

Camera webpage access tutorial

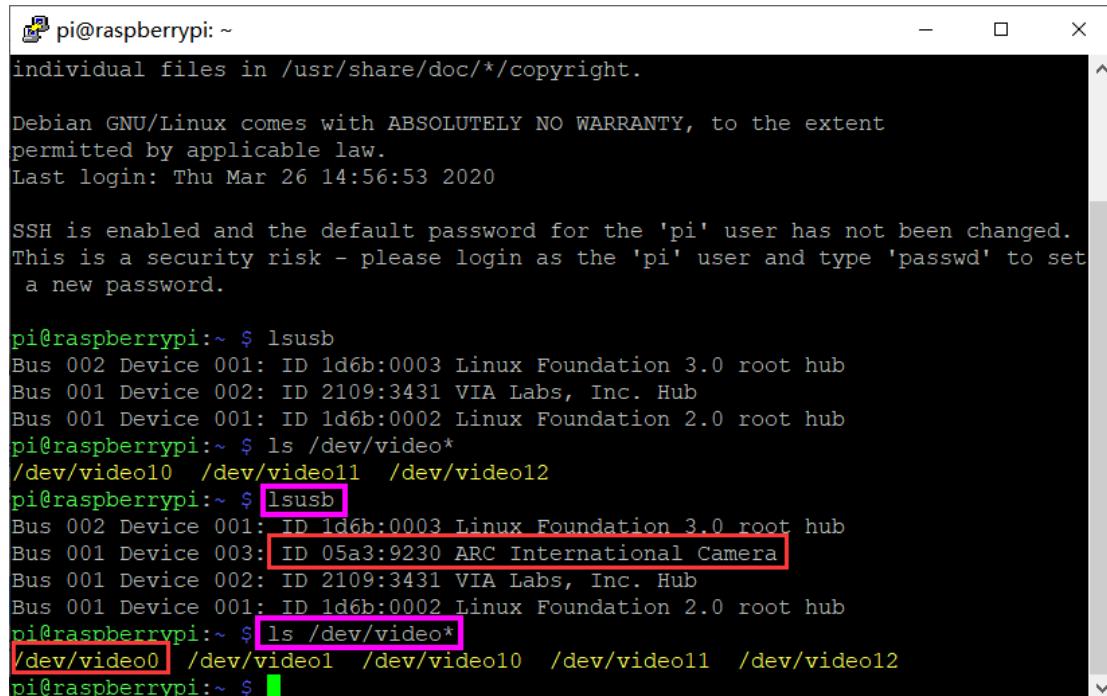
Part 1--Connect camera into Raspberry Pi board

1. User must ensure that the camera is properly inserted into the Raspberry Pi board before supplying power to the Raspberry Pi board.

2. There are two kinds of commands that the Raspberry Pi terminal can use to detect external camera devices: "lsusb" and "ls/dev/video*". (In some cases, you may be able to use the camera without seeing video0 service)

After we input following command, we can detect camera service.

As shown below.



```

pi@raspberrypi:~ 
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Mar 26 14:56:53 2020

SSH is enabled and the default password for the 'pi' user has not been changed.
This is a security risk - please login as the 'pi' user and type 'passwd' to set
a new password.

pi@raspberrypi:~ $ lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 002: ID 2109:3431 VIA Labs, Inc. Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
pi@raspberrypi:~ $ ls /dev/video*
/dev/video10  /dev/video11  /dev/video12
pi@raspberrypi:~ $ lsusb
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub
Bus 001 Device 003: ID 05a3:9230 ARC International Camera
Bus 001 Device 002: ID 2109:3431 VIA Labs, Inc. Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
pi@raspberrypi:~ $ ls /dev/video*
/dev/video0  /dev/video1  /dev/video10  /dev/video11  /dev/video12
pi@raspberrypi:~ $ 

```

Part 2 -- Upgrading the system

You must to install a new operating system before use camera, which can identify if the camera module is connected. The simplest method is download Raspbain system from Raspberry Pi website, and install it to new SD card.

