LoiterTrace™

Best Practices

Getting the Most from LoiterTrace

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ADPRO® by xtralis

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Convention	Description
Bold	Used to denote: emphasis Used for names of menus, menu options, toolbar buttons
Italics	Used to denote: references to other parts of this document or other documents. Used for the result of an action

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1 Introduction

LoiterTrace was designed to detect people loitering. It is suitable for both indoor and outdoor use. By default the system detects people who have loitered for longer than three minutes (180 seconds), and uses typically suitable values for other settings. However, not every scene is the same and the suggestions in this document aim to guide users in the selection of parameters to best suit their application. Furthermore, the site design, calibration, and detection area placement have significant impact on performance, so this document aims to highlight the things to watch out for.

More detailed information can be found in the ADPRO LoiterTrace Techincal Manual, document 26471.

2 Warning

With careful and accurate installation, set-up and calibration, LoiterTrace can provide low false alarm rates and reliable detection capabilities. While carefully adjusted settings can ensure better protection at your site, we encourage all users to read the documentation in its entirety, participate in the Xtralis training courses, consult our technical support staff and consider your site requirements carefully prior to making a change to the settings. All settings have trade-offs, and it is important to implement the proper settings that are best for your site and needs.

3 Site Design

It is commonly believed that video analytics can overcome poor site design. However, unsuitable placement of cameras and lighting are significant causes of false alarms and missed detections for all video analytics products. Video analytic solutions are flexible and very effective, but good results require good site designs.

3.1 Camera Angle

The diagrams below show key issues to be aware of when mounting cameras. None of these prevent video analytics from being used, but it is important to understand the implications of each.

- If too low then movement towards or away from the camera is barely visible and may not be detected.
- If the camera angle is too steep then height cannot be used to ignore small animals.
- Significant amounts of moving foliage or shadows can cause false alarms and should be avoided.
- Bright lights in the view can shut down the camera iris reducing visibility and detection performance.
- The sun and moon can blind a camera at certain times of the day if they are in the camera's view.

Keep in mind that the view needs to be suitable 24 hours a day throughout all seasons.

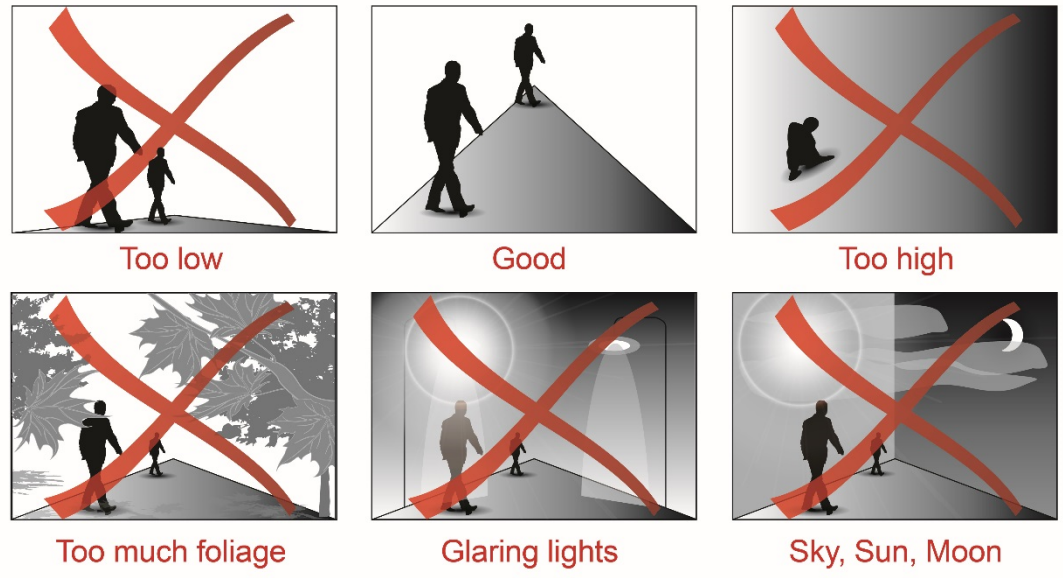
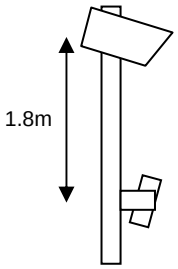


Figure 1: Camera placement considerations

3.2 Lighting

Except where thermal cameras are used, good lighting night and day is essential for reliable analytics. The best position for lighting is 1.8m below the camera so that insects flying up from the ground do not pass the camera on the way to the light source. Camera mounted lights such as ring-lights should be avoided because they will attract insects and spiders and cause strong, bright reflections of nearby rain and insects. These situations will shut down the iris of the camera and decrease both the visibility and detection sensitivity.

