
Configuration & Installation Guidance of Queue detection camera

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Chapter 1. Camera Installation Specification

1.1 Installation Environment Selection

The detection accuracy of queue detection camera is greatly influenced by the camera installation position, site illumination (too dark or too bright) and other factors. In order to have a better effect, it's suggested to:

- (1) Install the camera in open area and try to avoid any obstacle which could be in front of it. Make sure the human head and shoulder are clearly to the camera.
- (2) Install the camera in a place with stable and plenty sunshine.

1.2 Camera Installation Requirement

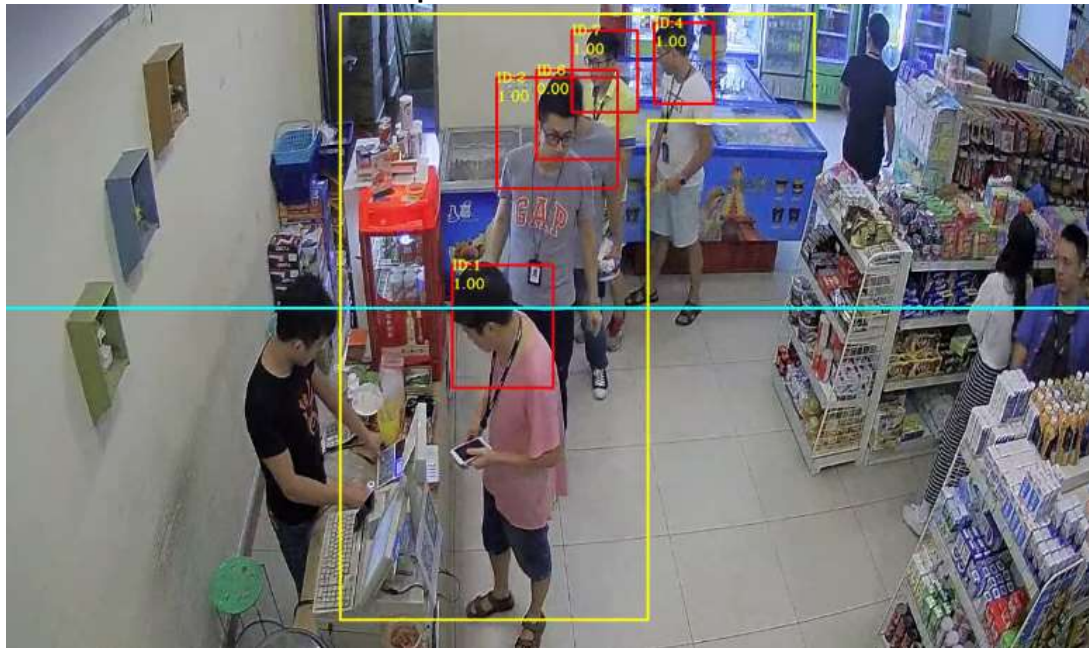
1.2.1 Installation scenario

1. Install the camera with ceiling mounting style.
2. Do not install the camera in front of the queue otherwise the people in front/ back of each other may block themselves.
3. Make sure the detected head and shoulder are 48 pixels or higher (1080p).
4. Try to avoid any obstacle from the camera to the middle of the queue.

Example of standard scenario:

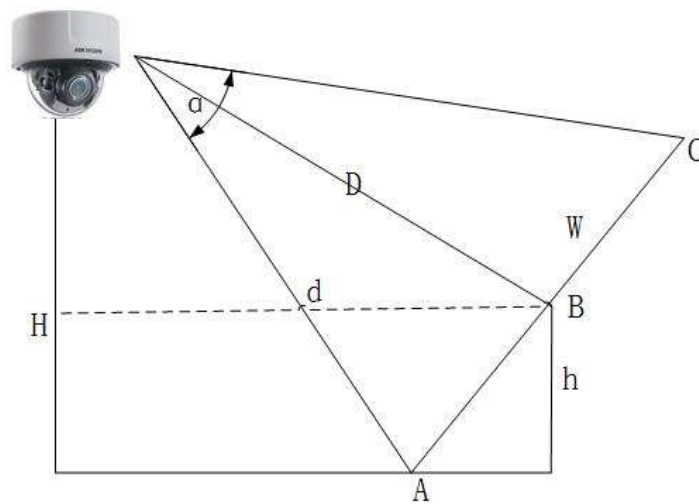


Example of unsuitable scenario:



1.2.2 Camera Lens Selection

The monitoring range and mounting style is also influenced by camera models, lens focal length and monitoring width. The relationship is as below:



- Installation height is H
- Assume A, B, C are the people in the left, middle and right, and the height of B is h
- The horizontal distance from camera to B is d
- The horizontal FOV of camera is α (ranges from 103.3°~38.6°)
- The distance from camera to B is D, $D = \sqrt{(H - h)^2 + d^2}$
- The monitored queue width is W (which is from A to C), $W = 2D \times \tan(\alpha / 2)$

Note: this equation is for single queue. For multi queue situations, it's suggested to leave more than 0.7m between each line to prevent people from blocking each other. Meanwhile, make sure the detected head and shoulder are 64 pixels or higher for the farthest detected people.

1.3 Camera Installation Position & Lens Queue Table

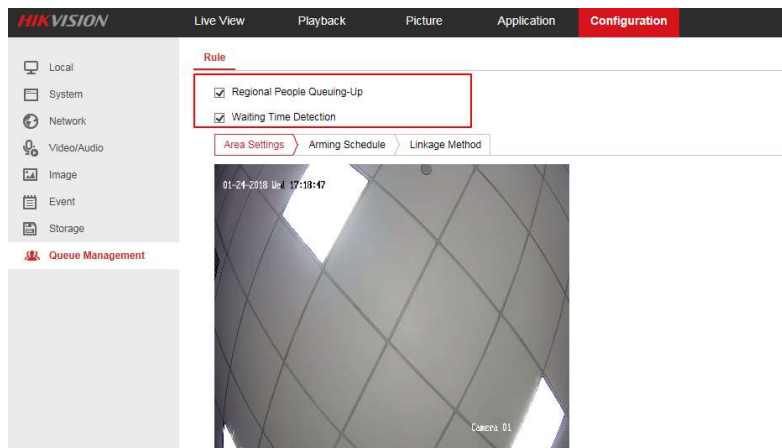
Lens (mm)	Camera Height (m)	Min Monitoring Distance (m)	Max Monitoring Distance (m)	Min Monitoring Width (m)	Max Monitoring Width (m)
2.8mm	2.5	0.169	2.3	2.7	6.3
	3	0.274	3.7	3.3	8.8
	3.5	0.87	4	4.31	8.94
	4	0.88	5.2	5.08	12.34
	4.5	0.88	6.33	6.25	11.64
	5	1.12	7.58	7.49	11.27
	5.5	1.18	8.58	6.84	11.1
	6	1.56	8.76	5.97	10.01
3.8mm	5.85	0.97	4	4.46	6.7
8mm	6	5.34	8.4	4.87	7.3
12mm	4.68	3.54	5.6	3.2	4.8

Chapter 2. Configuration

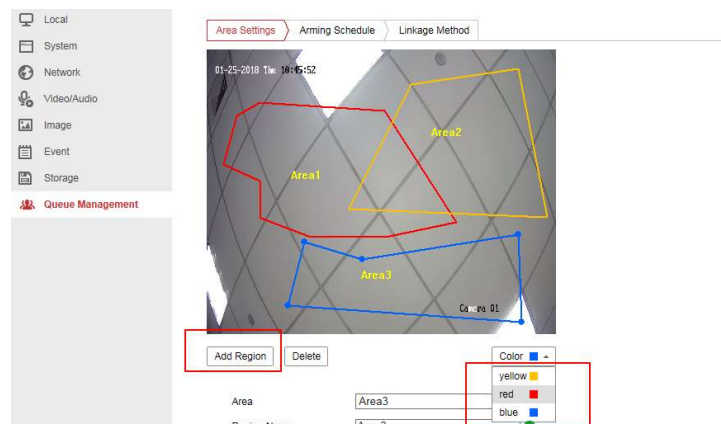
2.1 Camera Configuration Via IE browser

Step 1: Go to Configuration->Queue Management->Rule to enable both Regional People Queueing-Up function and Waiting Time Detection;

Note: you can enable one/both of the functions according to your real requirement.



Step2: Click 'Add Region' to draw one or more detection regions (decagon is supported for one single region & at most 3 regions are supported). The colors you can select are yellow, red and blue.