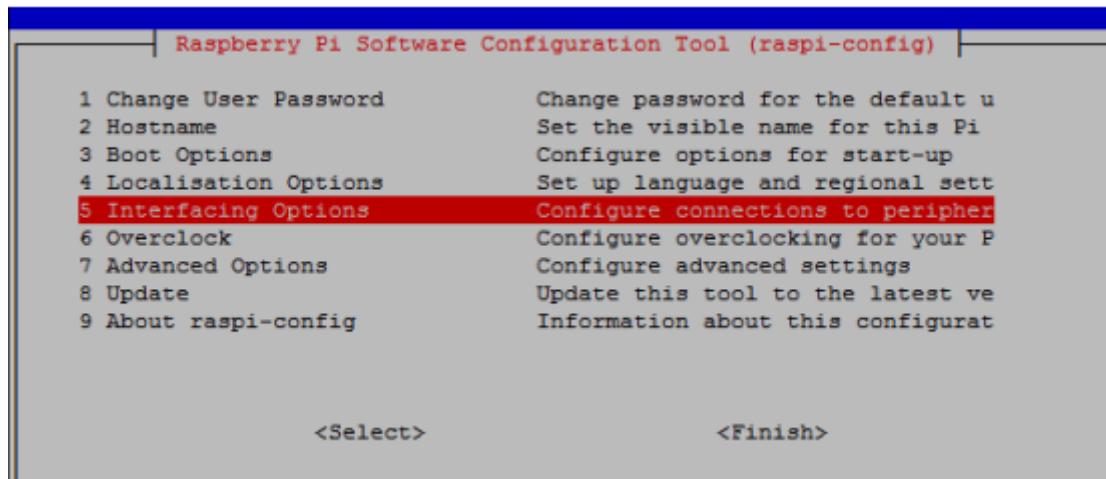
Regardless of the version of the Raspbian system you are using, I recommend that you update the system with the following command:

**sudo apt-get update
sudo apt-get upgrade**

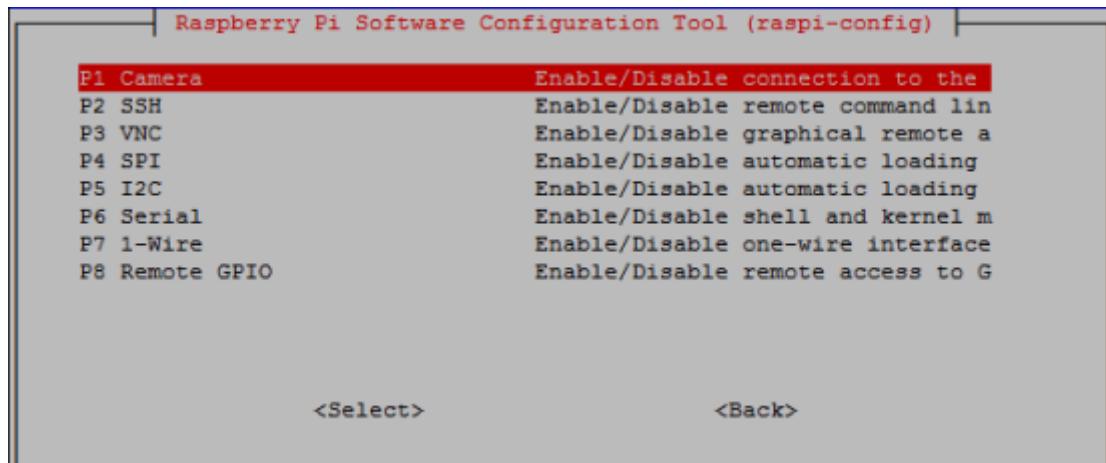
Part 3 -- Open the camera service of Raspberry Pi

1. If you use Raspberry Pi official system image, you need to open the camera service. Input **sudo raspi-config** command to enter following interface.

