



Comprehensive Video Analytics Solutions

innoVi Best Practices



Version 1.3, August 2020



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1. Overview

innoVi is a cloud-based video analytics Software as a Service (SaaS), powered by cutting-edge Deep Learning technology that enables unparalleled detection accuracy.

innoVi supports any fixed IP / analog camera by connecting with innoVi Edge, a compact appliance with pre-loaded Agent Vi software, that connects any ONVIF / RTSP video source to innoVi.

This document describes best practices and considerations for selecting the cameras, viewing angles, ONVIF/RTSP resolutions and frame rates, to achieve the best analytics performance.

2. General Recommendations

2.1. Camera Mounting Height and Angle

1. Mount cameras at least 3.5 meters / 11.5 feet from the ground.
2. The camera's angle should be 20 - 60 degrees below the camera's horizontal line.

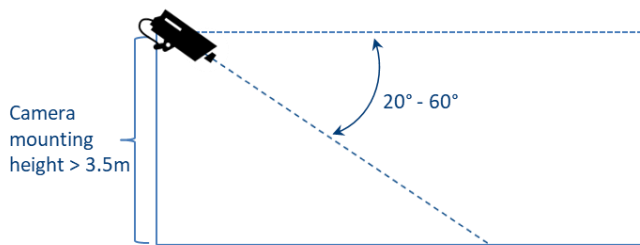


Figure 1- Camera mounting height and angle

2.2. Camera's Viewing Angle

Cameras with wide viewing angles cover wide visible areas, however they limit the analytics detection distance (see Table 1 - Estimated Detection Ranges of Optical Cameras or Table 2 - Estimated Detection Ranges with thermal cameras).

It is recommended to use cameras with viewing angles (horizontal FoV) that are narrower than **100°**. Fisheye cameras or cameras with a horizontal field of view that is wider than 100° may suffer from image warping that degrades analytics performance.

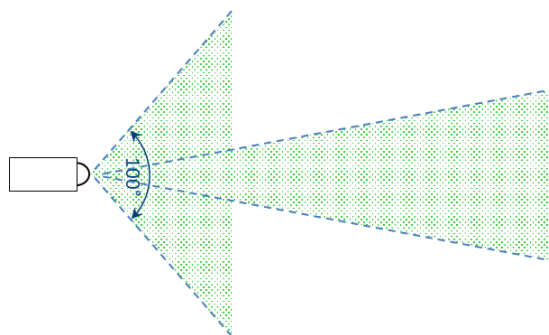


Figure 2 - Camera Horizontal Field of View

3. Optical Camera Recommendations

3.1. Video Stream Resolution and Frame Rate (FPS)

1. The recommended video stream frame rate is **8FPS**.

Note:

- Lower frame rates will degrade analytics performance.
- To meet the minimal required frame rate, the camera’s shutter speed should be at least 1/12 seconds.
- Higher frame rates consume additional computing resources but will not result in improved analytics performance.

2. The recommended video stream resolution is **720p**.

Note:

Using 1080p video stream resolution will result in improved detection ranges (see the table below) but will consume more computing resources and network bandwidth.

Using video stream resolution that is higher than 1080p will not necessarily result in improved analytics performance as megapixel cameras generally suffer from degraded low light performance.

Table 1 lists the estimated detection ranges with optical cameras according to the video stream resolution, the camera’s horizontal FOV angle and the target type:

Video Stream Resolution	Units	Horizontal FOV angle					
		72°		43°		22°	
		Person	Vehicle	Person	Vehicle	Person	Vehicle
480p	Meters	15	40	30	80	60	160
720p		30	80	60	160	120	320
1080p		50	130	90	240	180	480
480p	Feet	50	130	100	260	200	520
720p		100	280	200	520	400	1050
1080p		160	420	290	780	600	1570

Table 1 - Estimated Detection Ranges of Optical Cameras

Note:

Detection ranges are estimated based on the following assumptions:

1. The target is not obscured.
2. Person height is 1.80m / 5.9ft, minimal person height is 48 pixels. Vehicle width is 4.8m / 15.7ft.
3. Cameras with narrow horizontal FOV are more sensitive to camera shake.



3.2. Additional Recommendations

The following environmental conditions may degrade analytics performance:

1. Obscured targets
2. Camera shake
3. Fog
4. Inadequate lighting at the required detection distances

4. Thermal Camera Recommendations

4.1. Video Stream Resolution and Frame Rate (FPS)

1. The recommended minimal frame rate is **8FPS**.

Note:

Lower frame rates will degrade analytics performance.

Higher frame rates consume additional computing resources but will not result in improved analytics performance.

2. The recommended resolution is **VGA** (or above).

Table 2 lists the estimated detection ranges with thermal cameras according to the video stream resolution, the camera’s horizontal FOV angle and the target type:

Video Stream Resolution	Units	Horizontal FOV angle					
		63°		32°		17°	
		Person	Vehicle	Person	Vehicle	Person	Vehicle
QVGA	Meters	15	35	30	70	60	140
VGA		30	70	60	150	120	290
QVGA	Feet	50	110	100	230	200	460
VGA		100	230	200	490	400	950

Table 2 - Estimated Detection Ranges with thermal cameras

Note:

Detection ranges are estimated based on the following assumptions:

1. The target is not obscured.
2. Person height is 1.80m / 5.9ft, minimal person height is 48 pixels. Vehicle width is 4.8m / 15.7ft.
3. Cameras with narrow horizontal FOV are more sensitive to camera shake.

4.2. Thermal Camera Automatic Gain Control (AGC)

To minimize the ‘breathing’ effect created by thermal cameras’ AGC, it is recommended to (1) use lenses with small focal length and (2) set the camera’s maximum gain to be in the range of **3-9dB**.

4.3. Additional Recommendations

The following environmental conditions may degrade analytics performance:

1. Obscured targets
2. Camera shake

5. Contact Agent Vi Support

- Use the **Contact Support** or **Submit a Support Request** option from within innoVi
- Use the innoVi support form on Agent Vi's website:
<https://www.agentvi.com/support/innovi-request/>
- Email innovi-support@agentvi.com





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USA: +1-855-AgentVi (+1-855-2436884) EMEA: +972-72-220-1500 S.E. Asia: +65-6813-2064

For more information, visit: www.agentvi.com or email: sales@agentvi.com