Step 3: Configure the Alarm Interval, Alarm Threshold and Waiting Time Detection Settings for each region.

The screenshot shows the 'Queue Management' configuration page. On the left is a sidebar with 'Queue Management' highlighted. The main content area has a top bar with 'Add Region', 'Delete', and 'Color' options. Below this, there are fields for 'Area' (Area1) and 'Region Name' (Area1). The 'Alarm Interval' is set to 300 seconds. Under 'People Queuing-Up Settings', the 'OSD' checkbox is checked and the 'Alarm Threshold' is set to 5 persons. Under 'Waiting Time Detection Settings', the 'Alarm Threshold' is set to 300 seconds. A red 'Save' button is at the bottom.

Advanced parameter meaning:

Alarm Interval: it's set to avoid multiple repeated alarm. For instance, if this value is set to 300s, the second alarm will not be triggered unless it's 300s or longer after the first alarm.


Alarm Threshold: Alarm will be triggered when the people in the detection region is equal to or higher than the set value.

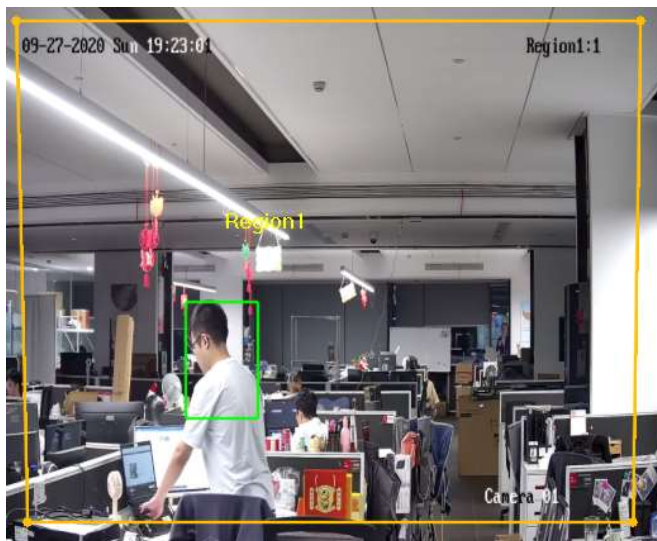
Waiting Time Detection Settings: Alarm will be triggered when the waiting time in the detection region is equal to or higher than the set value.

People Queuing-Up OSD: Display the people numbers of each region on the video.

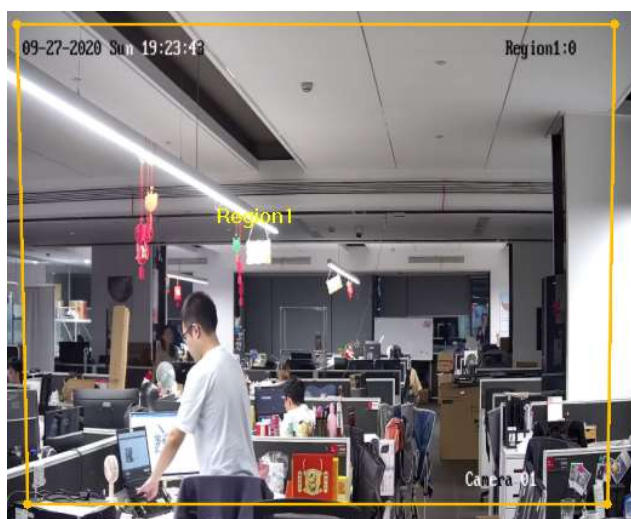
We can set the target filter in the Advanced Configuration. Switch the Target Size to limit the counting target size, which default is 96 pixels target width.

[Important] And we suggest adjust the Target Size to the minimum number.

Filter		
Target Size	<input type="text" value="96"/>	pixel 
Target Displacement	<input type="text" value="96"/>	pixel
Min. Waiting Duration	<input type="text" value="10"/>	s
Validity	<input type="text" value="50"/>	



