AXIS Demographic Identifier

User Manual

AXIS Demographic Identifier

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Solution overview

An overview of the different devices, applications, and tools needed for a complete system.

AXIS Demographic Identifier

AXIS Demographic Identifier is an analytic software that can be installed on a network camera.

The application is intended for retail and other environments where you want to estimate the gender and age of people passing by. AXIS Demographic Identifier is suitable for digital signage implementations, as well as when you want extended knowledge about visitors. When combined with AXIS People Counter statistics, the output gives you a good understanding about the number of men and women that have visited, and what age category the visitors were in.
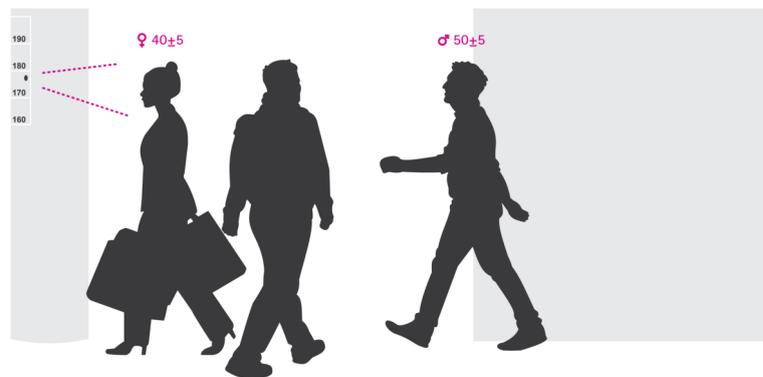
How does gender and age detection work?

Each **face track**, consisting on several **face detections**, results in one gender and one age estimate. A face detection is one box of the face detected in the image. In theory, the application can detect up to 100 faces (boxes) per image.

A face track can be 1 second, 10 minutes, or any duration, all depending on how long the application keeps detecting the face. This means a face track can consist of 5, 10 000, or any amount of face detections. The age and gender estimate is not necessarily more accurate if the face track is longer.

To make the application work as expected, a proper installation and setup is very important.

How to mount the camera

Camera placement

Mount the camera so that it points to the face of the people walking by. The application tolerates an angle of approximately +/- 15 degrees of yaw, roll or pitch from a frontal face.

Mounting examples:

- This camera is mounted next to an exit, pointing at the people passing by.
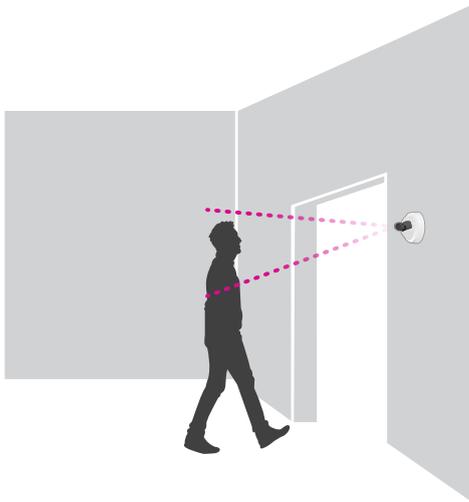
- Mount the camera so that it has a view from above. This camera is mounted at the exit, pointing at the people walking out.
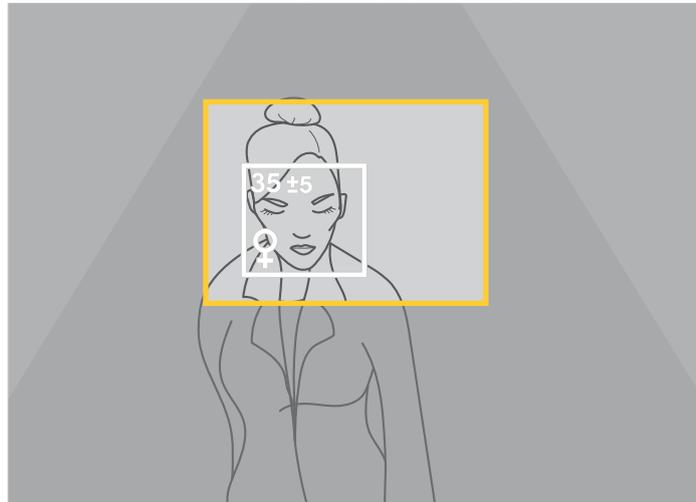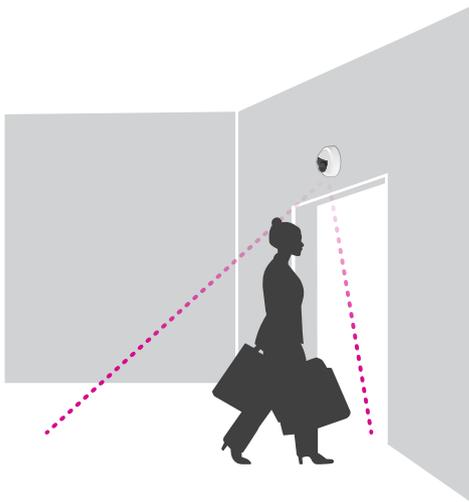
- In this digital signage scenario, the camera is mounted so that it looks straight at the person's face.