2. Choose fifth option [**Interfacing Options**] and click [**Enter**] key to enter next interface.



3. ChoOse [**Camera**] to enable camera.

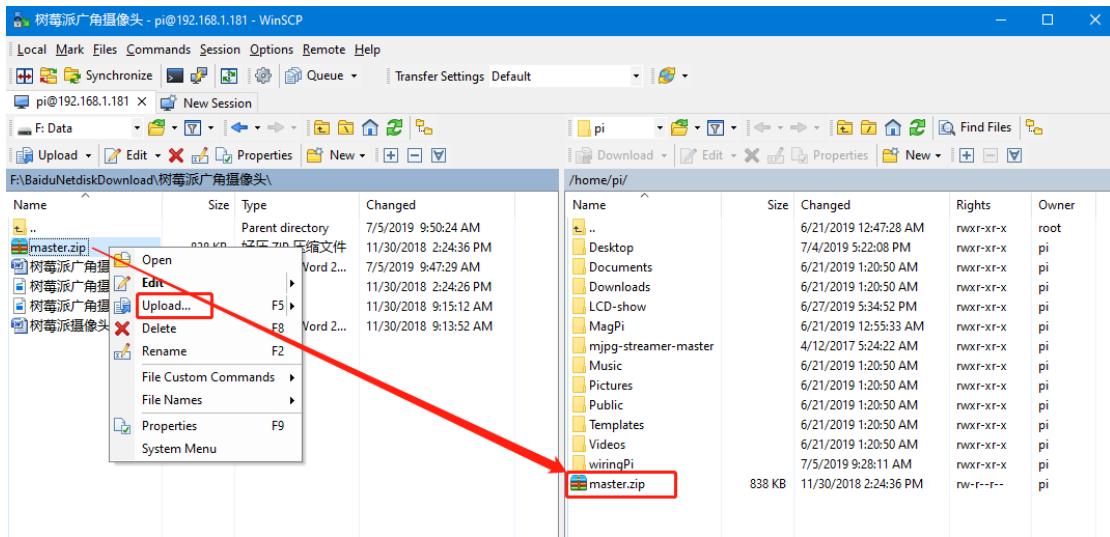


4. Finally, we need to reboot Raspberry Pi.

Input **sudo reboot** command.

Part 4 -- Using camera

1. You can transfer the video which captured by the Raspberry Pi to the web page. You need to log in to the WinSCP software and transfer the master.zip file to the pi directory of the Raspberry Pi.



2. You should input: **#unzip master.zip**

(This command to unzip mater.zip)

After complete unzip, input **ls**, you can see **mjpg-streamer-master** folder. As shown in the figure below.



3. Compiling this project requires cmake: perform the following command to install download.

(apt-get is a networked installation, so you need make Raspberry Pi successfully connect to the network.)

You should input:

#sudo apt-get install cmake

A prompt will appear when installing, you need to enter Y.

After completion, As shown in the figure below.

```

Suggested packages:
  codeblocks eclipse ninja-build
The following NEW packages will be installed:
  cmake cmake-data
0 upgraded, 2 newly installed, 0 to remove and 6 not upgraded.
Need to get 2,845 kB of archives.
After this operation, 14.6 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://mirrordirector.raspbian.org/raspbian/ jessie/main cmake-data all 3
0.2-1+deb8u1 [929 kB]
Get:2 http://mirrordirector.raspbian.org/raspbian/ jessie/main cmake armhf 3.0.
-1+deb8u1 [1,915 kB]
Fetched 2,845 kB in 3s (861 kB/s)
Selecting previously unselected package cmake-data.
(Reading database ... 124054 files and directories currently installed.)
Preparing to unpack .../cmake-data_3.0.2-1+deb8u1_all.deb ...
Unpacking cmake-data (3.0.2-1+deb8u1) ...
Selecting previously unselected package cmake.
Preparing to unpack .../cmake_3.0.2-1+deb8u1_armhf.deb ...
Unpacking cmake (3.0.2-1+deb8u1) ...
Processing triggers for man-db (2.7.0.2-5) ...
Setting up cmake-data (3.0.2-1+deb8u1) ...
Setting up cmake (3.0.2-1+deb8u1) ...
root@raspberrypi:/home# █

