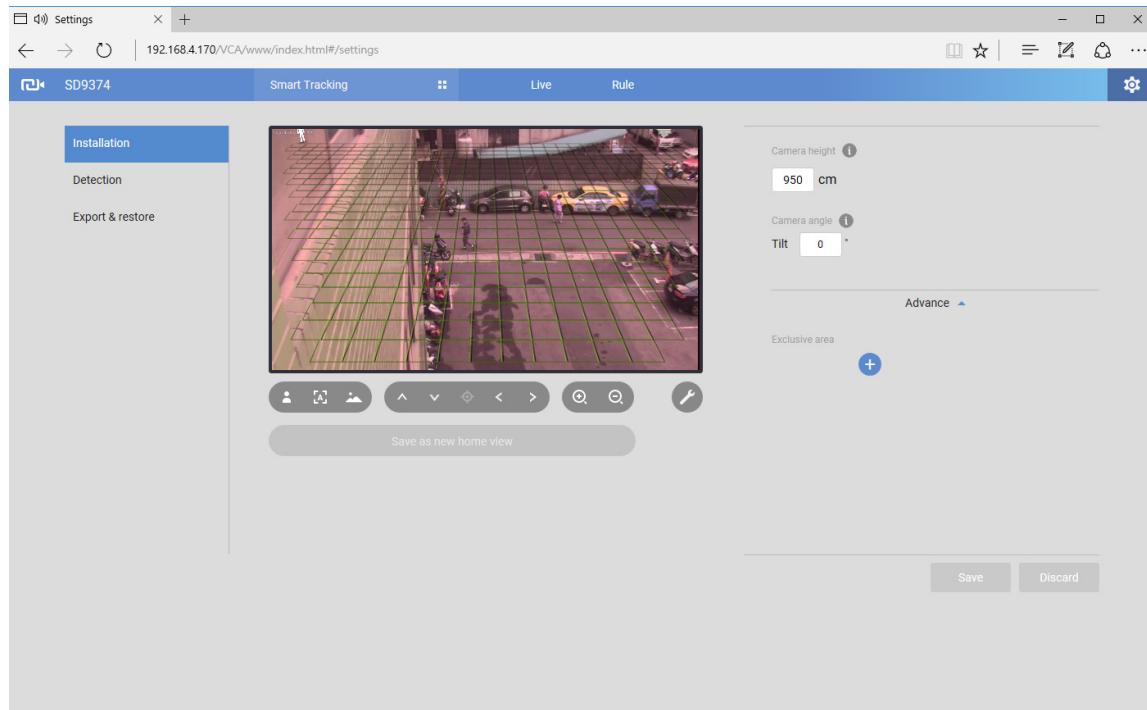
2. Open a web console to the camera. Enter the **Configuration > Applications > Package management** page. Click on **Smart Tracking** to open the monitoring and configuration page.

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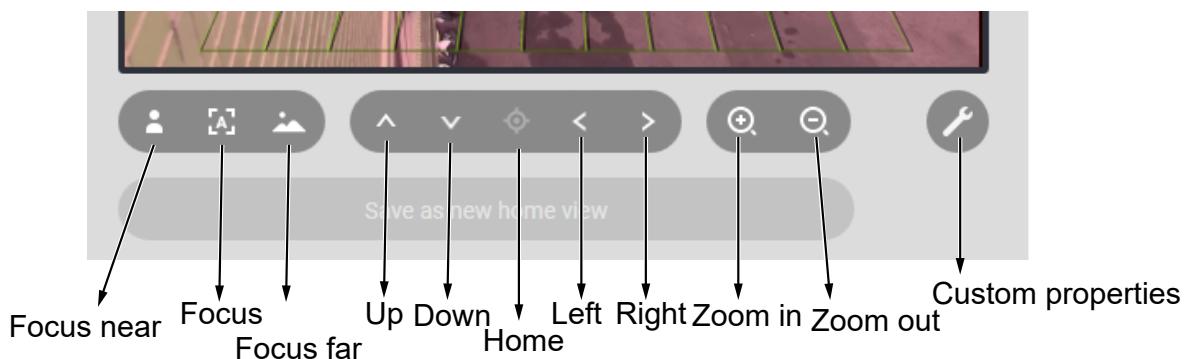
3. The utility defaults to the Live page. Click on the **Settings**  button on the upper-right corner to enter the Settings page.