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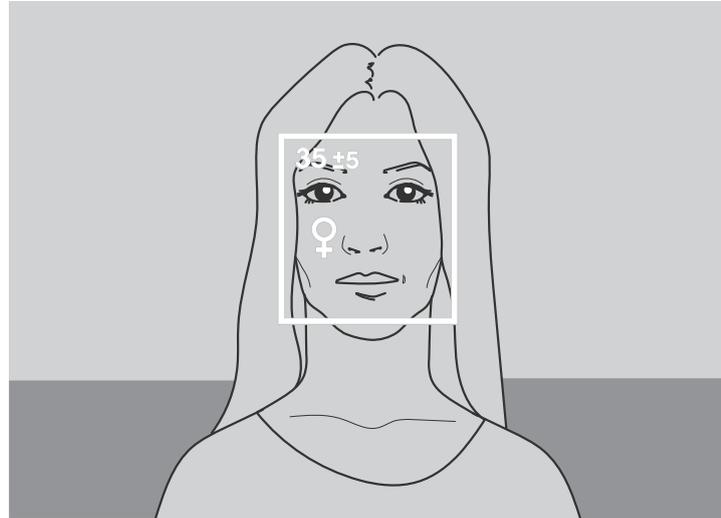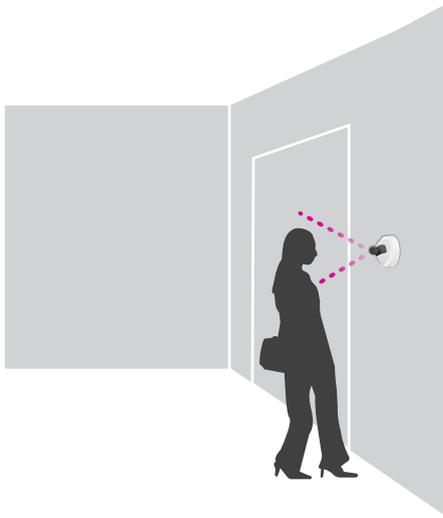
Image quality

Aim for a setup where the faces passing by are:

- in focus

- rich in contrast

- evenly illuminated without reflections and shadows

Note

In scenes with strong backlight, resulting in dark faces with low contrast, consider complementing the setup with illumination sources to achieve better face images.

Find the device on the network

To find Axis devices on the network and assign them IP addresses in Windows®, use AXIS IP Utility or AXIS Device Manager. Both applications are free and can be downloaded from *axis.com/support*.

For more information about how to find and assign IP addresses, see the document *How to assign an IP address and access your device* on the device page at *axis.com*.

Access the device

1. Open a browser and enter the IP address or host name of the Axis device.

   If you have a Mac computer (OS X), go to Safari, click Bonjour and select the device from the drop-down list. To add Bonjour as a browser bookmark, go to **Safari > Preferences**.

   If you do not know the IP address, use AXIS IP Utility or AXIS Device Manager to find the device on the network.

2. Enter the username and password. If you access the device for the first time, you must set the root password. See *Set a new password for the root account on page 6* .

3. The live view page opens in your browser.

Secure passwords

Important

   Axis devices send the initially set password in clear text over the network. To protect your device after the first login, set up a secure and encrypted HTTPS connection and then change the password.

The device password is the primary protection for your data and services. Axis devices do not impose a password policy as they may be used in various types of installations.

To protect your data we strongly recommend that you:

- Use a password with at least 8 characters, preferably created by a password generator.

- Don't expose the password.