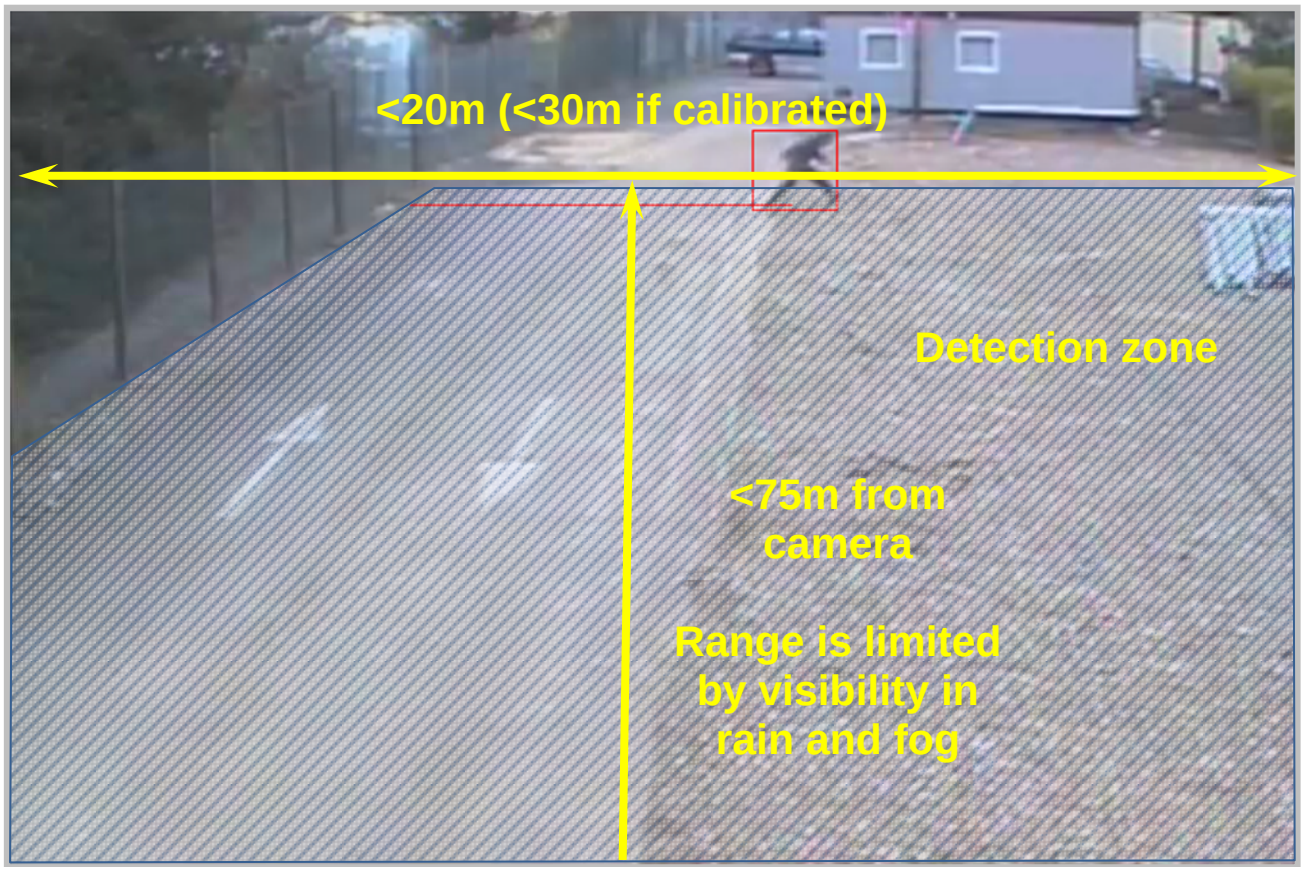


3.3 Rain

Raindrops on the camera lens reduce visibility and can refract nearby lights into the camera view. As many cameras come with inadequate rain hoods, they should be sheltered from the rain, or installed with well-designed hoods that deflect raindrops away from the lenses in all weather conditions. Long lens hoods are effective and are commonly seen on motorway surveillance cameras for this reason.

3.4 Maximum Field of View

By default, LoiterTrace works with a field of view up to 20m wide. This is measured from edge to edge of the image at the maximum distance your detection area will reach. The diagram below shows this clearly. If you calibrate the scene, the field of view is extended to 30m wide. Using a wider field of view is not recommended as it will reduce detection reliability. Attempting to detect further than 75m from the camera is also not recommended as poor weather will reduce visibility and detection performance at that range. The maximum range should restricted in accordance with prevailing weather conditions in the area.



4 System Settings

4.1 Calibration

The default maximum field of view for LoiterTrace is 20m, but this can be increased to 30m by calibrating the scene. For best results place the height cursors at the nearest and furthest points of your detection area and set their heights accurately. Size estimates in the areas above and below these points in the image (the red bars below) will be less accurate and may lead to false alarms and missed targets.