4. Enter the correct installation height.

If using models that are not equipped with a G sensor, you can manually enter the tilt and roll angles.



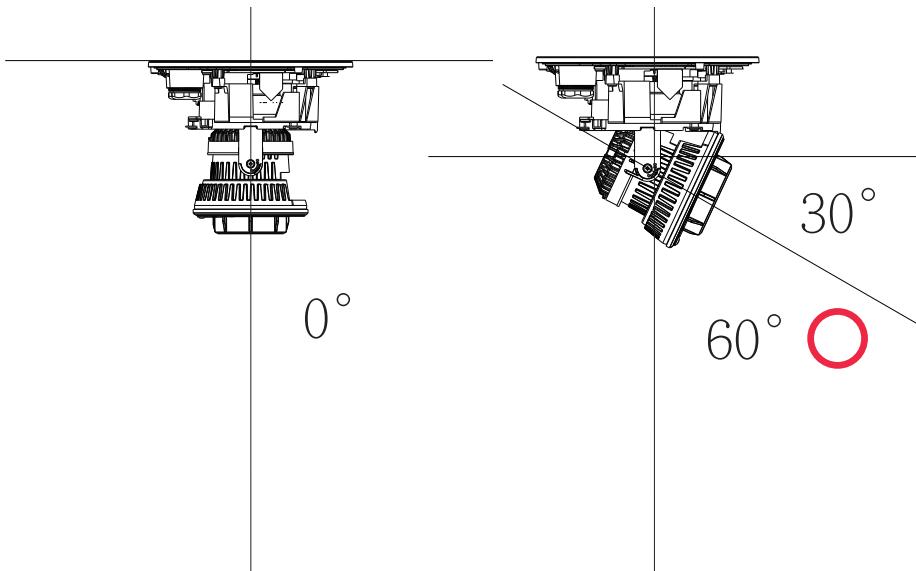
You can configure a new Home position using the onscreen controls. See the PTZ buttons below for information. You can click and hold down the mouse button for longer than 0.5 second for a continuous move.



If you move your FOV to a new position, you can click "**Save as new Tracking Center**" button to configure it as a new home position. The detection of people always occurs at the Home position.

Note that either in the Live view or the Settings page, using the PTZ control buttons automatically pause the on-going tracking activities.

Note that the tilt angle correlates to the absolute downward direction. If a camera is installed on a ceiling, and its lens points straight downward, its tilt angle is 0 degree. If your camera lens is tilted, enter the angle related to the vertical line, e.g., 60° as shown below.