```

4. You need to install library

You should input:

#sudo apt-get install libjpeg8-dev

After completion, As shown in the figure below.

```

root@raspberrypi:/home# sudo apt-get install libjpeg8-dev
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  libjpeg8-dev
0 upgraded, 1 newly installed, 0 to remove and 6 not upgraded.
Need to get 205 kB of archives.
After this operation, 436 kB of additional disk space will be used.
Get:1 http://mirrordirector.raspbian.org/raspbian/ jessie/main libjpeg8-dev a
f 8d1-2 [205 kB]
Fetched 205 kB in 1s (150 kB/s)
Selecting previously unselected package libjpeg8-dev:armhf.
(Reading database ... 125733 files and directories currently installed.)
Preparing to unpack .../libjpeg8-dev_8d1-2_armhf.deb ...
Unpacking libjpeg8-dev:armhf (8d1-2) ...
Setting up libjpeg8-dev:armhf (8d1-2) ...
root@raspberrypi:/home# █

```

5.Compling

Note: we possess two formats of camera (JPEG/YUYV)

2-degree-of-freedom camera: **YUYV/JPEG**

If we want to change to the YUYV format, we need to modify the relevant files and compile:

Specific steps as shown below:

You should enter the **input_uvc.c** file in the **/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/plugins/input_uvc/** directory.

You should input:

```
cd /home/pi/mjpg-streamer-master/mjpg-streamer-experimental/plugins/input_uvc/
```

You should input:

```
ls
```

```
pi@raspberrypi:~ $ cd /home/pi/mjpg-streamer-master/mjpg-streamer-experimental/plugins/input_uvc/
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental/plugins/input_uvc $ ls
CMakeLists.txt  dynctrl.h  input_uvc.c  jpeg_utils.h  uvc_compat.h  v4l2uvc.c
dynctrl.c      huffman.h  jpeg_utils.c  README.md    uvcvideo.h   v4l2uvc.h
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental/plugins/input_uvc $
```

Just modify the format of 135 lines to **V4L2_PIX_FMT_YUYV** (The default is **format=V4L2_PIX_FMT_MJPEG**)

You should input command

```
nano -c input_uvc.c
```

```
int input_init(input_parameter *param, int id)
{
    char *dev = "/dev/video0", *s;
    int width = 640, height = 480, fps = -1, format = V4L2_PIX_FMT_YUYV, i;
    v4l2_std_id tvnorm = V4L2_STD_UNKNOWN;
    context *pctx;
    context_settings *settings;

[ line 135/814 (16%), col 1/76 (1%), char 4854/29175 (16%) ]
```

If you want to change the resolution and frame rate of the USB camera, you can change it here.

After the modification is completed, press **ctrl+X**, press **Y** to save, and then press the **Enter** key.

Then return to the **mjpg-streamer-experimental** folder to compile

Then return to **mjpg-streamer-experimental**:

```
cd /home/pi/mjpg-streamer-master/mjpg-streamer-experimental
```

And input **make clean all** to complete the compilation.

```
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental/plugins/input_uvc $ cd /home/pi/mjpg-streamer-master/mjpg-streamer-experimental
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental $ sudo make clean all
[ ! -f _build/Makefile ] || make -C _build clean
make[1]: Entering directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
make[2]: Entering directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
make[3]: Entering directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experiment
```

You can wait for the compilation to complete, you can see the interface shown below.

```
[ 92%] Built target output_rtsp
make[3]: Entering directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
make[3]: Leaving directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
make[3]: Entering directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
make[3]: Leaving directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
[ 96%] Building C object plugins/output_udp/CMakeFiles/output_udp.dir/output_udp.c.o
[100%] Linking C shared library output_udp.so
make[3]: Leaving directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
[100%] Built target output_udp
make[2]: Leaving directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
make[1]: Leaving directory '/home/pi/mjpg-streamer-master/mjpg-streamer-experimental/_build'
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental $
```

6.Restart system

You need to input: **sudo reboot** to reboot system

Plug in the camera and restart the system.