- Change the password at a recurring interval, at least once a year.

Set a new password for the root account

Important

   The default administrator username is **root**. If the password for root is lost, reset the device to factory default settings.

1. Type a password. Follow the instructions about secure passwords. See *Secure passwords on page 6* .

2. Retype the password to confirm the spelling.

3. Click **Create login**. The password has now been configured.

Install the application on the camera

Note

- The license is only valid for one camera. You cannot activate the license on another camera without a new registration key.
- To install applications on the camera you need administrator rights.

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Find the device on the network

1. Install the camera on your network..

2. Go to the camera's webpage in your browser, see the User Manual for the camera.

3. For products with firmware 7.10 or later, go to **Settings > Apps**.

   For products with firmware 6.50 or previous, go to **Setup > Applications** .

4. Upload the application file (.eap) to the camera.

5. Activate the license. If you're online, enter the license code. The application automatically activates the license.

How to activate the license when you're offline

To activate the license when you're offline, you need a license key. If you don't have a license key on the computer, do the following:

1. Go to *www.axis.com/applications*

2. Go to **License key registration**. You need the license code and the Axis device serial number.

3. Save the license key file on the computer and select the file when the application asks for it.

Access the application settings

1. In the camera's webpage, go to **Settings > Apps**, select the application and click **Open**.

Additional settings

How to set date and time

The date and time settings are important for your camera to keep the correct time for a longer period of time, and for the statistics to be attributed to the correct time.

1. To set the date and time you need to go to the camera's webpage.

    - For products with firmware 7.10 or later, go to **Settings > System > Date and time**.

    - For products with firmware 6.50 or previous, go to **Setup > System Options > Date & Time**.

2. For detailed instructions about the user account, go to the product's built-in help ❓.

1. In the camera's webpage, go to **Setup > System Options > Date & Time**.

2. In the application, go to **Settings > General** and select the correct time zone.

How to set up a user account

In the camera you can set up different account privileges so that unauthorized personnel can view statistics but not change any settings of the counter.

1. To set up a user account, go to the camera's webpage.

    - For products with firmware 7.10 or later, go to **Settings > System > Users**.

    - For products with firmware 6.50 or previous, go to **Setup > System Options > Security > Users**.

2. For detailed instructions about the user account, go to the camera's built-in help. ❓

How to set up the detection area

The detection area is the area in the image where the application should detect faces. When you set up the detection area, keep in mind that the longer the face is visible in the image, the better the detection will be. Also bear in mind that the higher frames per second (fps), the more accurate detections.

1. In the application settings, go to **Settings > General**.

2. Make sure the application **Status** is on.

3. Type a name in the **Name** field. This is the name that shows up in AXIS Store Reporter.

4. Set the **Detection area** by clicking **Setup**.

5. To set the detection area, adjust the size of the yellow window. The smaller the window, the higher frames per second which in turn gives more accurate detections.

Note

To be able to detect a face, the size of the green window needs to be at least 50 pixels.

6. To set the size of the faces you want to analyze, adjust the size of the green window. The larger the window, the higher frames per second which in turn gives more accurate detections.

7. Go to **Live view** to check the detection area.

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Additional settings

How to trigger an event

1. Go to **Settings > Events**.

2. Select **Enable**.

3. Click **Submit**.

4. Go to the camera's webpage to access the event system.

5. In the event setup, use the trigger **Application** and choose between the following default triggers:

    - **Demographics-any_0_30** – detects people with any gender from age 0 to 30, regardless of gender

    - **Demographics-any_0_31_plus** – detects people from age 31 and older, regardless of gender

    - **Demographics-female** – detects women

    - **Demographics-male** – detects men

6. Follow the built-in instructions to set up an event.

How to create customized triggers

In the advanced mode, you can create your own triggers by customizing the following parameters:

`[top row]` – the name of the trigger

`gender` – male or female

`min_age` – the minimum age of the person

`max_age` – the maximum age of the person

`t_min` – the amount of time in seconds between face triggers upon detection

Example

If you want to play a video that is 20 seconds long, targeted at women aged between 31 and 65, this is what the customized trigger should look like.

```
"play_video_middle_age_women":  {
"gender":  "female",
"min_age":  31,
"max_age":  65,
"t_min":  20
}
```

1. Go to **Settings > Events**.

2. Select **Enable**.

3. Select **Advanced**.

Note

In the text field, do not change or remove any of the code characters.