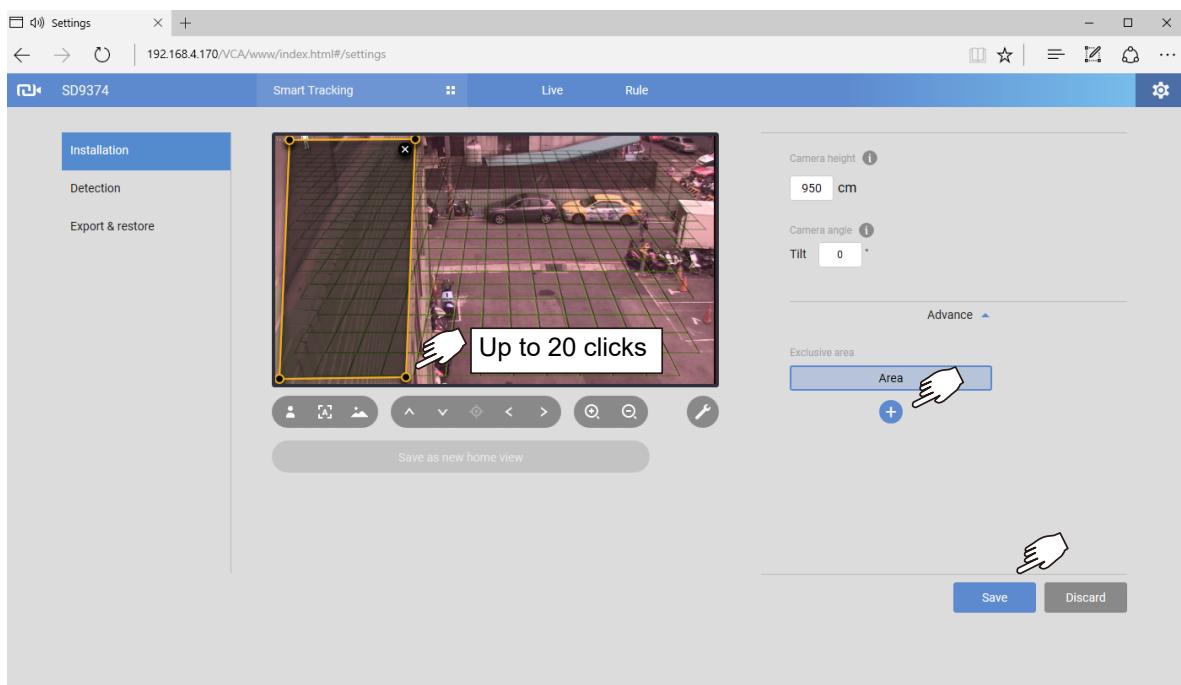


The roll angle is one that refers to the horizontal level line.

Exclusive Areas

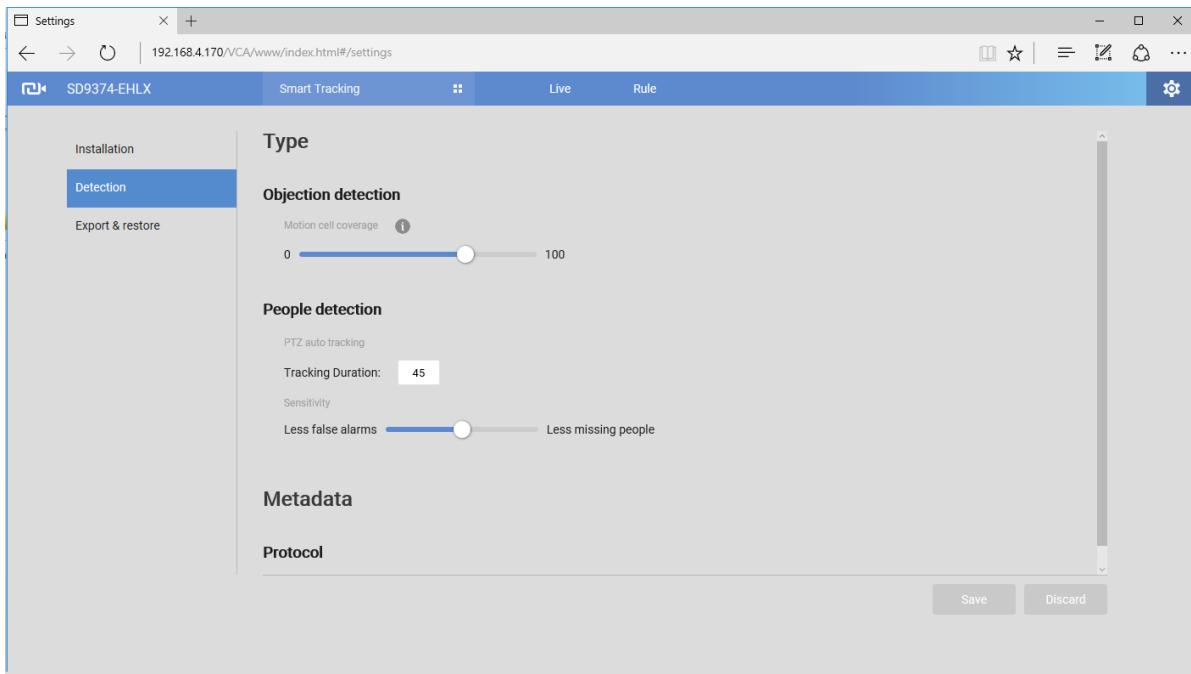
Click the **Advanced** button and click the Add button  to add an Exclusive area. Sometimes there are non-related elements in your field of view, such as a white wall where no one can walk on it or a fish pond with reflective water surface. You can add exclusive areas to block out the unnecessary elements in scene.