Figure 2: Poor Calibration

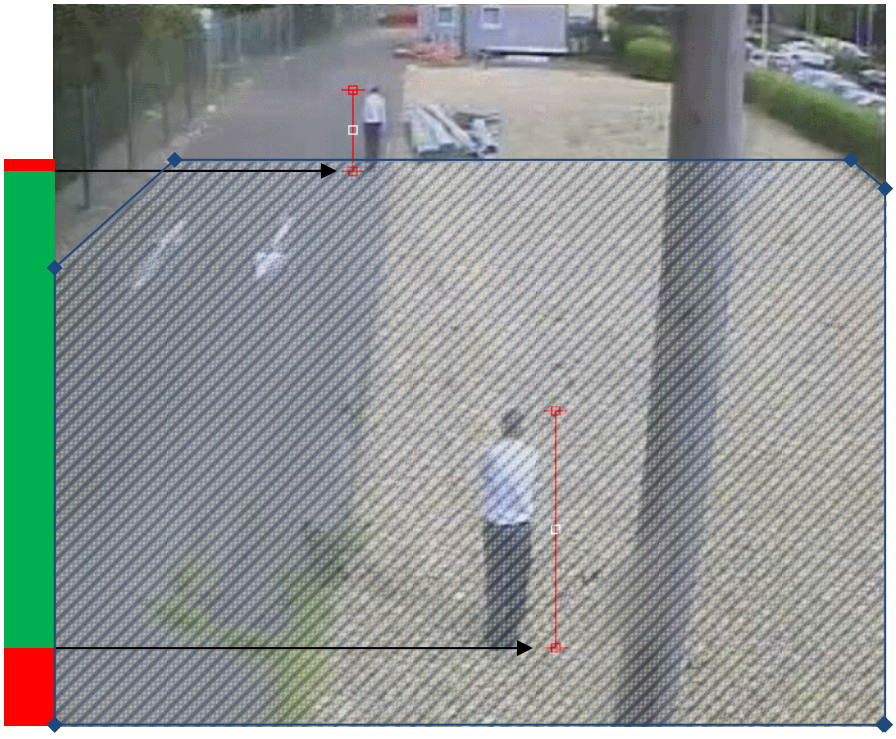


Figure 3: Good Calibration

4.2 Detection Areas

Detection areas can be viewed as ground hugging carpets that are spread where loiterers are to be detected. Since only the bottoms of the targets are tracked, the detection areas do not need to extend up the sides of buildings or fences. However, they do need to be flush with the bottom of the image if targets crossing there are to be detected, and they must be placed carefully to detect only what is intended.

Detection area does not need to cover the fence

Poorly placed bottom edge misses foreground targets

Figure 4: Poor Detection Area Placement

Detection area only needs to cover the ground

Flush with bottom so foreground targets are not missed

Figure 5: Good Detection Area Placement

4.3 Mask Areas

Mask areas prevent the image under them from being processed by the analytics. In some cases the bottom of a bounding box may be inside the detection area and cause an alarm even though the target itself is outside. It is recommended that you mask areas outside the detection area to avoid this issue. Be sure to leave room above the detection area so that the mask does not remove people you want to detect.

4.4 Loiter Time

The algorithm works best with loiter times from one to five minutes. Longer times are possible, but take care to select a suitable maximum static time.

4.5 Contrast Sensitivity

Contrast sensitivity is typically set to 3. Lower values require greater contrast between the target and the background for the target to be detected, so these values may be useful in eliminating false alarms from subtle shadows. Higher values require less contrast between the target and the background for the target to be detected, so these values may be useful in poorly lit areas where the target is difficult to detect.

Contrast sensitivity has a direct impact on whether a box is drawn around a target or not. If a real target enters the scene and a box is not drawn around it, then the contrast sensitivity may not be high enough. If there are many boxes falsely appearing in a quiet scene, then the contrast sensitivity may be too high.

4.6 Object Sensitivity

Object sensitivity is typically set to 3. Lower values require objects to be consistent in shape, size and speed, so it can be useful in ignoring foliage and shadows from moving trees. Higher values are more likely to detect a target, and the maximum value of 5 completely ignores object consistency, allowing all objects to be considered for the loitering test.

4.7 Maximum Static Time

The maximum static time determines how long a target can remain absolutely still for before the algorithm decides to ignore it. By default this is half the loiter time. A low value (minimum is 10s) means that the target needs to move more frequently to remain detected. A high value, which can be as high as the loiter time, allows the system to detect targets that lie down, or stand very still, but it also increases the chance of false alarms from other changes to the scene such as rubbish bins that are moved around. The recommended value is scene dependent, but the default is a good start.

4.8 Timer Strategy

When a target enters a detection area, its loiter timer starts. When two targets with different loiter timers cross paths, their bounding boxes combine into one. The timer strategy determines whether to assign the larger (maximum) or the smaller (minimum) of the two loiter timers to the combined bounding box.

The maximum time strategy (the default) ensures that no target can remain longer than the loiter time, and is useful where every violation must be detected. However it can cause false alarms if a target with a small timer crosses a target with a large timer. The target with the smaller timer is unjustly given the larger timer and may cause a loiter alarm even though they have not been present in the scene for long enough.

The minimum timer strategy eliminates the false alarms of the maximum timer strategy, but if targets are frequently passing a stationary target, the stationary target's loiter timer is frequently reset to the smaller values of the moving targets, and, in the worst case, may never cause an alarm.

The recommended value for this setting depends on the application.

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