4. In the text field, we recommend that you copy an existing trigger and then change the parameters `gender`, `min_age`, `max_age` or `t_min`.

5. To check the code and the content, click **Verify**.

6. If there's something wrong with the code or the parameters, check the code and try again. You can always reset to default by clicking **Use default settings**.

7. Click **Submit**.

8. Go to the camera's webpage to access the event system.

9. In the event setup, use the trigger **Application** and then select the trigger you just created.

How to set up a schedule

To avoid unwanted detection during the night or during holidays, we recommend that you set up a schedule.

1. Go to **Settings > Schedule**.

2. Select start and stop times by moving the slider. You can set individual schedules for each day of the week by selecting **Per day schedule** and then move the corresponding slider.

How to disable the application on a specific day of the week

Deselect the checkbox next to the slider.

How to disable the application during holidays

Select the holiday dates in the calendar under **Holidays**.

How to copy the application settings to another camera

Use the copy functionality if you want to copy the application settings to, for example, other cameras in the same store with the same mounting height. Camera-specific settings, such as the application license and camera name, are not included.

1. To copy the application settings, go to **Maintenance > Parameter backups**.

2. Click **Copy**. The computer saves the file in your browser's default folder for downloads.

About the statistics

There are several ways to use the statistics from the counter:

- In the application's webpage, view real-time counting data in the built-in graphs.

- View built-in graphs in day and week view from the statistics page. The data is updated in real time.

  Data is available on the camera for up to 90 days and updated every 15 minutes. The data is stored in 15-minute bins representing the in and out counts for the 15-minute periods.

- View graphs of historical data directly on the camera.

- Download data through an open API.

- Use AXIS Store Data Manager, a software package that acts as a central point to store and manage data collected from all cameras. See *Connect a camera to a folder in AXIS Store Data Manager on page 11*.

- Use AXIS Store Reporter, a statistical web-based solution, for managing and monitoring historical data.

- Download statistics to your computer, see *How to download statistics on page 12*.

The statistics is divided into gender and age. The data is stored on the camera's SD card in two different ways:

By age and gender category in 15 minutes intervals

Each face track is saved in age and gender categories as shown below:

Interval start	Interval stop	M tot	M (0–14)	M (15–24)	M (25–34)	M (35–44)	M (45–54)	M (55–64)	M (65–74)	M (75–)
2017-12-02 08:15	2017-12-02 08:30	3			1	1	1			

Interval start	Interval stop	W tot	W (0–14)	W (15–24)	W (25–34)	W (35–44)	W (45–54)	W (55–64)	W (65–74)	W (75–)
2017-12-02 08:15	2017-12-02 08:30	4			2	1	1			

By face track

There's enough space to store about 20 000 tracks. The tracks are stored in a cycle buffer, which means when reaching track 20 001, it overwrites the first track.

The tracks are stored in JSON format as explained in the HTTP API section.

Connect a camera to a folder in AXIS Store Data Manager

To perform this task, the application must be installed on the camera.

1. In AXIS Store Data Manager, go to **Sources** and get the **Folder connection identifier** and the **Folder connection password** for the folder you want to connect to.

2. In the camera's webpage, go to **Settings > Apps** and open the application's webpage.

3. In the application's webpage, go to **Settings > Reporting**.

4. To enable pushing data to a server, select **Enabled**.

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About the statistics

5. Enter the web address for AXIS Store Data Manager, for example `http://[systemintegrator1].asdm.axis.com/datamanager` where `[systemintegrator1]` is replaced by a unique name.

6. Enter the **Folder connection identifier** and **Folder connection password**.

7. To test the connection, click **Run test**.

8. Click **Submit**.

How to download statistics

1. Go to **Statistics > Download statistics**.

2. Select the file format:

    - If you select .xml, .csv or .json format you can also select the time interval.

3. Select date in the calendar. The browser saves the file in the default download folder.

If you want to download all available data, click **Download all** next to the file format.

Troubleshooting

If you can't find what you're looking for here, try the troubleshooting section at *axis.com/support*.