Use mouse clicks on the screen to draw polygons to create Exclusive areas. Click **Save** to preserve your settings.



5. When done, click **Save** to preserve your settings.

6. Click on the **Detection** tab to move to the detection parameters page or click the **Rule** tab to create detection rules. Configure the detection parameters such as those related to **People detection**.

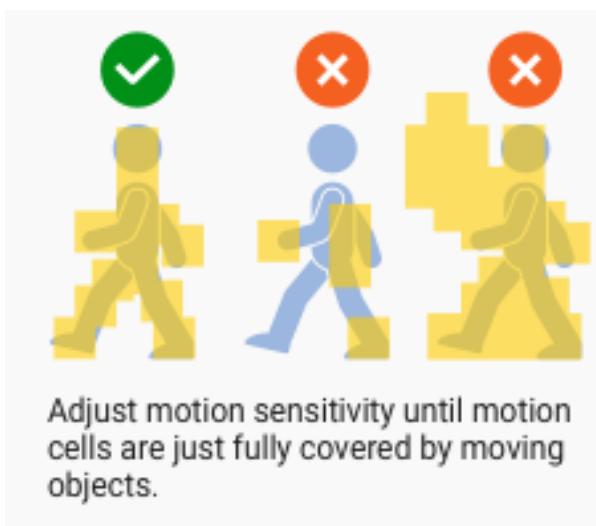


Object detection

Motion cell coverage: This parameter is related to the Motion detection function in firmware.

The sensitivity level is related to the detection of human figures on screen. Tune the sensitivity so that the appearance of motion cells better coordinates the appearance of the objects of your interest. Default is 70%.

Coordinated cells too few excessive cells



People detection

PTZ auto tracking:

Tracking Duration (seconds): This determines how long will the PTZ camera track a person once he is found in scene. Default is 45 seconds. If necessary, enter a different number of your preference.

Sensitivity: Tune the sensitivity of human silhouette detection. If you find the situation where people have not been properly detected, tune for a higher sensitivity. If you find the occurrences of false alarms, tune down the sensitivity.

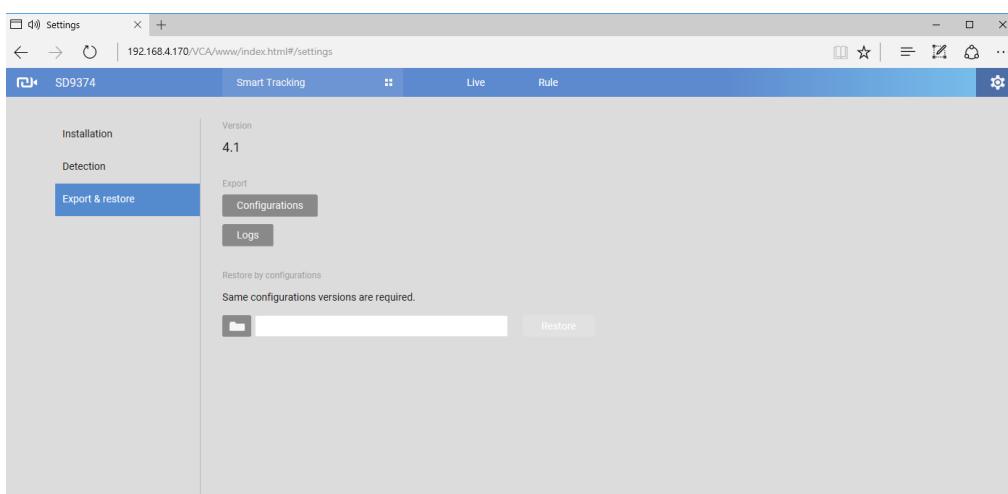
- In real-world applications, the effectiveness of People detection can be affected by the following:
 - Fast moving, running in the scene,
 - Lingering at the edges of FOV,
 - People crouching or crawling.