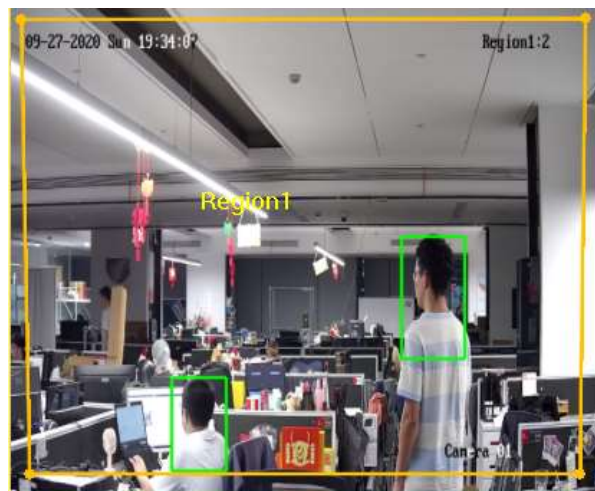
Target size: 96 pixels



Target size: 300 pixels

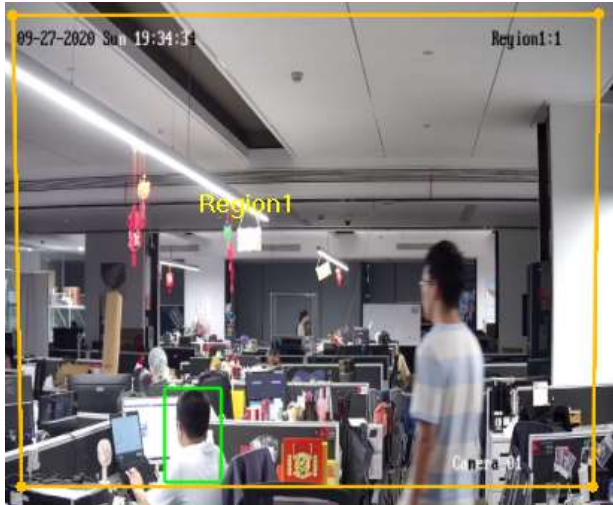
Then set the Min. Waiting Duration to 0s which default is 1s to make the camera count the target immediately when it goes into the area. Or if you want to filter the wandering person, you can set this parameter higher.

Filter		
Target Size	<input type="text" value="96"/>	pixel
Target Displacement	<input type="text" value="96"/>	pixel
Min. Waiting Duration	<input type="text" value="0"/>	✓ s ←
Validity	<input type="text" value="50"/>	



Min. Waiting Duration: 0s

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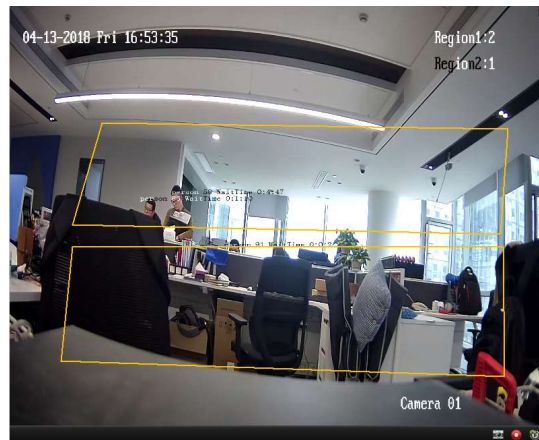


coming outside the area

Min. Waiting Duration: 5s

Chapter 3 Performance

3.1 We can get real time persons' number of each region from OSD information.



3.2 Queue Statistics from web

Go to Application. We can get visualizing statistics. There are multiple dimensions for the data.

Queuing-Up Time Analysis

Queuing-Up Time Analysis calculates people number of different waiting time level. Regional comparison and multiple waiting time level comparison are supported.

Steps:

1. Select **Statistic Type**.

Regional Comparison: Compares queuing-up people number of different regions.

- a. Check one or more regions.
- b. Set waiting time level. Check desired time range radio button and input value.

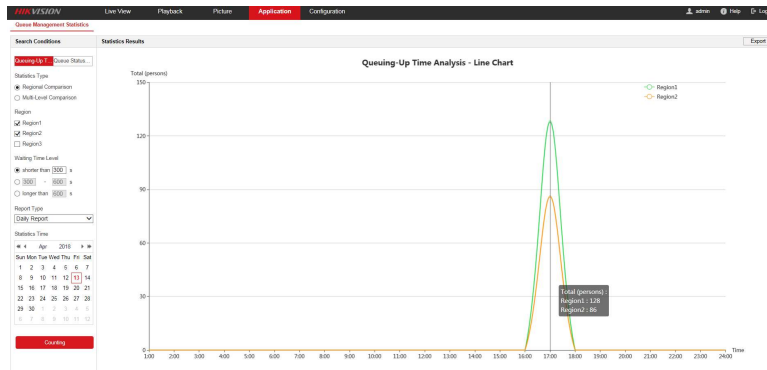
For example, if you want to see the people number who wait longer than 10 minutes, check the third radio button and input 600 in correspondent text field.