Issue	Action
The software does not upload to AXIS Store Data Manager.	The most common reason is network communication problems. Run the connection test under **Settings > Reporting** to get information about the root cause for the problem.
The application doesn't work with WDR.	To detect the faces of people as fast as possible we recommend that you use the capture mode without WDR (Wide Dynamic Range). Without WDR the frame rate is higher and the face detection becomes faster. However, without WDR, the video stream could look dark if there is strong light into the lens. Therefore, we recommend that you to avoid strong back light.
The application doesn't work in my browser.	Avoid the web browser Internet Explorer® when using AXIS Demographic Identifier. Chrome™ or Firefox® works better and renders the video stream faster.

How to restart the application

If the counting is inaccurate or the web interface unusually slow, you can try restarting the running services or restart the camera.

Go to **Maintenance > Restart**.

How to reset the application

Go to **Maintenance > Reset** and do one of the following:

- To clear all counting data from the camera, click **Clear data**.

- To restore all settings of the application to default, click **Restore settings**.

How to backup the settings

1. To backup the application settings, go to **Maintenance > Parameter backups**.

2. Click **Backup**. The computer saves the file in your browser's default folder for downloads.

How to restore the settings

1. Go to **Maintenance > Parameter backups**.

2. Browse to select the previously saved backup file and then click **Restore**.

How to generate a log report

If you have any trouble with your camera you can generate a log report.

1. Go to **Maintenance > Logs**.

2. Click **Generate logs**.

3. The browser saves the file on the default download browser on the computer.

4. Attach the log report when submitting an issue to support.

How to manage your license

Go to **Maintenance > Registration**.

- To register a license, click on the **Registration page**.

- If you want to remove you license from this product, click **Clear registration**.

- If you have an updated license, click **Renew license**.

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Demographic identifier API

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Common examples

Example

Get Live tracks

Request
```
http://<servername>/local/demographics/.api?tracks-live.json
```

Return (example) – No active track found
```
{
  "live":  {
  "tracks" :  [
  ]
  }
}
```

Return (example) – One active track found
```
{
  "live":  {
    "tracks" :  [
    {
      "time_start" :  1447749079.091622,
      "time_end" :  1447749081.011605,
      "gender_average" :  1,
      "age_average" :  20,
      "boxsize_average" :  177,
      "gender_last" :  1,
      "age_last" :  21,
      "boxsize_last" :  180
    } ]
  }
}
```

Return (example) – Two active tracks found
```
{
  "live":  {
    "tracks" :  [
    {
      "time_start" :  1447749104.451576,
      "time_end" :  1447749109.451567,
      "gender_average" :  1,
      "age_average" :  20,
      "boxsize_average" :  198,
      "gender_last" :  1,
      "age_last" :  18,
      "boxsize_last" :  195
    },
    {
      "time_start" :  1447749107.811568,
      "time_end" :  1447749109.451567,
      "gender_average" :  -1,
      "age_average" :  21,
      "boxsize_average" :  160,
      "gender_last" :  -1,
      "age_last" :  23,
      "boxsize_last" :  158
    } ]
  }
```

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```
}
```

Get Ended tracks

Request
```
http://<servername>/local/demographics/.api?tracks-ended.json
```

Return (example) – No active track found
```
{
   "ended":  {
     "time_start":  1447748743.039911,
     "time_end":  1447749643.039911,
     "tracks":  [
   ]
   }
}
```

Return (example) – One ended track found
```
{
   "ended":  {
     "time_start":  1447749887.539835,
     "time_end":  1447749947.539835,
     "tracks":  [
     {
       "time_start":  1447749942.930319,
       "time_end":  1447749946.210321,
       "gender_average":  1,
       "age_average":  21,
       "boxsize_average":  219
     } ]
   }
}
```

Return (example) – Two ended tracks found
```
{
   "ended":  {
     "time_start":  1447750011.470372,
     "time_end":  1447750071.470372,
     "tracks":  [
     {
       "time_start":  1447750064.890142,
       "time_end":  1447750067.690133,
       "gender_average":  1,
       "age_average":  22,
       "boxsize_average":  217
     },
     {
       "time_start":  1447750066.130135,
       "time_end":  1447750067.690133,
       "gender_average":  -1,
       "age_average":  18,
       "boxsize_average":  192
     } ]
   }
}
```

Example

Get Live and Ended tracks

Request
```
http://<servername>/local/demographics/.api?tracks-live-and-ended.json&time=60
```

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Return (example) – Two Live and one Ended track