On the contrary, if tuned towards "Less false alarms," the detection algorithm will apply more strictly human silhouette matching. In some situations, such as when a man crouches down to pick up an object, he will be temporarily undetected.

Metadata

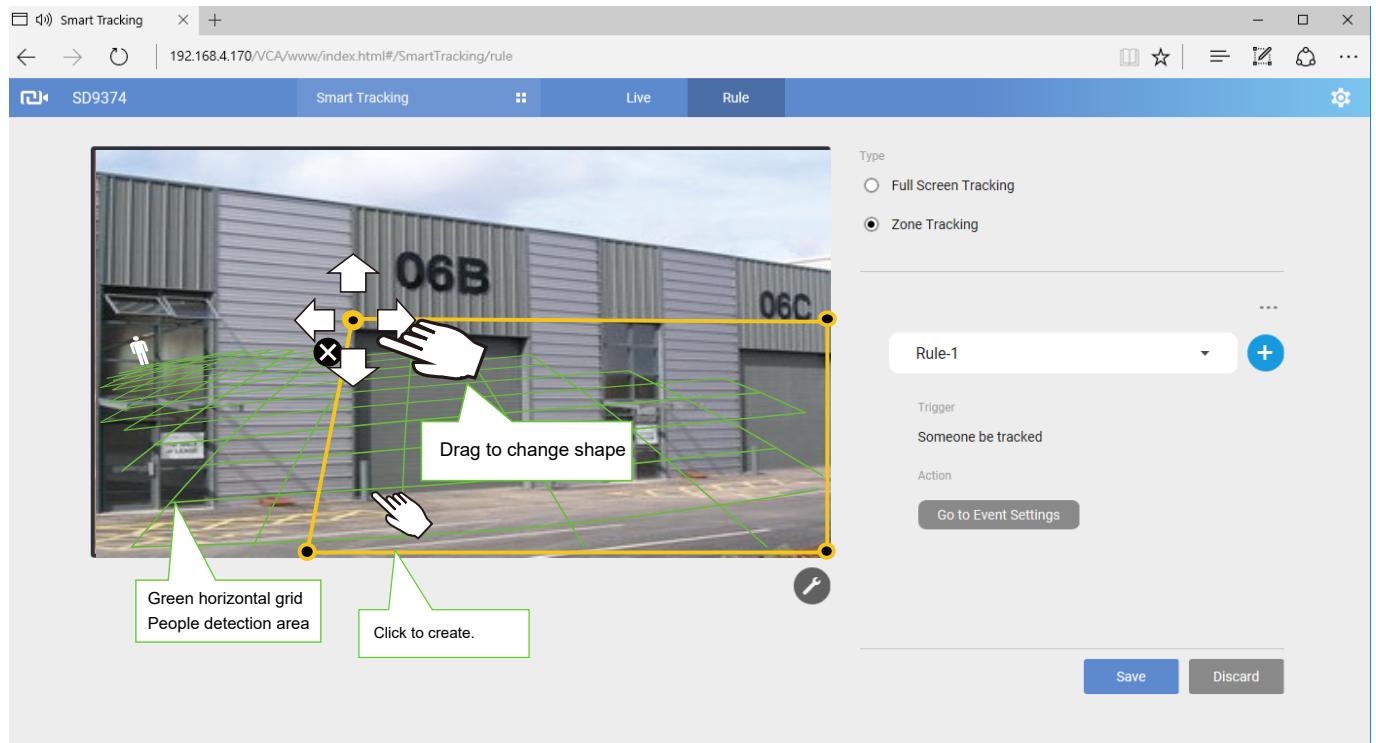
Protocol: The ONVIF protocol option is reserved for the integration of this feature into 3rd-party software.

