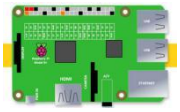
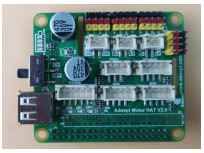
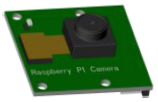
Lesson 9 How to Take a Photo with Raspberry Pi

In this tutorial we will learn the photography function of the Raspberry Pi.

For more details, refer to the Raspberry Pi official website:

https://www.raspberrypi.org/documentation/usage/camera/README.md

9.1 Components & Parts

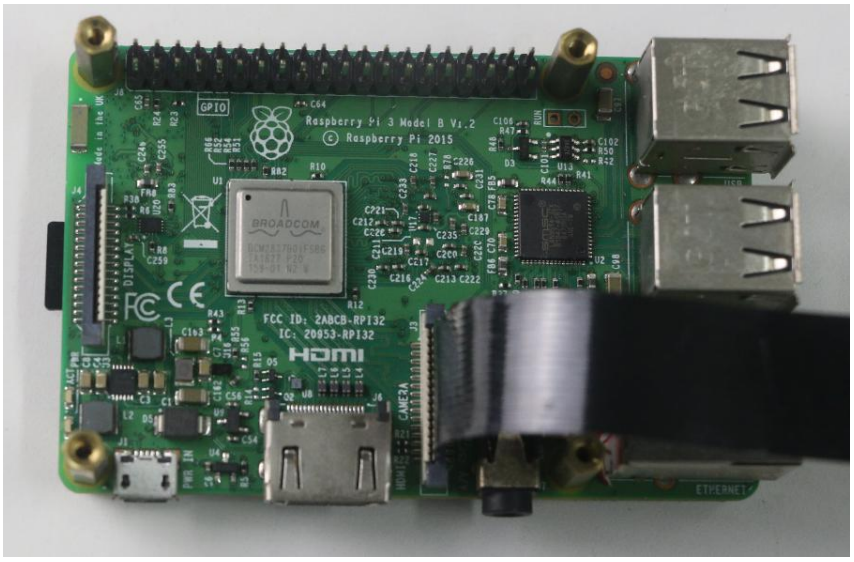
Components	Quantity	Picture
Raspberry Pi	1	
Robot HAT	1	
Camera Module	1	
Camera Flex Cable	1	

9.2 Introducing the Camera Module

The Raspberry Pi camera module is capable of taking full HD 1080p photos and videos and can be controlled programmatically.

9.3 Schematic Diagram

The flex cable inserts into the connector situated between the Ethernet and HDMI ports, with the silver connectors facing the HDMI port. The flex cable connector should be opened by pulling the tabs on the top of the connector upwards then towards the Ethernet port. The flex cable should be inserted firmly into the connector, with care taken not to bend the flex at too acute an angle. The top part of the connector should then be pushed towards the HDMI connector and down, while the flex cable is held in place. (Pay attention that the metal of the connector should be in contact with that of the cable)



Install the Motor HAT. Insert the cable through the hole of the Motor HAT.

Connect the flex cable and camera module (metals of both should be in contact with each other).

9.4 Programming the Raspberry Pi to Take Photos

Run the code

1. Log into the Raspberry Pi remotely.

```
Linux raspberrypi 4.19.118-v7l+ #1311 SMP Mon Apr 27 14:26:42 BST 2020 armv7l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Sat Aug 29 08:17:49 2020 from 192.168.3.208

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:~ $
```

2. When the Raspberry Pi is configured with the robot software, the Raspberry Pi will automatically run the webServer.py program. If you need to use the camera in other programs, you need to terminate this program. Termination command:

```
sudo killall python3
```

3. View the files of the current directory:

ls

```
pi@raspberrypi:~ $ ls
adeept_alter      adeept_rasptank     Downloads               rpi-backup
adeept_awr        adeept_rasptankpro  flask-video-streaming   sphinxbase-5prealpha
adeept_darkpaw    Bookshelf           Music                   startup.sh
adeept_picar-b    create_ap           Pictures                Templates
adeept_picarpro   Desktop             pocketsphinx-5prealpha  test
adeept_raspclaws  Documents           Public                  Videos
pi@raspberrypi:~ $
```

4. Type in commands, press Enter to run the program:

raspistill -t 1000 -o image.jpg

```
pi@raspberrypi:~ $
pi@raspberrypi:~ $ raspistill -t 1000 -o image.jpg
pi@raspberrypi:~ $
```

5. 1s after the successful run, the camera will take a photo *image.jpg*.

- 1000: delay time of photo shooting
- image.jpg: name of the photo

6. Type in "ls" to view the file.

ls

```
pi@raspberrypi:~ $ raspistill -t 1000 -o image.jpg
pi@raspberrypi:~ $ ls
adeept_alter      adeept_rasptankpro  image.jpg               startup.sh
adeept_awr        Bookshelf           Music                   Templates
adeept_darkpaw    create_ap           Pictures                test
adeept_picar-b    Desktop             pocketsphinx-5prealpha  Videos
adeept_picarpro   Documents           Public
adeept_raspclaws  Downloads           rpi-backup
adeept_rasptank   flask-video-streaming  sphinxbase-5prealpha
pi@raspberrypi:~ $
```

9.5 Q&A

- Error occurs when the command "raspistill -t 1000 -o image.jpg" is typed in the command line.

```
pi@raspberrypi:~ $
pi@raspberrypi:~ $ raspistill -t 1000 -o image.jpg
mmal: mmal_vc_component_enable: failed to enable component: ENOSPC
mmal: camera component couldn't be enabled
mmal: main: Failed to create camera component
mmal: Failed to run camera app. Please check for firmware updates

pi@raspberrypi:~ $
```

1. Run " sudo killall python3".

2. Check whether the camera connector of the Raspberry Pi, flex cable, and camera module are well connected.

   - Metals of the flex cable and camera module should be in contact with each other
   - Metals of the camera module's flex cable and camera connector of the Raspberry Pi should be in contact with each other

Check whether the flex cable and camera are good or damaged.