```
{
  "live":  {
    "tracks":  [
    {
      "time_start":  1447750516.809464,
      "time_end":  1447750523.329454,
      "gender_average":  1,
      "age_average":  19,
      "boxsize_average":  218,
      "gender_last":  1,
      "age_last":  19,
      "boxsize_last":  218
    },
    {
      "time_start" 1447750521.569459,
      "time_end":  1447750523.329454,
      "gender_average":  -1,
      "age_average":  17,
      "boxsize_average":  222,
      "gender_last":  260,
      "age_last":  19,
      "boxsize_last":  217
    } ]
  },
  "ended":  {
    "time_start":  1447750463.936758,
    "time_end":  1447750523.936758,
    "tracks":  [
    {
      "time_start":  1447750514.249470,
      "time_end":  1447750515.329465,
      "gender_average":  1,
      "age_average":  20,
      "boxsize_average":  239
    } ]
  }
}
```

API specification

Get live tracks

This API returns live face tracks (boxes), currently active in the video stream.

Request

```
http://<servername>/local/demographics/.api?tracks-live.json
```

Return

See *Common examples on page 15* for return examples.

Return value descriptions

Value	Description
<time_start>	Time of the first face observation in seconds in form of UTC (Coordinated Universal Time)
<time-end>	Time of the last face observation in seconds.
<gender_average>	-1 for female estimate and 1 for male estimate on average since <time_start>.

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Value	Description
<age_average>	Estimated age over the track since <time_start>.
<boxsize_average>	Average box size over the track since <time_start>.
<gender_last>	-1 for female guess and 1 for male guess on last observation.
<age_last>	Estimated age on last observation.
<boxsize_last>	Boxsize on last observation.

Get ended tracks

This API returns previously detected (ended) tracks.

Request
http://<servername>/local/demographics/.api?tracks-ended.json&<time>

Request parameter descriptions

Parameter	Description
<time>	Use time to adjust the amount of time (in seconds) to include in the return. The default value is 15 minutes.

Return

See *Common examples on page 15* for return examples.

Return value descriptions

Value	Description
<time_start>	Time of the first face observation in seconds in form of UTC (Coordinated Universal Time)
<time-end>	Time of the last face observation in seconds.
<gender_average>	-1 for female estimate and 1 for male estimate on average since <time_start>.
<age_average>	Estimated age over the track since <time_start>.
<boxsize_average>	Average box size over the track since <time_start>.

Get live and ended tracks

This API combines the Live API described in *Get live tracks on page 17*, and the Ended API described in *Get ended tracks on page 18*. It returns both live information, as well as ended tracks.

Request
http://<servername>/local/demographics/.api?tracks-live-and-ended.json

Request parameter descriptions

Parameter	Description
<time>	Use time to adjust the amount of time (in seconds) to include in the return. The default value is 15 minutes.

Return

See *Common examples on page 15* for return examples.

Return value descriptions

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Value	Description
<time_start>	Time of the first face observation in seconds in form of UTC (Coordinated Universal Time)
<time-end>	Time of the last face observation in seconds.
<gender_average>	-1 for female estimate and 1 for male estimate on average since <time_start>.
<age_average>	Estimated age over the track since <time_start>.
<boxsize_average>	Average box size over the track since <time_start>.
<gender_last>	-1 for female guess and 1 for male guess on last observation.
<age_last>	Estimated age on last observation.
<boxsize_last>	Boxsize on last observation.

Get FPS

This API checks the FPS used by the Demographics algorithm.

Request
```
http://<servername>/demographics/.api?fps.json
```

Return
```
{
   "fps":<fps>
}
```

Restart service

Restarts the Demographics service

Request
```
http://<servername>/demographics/.apioperator?restart
```

Reboot the camera

Reboots the camera

Request
```
http://<servername>/demographics/.apioperator?reboot
```

Get statistics

Returns historical data in JSON format

Request
```
http://<servername>/local/demographics/.api?export-json[&date=<date>][&res=<res>]
```

Request parameter descriptions

Parameter	Description
<date>	a date of the form YYYYMMDD
	a date interval of the form YYYYMMDD-YYYYMMDD
	comma separated dates of the form YYYYMMDD,[..],YYYYMMDD
	all (default) for all available data

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Parameter	Description
<res>	`15m` (default) for data in 15 minute bins
	`1h` for data in 1 hour bins
	`24h` for data in 1 day bins

Return

This script returns data in JSON format.