7. **Export & restore:** You can export your Smart tracking configurations as a file to your management computer. You can also restore a tracking configuration from a previously-saved file. Select a pre-saved file from your management computer, and click Restore.



8. Click on the **Rule** tab on top to configure the detection rules. Use the streaming window to create a detection zone. If the need should arise, you can create up to **5** detection zones.

Note that the detection zones can only be configured in the FOV of the Home position.

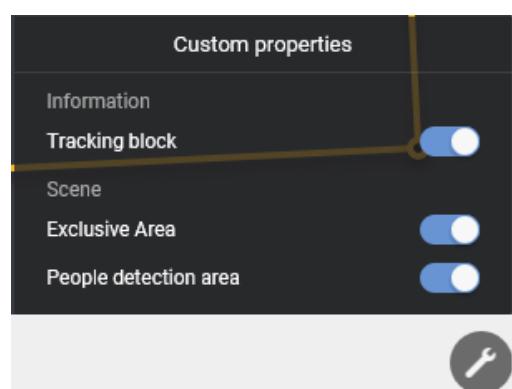


Change the coverage area of the window by dragging the corner marks. Note that the coverage area should comply with the People detection area. The People detection area is indicated by the green mesh lines.

The display elements can be configured in the **Custom properties** pane:

- * **Tracking box**: The vertical bounding box surrounding a standing or walking human form.
- * **Exclusive Area**: Displays the Exclusive area(s) you created in the Settings page.
- * **People detection area**: The green horizontal grid mesh is automatically generated according to the camera's FOV, installation height, tilt, and roll angles. It is designed to indicate the area where the effective People detection can take effect. Place your detection zone within the green grid.

The approximate distance between any two of the green lines is 1 meter. The height of the little man on the upper left of the grid is approximately 1.7m.



If you select Full Screen Tracking, the complete Home position FOV will be considered as the detection zone.

Below are the statuses of the Smart Motion detection polygon:

Normal

Motion window (normal)



When people is triggered in the window.

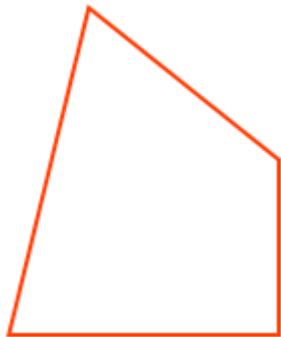
Selected by a mouse click. You can click on the delete button X to remove a configured zone.

Motion window (focus)



When moused over. You can edit the positions of the end points.

Motion window (trigger)

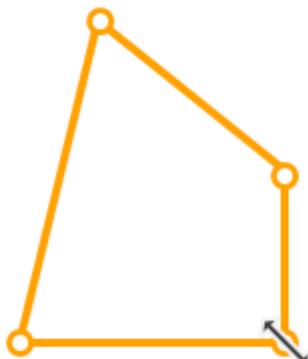


Motion window (hover on area)



Click and drag the end points to edit the coverage of the detection zone.

Motion window (hover on point)