7. After rebooting, enter the system.

You need to enter the **mjpg-streamer-experimental** directory by command. And use the following command to start the normal USB camera (for 2-DOF cameras):

```
#./mjpg_streamer -i "./input_uvc.so" -o "./output_http.so -w ./www"
```

Some cameras will report an error when executing this command. If they do not return to the command prompt and display "Starting Camera", it means success.

As shown in the figure below, the camera is successfully turned on:

```
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental $ ./mjpg_streamer -i "./input_uvc.so" -o "./output_http.so -w ./www"
MJPEG Streamer Version.: 2.0
  i: Using V4L2 device.: /dev/video0
  i: Desired Resolution: 640 x 480
  i: Frames Per Second.: -1
  i: Format.....: YUYV
  i: JPEG Quality....: 80
  i: TV-Norm.....: DEFAULT
UVCIIOC_CTRL_ADD - Error at Pan (relative): Inappropriate ioctl for device (25)
UVCIIOC_CTRL_ADD - Error at Tilt (relative): Inappropriate ioctl for device (25)
UVCIIOC_CTRL_ADD - Error at Pan Reset: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_ADD - Error at Tilt Reset: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_ADD - Error at Pan/tilt Reset: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_ADD - Error at Focus (absolute): Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at Pan (relative): Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at Tilt (relative): Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at Pan Reset: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at Tilt Reset: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at Pan/tilt Reset: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at Focus (absolute): Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at LED1 Mode: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at LED1 Frequency: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at Disable video processing: Inappropriate ioctl for device (25)
UVCIIOC_CTRL_MAP - Error at Raw bits per pixel: Inappropriate ioctl for device (25)
  o: www-folder-path.....: ./www/
  o: HTTP TCP port.....: 8080
  o: HTTP Listen Address..: (null)
  o: username:password....: disabled
  o: commands.....: enabled
```

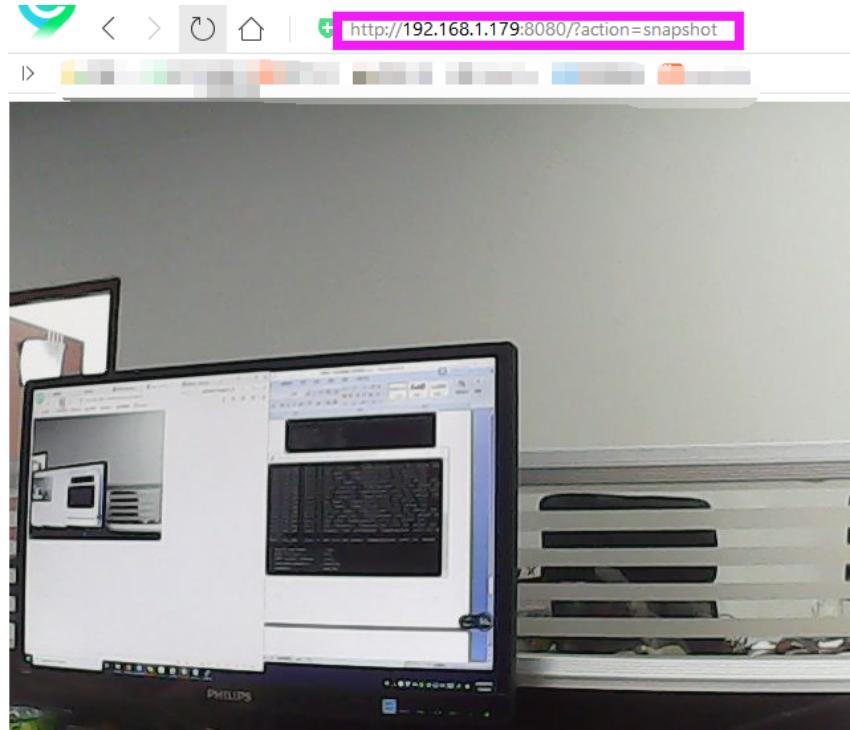
8. Testing

View the image, open the browser on the PC side, you need to enter the following URL to see the static screenshot:

http://<RaspberryPi IP>:8080/?action=snapshot

My URL is: <http://192.168.0.179:8080/?action=snapshot>

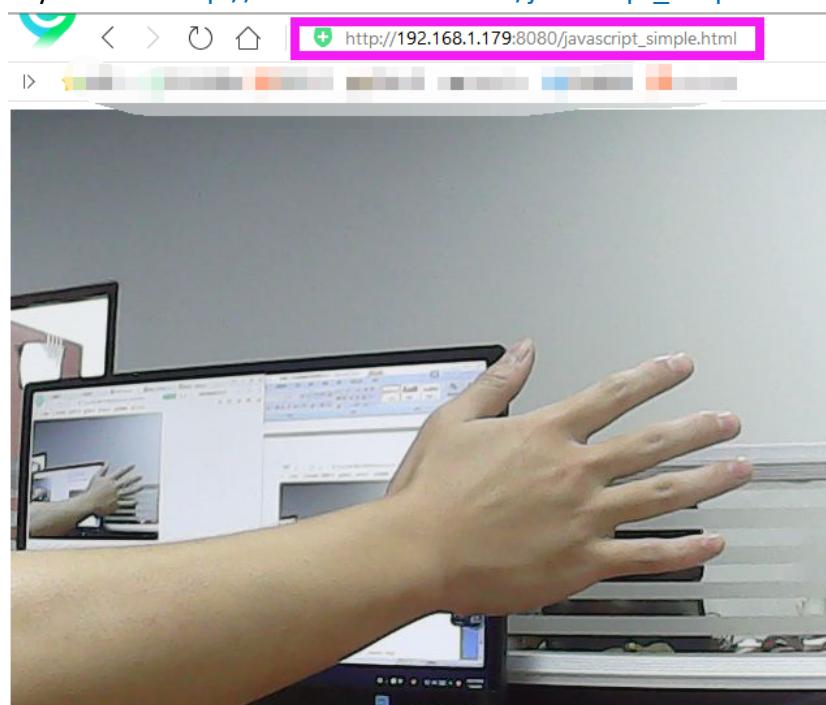
As shown below.



You should input the following URL to see the dynamic image:

http://<RaspberryPi IP>:8080/javascript_simple.html

My URL is: http://192.168.1.179:8080/javascript_simple.html



Note: After running the camera web page service, this process will occupy the camera, causing other camera commands to fail to run. Please end the process before running other camera commands.

View camera process number:

```
ps a
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental $ ps a
  PID TTY      STAT      TIME COMMAND
  578 ttys0    Ssl+     0:00 /usr/lib/xorg/Xorg :0 -seat seat0 -auth /var/run/lightdm
  579 ttys0    Ss       0:00 /bin/login -f
  580 ttys0    Ss+     0:00 /sbin/agetty -o -p -- \u --keep-baud 115200,38400,9600
  854 ttys0    S+      0:00 -bash
1105 pts/0    Ss      0:00 -bash
1118 pts/0    T1      7:48 ./mjpg_streamer -i ./input_uvc.so -o ./output_http.so
8613 pts/0    R+      0:00 ps a
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental $
```

Input following command to kill PID

```
sudo kill -9 1118
```

```
pi@raspberrypi:~/mjpg-streamer-master/mjpg-streamer-experimental $ sudo kill -9
1118
[1]+  Killed                  ./mjpg_streamer -i "./input_uvc.so" -o "./output_h
ttp.so -w ./www"
```

Different Raspberry Pi process numbers are different. Please refer to the process shown in your own system.