Multi-Level Comparison: Compares queuing-up people number of different waiting time levels.

- c. Check one or more regions.
- d. Set waiting time level. Check one or more desired time range checkboxes and input values.

For example, if you want to compare the people number who wait longer than 10 minutes and who wait shorter than 3 minutes, check the first and the third radio button and input 600 and 180 in correspondent text field.

2. Select **Report Type**. Daily report, weekly report, and monthly report are supported.
3. Select **Statistics Time**.
4. Click **Counting** to generate report.
5. (Optional) Click **Export** in the upper right corner to export data in desired format.



	00:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00	06:00-07:00	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00	18:00-19:00	
Camera1_Q1_Region 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	128	0	0
Camera1_Q1_Region 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	0	0

Regional Comparison of Queuing-Up Time Analysis example



Multi-level comparison of Queuing-Up Time Analysis example

Queue Status Analysis

Queue Status Analysis calculates the time and duration that a queue stays a certain length. Regional comparison and multiple queue length level comparison are supported.

Steps:

1. Select **Statistic Type**.

Regional Comparison: Compares the time and duration that a queue stays at a certain length in different regions.

- a. Check one or more regions.
- b. Set queue length level.

Queue length here means the people number in the region.

For example, if you want to see how long time the queue keeps more than 10 persons in a region, check the third radio button and input 10 in correspondent text field.

Multi-Level Comparison: Compares the time and duration of a queue at different queue length levels.

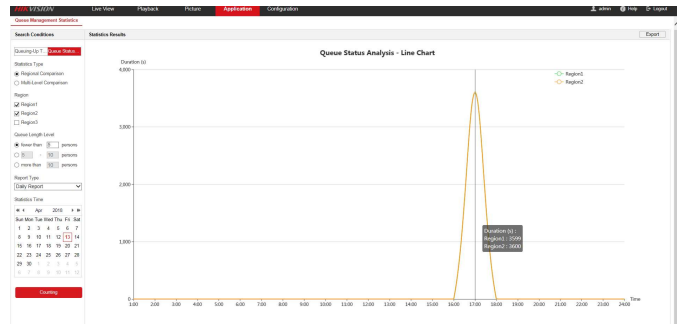
- c. Check one or more regions.
- d. Set the queue length level. Check one or more desired range checkboxes and input values.

2. Select **Report Type**. Daily report, weekly report, and monthly report are supported.

3. Select **Statistics Time**.

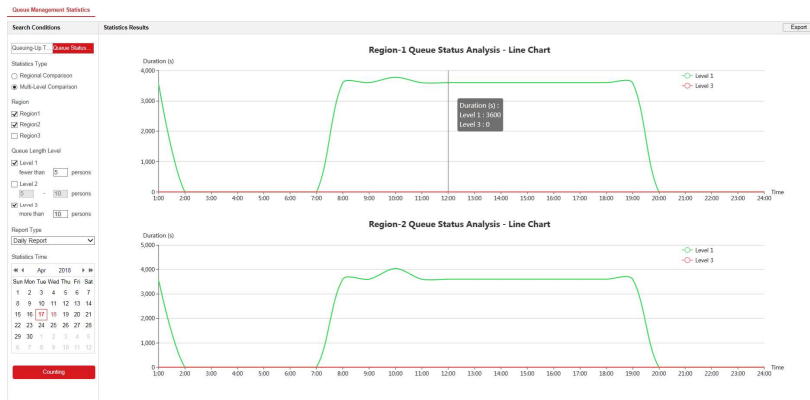
4. Click **Counting** to generate the report.

5. (Optional) Click **Export** in the upper right corner to export data in desired format.



	00:00-01:00	01:00-02:00	02:00-03:00	03:00-04:00	04:00-05:00	05:00-06:00	06:00-07:00	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00
Camera1_QL_Region 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3599	0
Camera1_QL_Region 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3600	0

Regional Comparison of Queue Status Analysis example



Multi-level comparison of Queue Status Analysis example