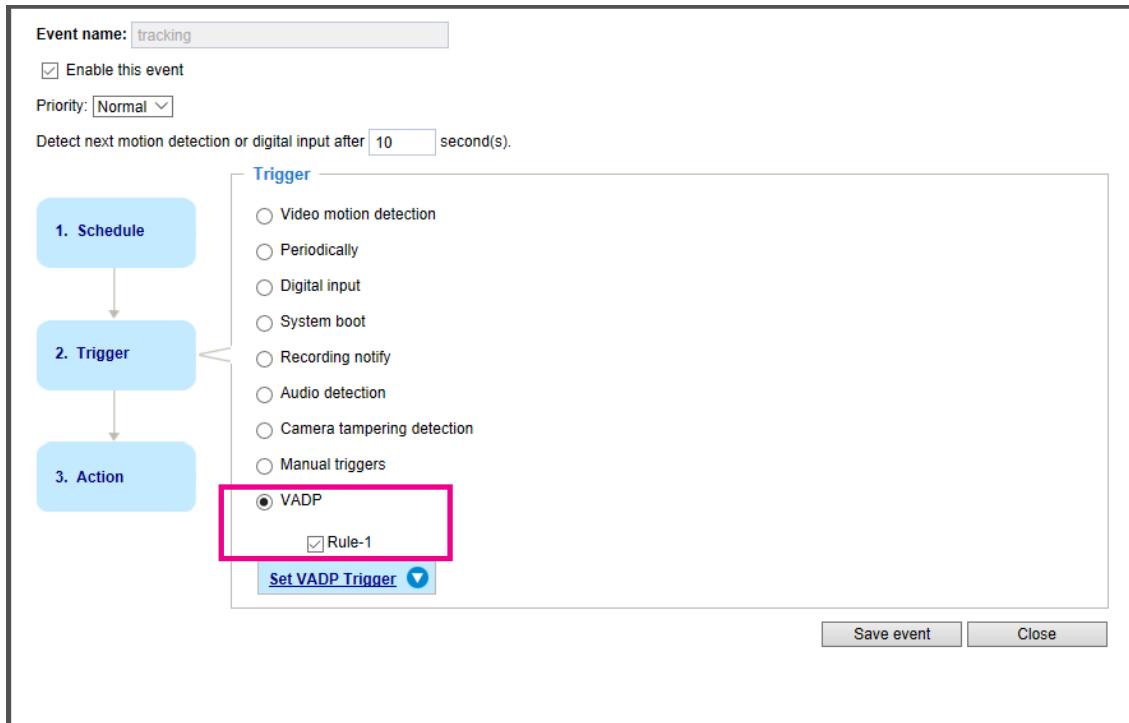


Click on the title bar to enter a name for the detection zone. Default is "Rule-#." Up to 64 alpha-numeric characters can be used in the name. Note that the following characters can not apply:

[], [""], ['], ['], [<], [>], [;], [\$_], [(], [)], [,]

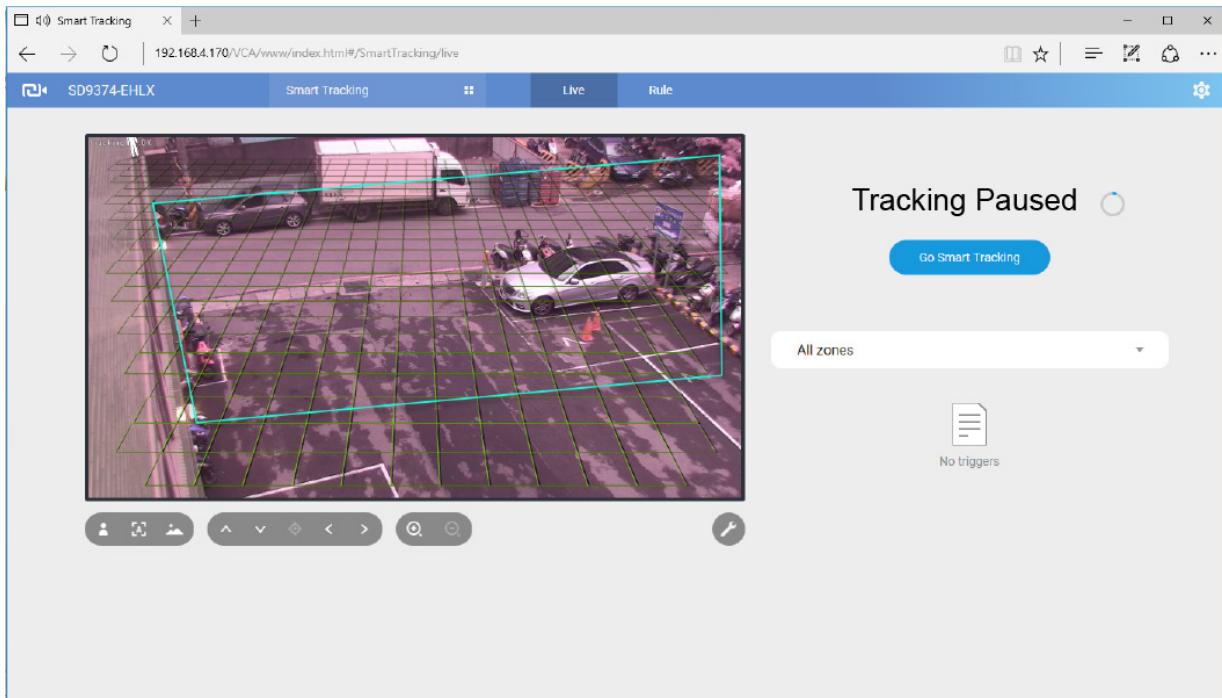
- **Go to Event Settings:** This is a shortcut to the firmware Event settings page. You can configure the occurrences of tracking events with the responses such as sending an Email, or starting a recording, or sending videos to FTP, etc.

Below is using the Tracking Rule-1 as an event trigger.

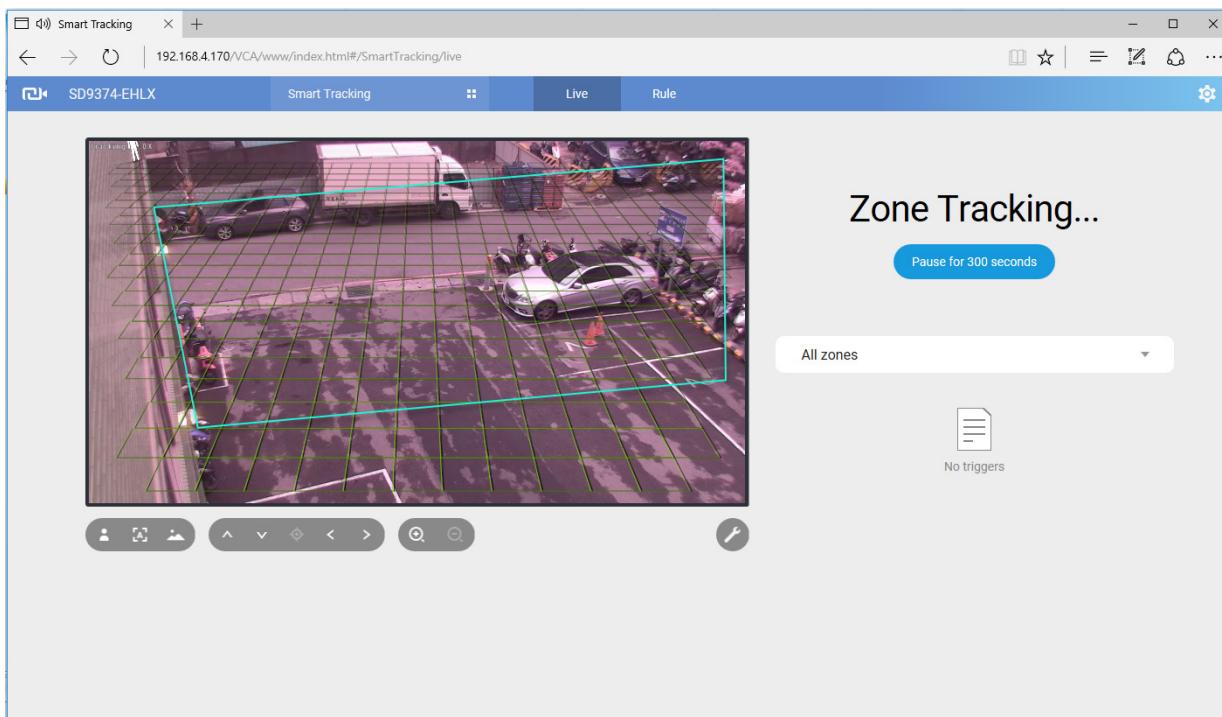


Starting the Tracking:

Go to the Live view. If Tracking is currently paused, click Go Smart Tracking.



When tracking is taking place, you can observe the tracking behavior. You can ask someone to help by walking through the area of your interest.



If you see the below message, someone may have opened another web console to the camera, or manually disabled the Smart tracking.

