
Getting started tutorial

Living Optics



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Getting started tutorial

This tutorial is intended to help you get started with using your Living Optics Camera. We will use the camera tool installed on the Nvidia Jetson AGX Orin and the multicolor LED torch supplied with the development kit.

- Please ensure that you have completed all steps in the *Unboxing the camera hardware* section of the user manual before proceeding.
- Follow the video version of this tutorial at (<https://livingoptics.com/getting-started/>) for a more hands-on view of this tutorial.
- You will need a monitor, keyboard and mouse to complete this tutorial. These are not supplied as part of the Living Optics Development kit.

Set the scene

Arrange the components of your Development Kit as shown in the picture below.

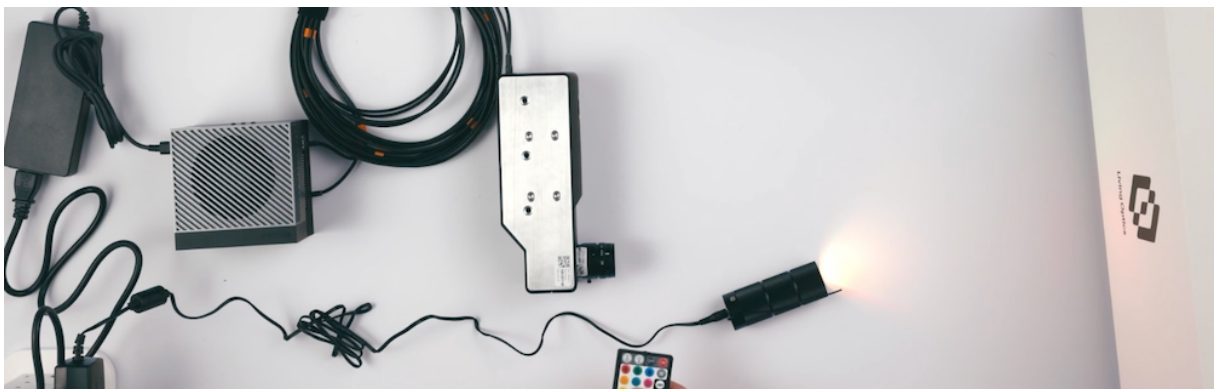


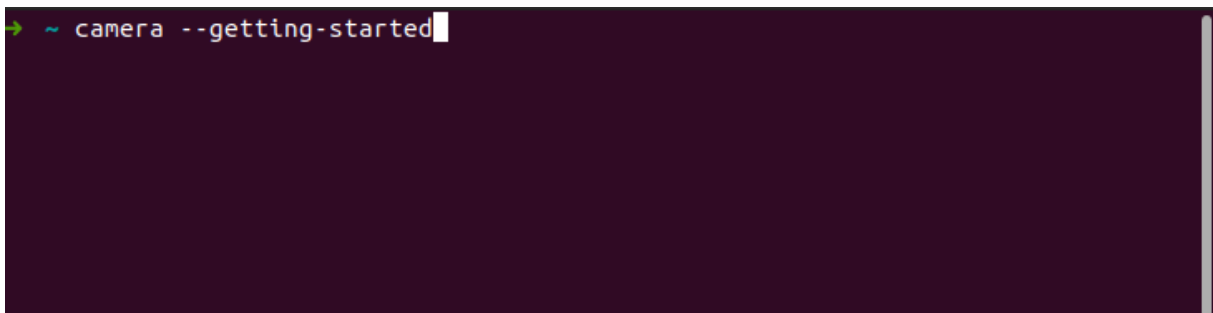
Figure 1: Set the scene

- Ensure the Nvidia Jetson AGX Orin is placed correctly with the fan and metal grating facing upwards - this is how it stays cool.
- Attach a monitor via Displayport and as well as a keyboard and mouse.
- Ensure your camera has the zoom objective lens fitted.
- Place your camera on a flat, level surface and orientate it towards the white surface of the Shipping box (or other white, matt surface of your choice).
- Plug the LED torch Power cable into a suitable power socket and attach to the back of the LED torch.
- Place the torch approximately 15-20 cm away from your chosen white surface.

- Turn the LED torch on using the LED remote and press the “W” button to set the torch to white.
- Connect the Nvidia Jetson AGX Orin power cable (it will now boot if power is flowing).
- Log in to the user account with the credentials provided with the Nvidia Jetson AGX Orin.

Start the Camera tool

- Open a terminal window and type the following: `camera --getting-started`. The argument adds some features to the tool to assist with this tutorial.



```
→ ~ camera --getting-started
```

Figure 2: Commandline

- Wait for the `camera tool` to open (a few seconds).
- Your `camera tool` will now show the live scene view.
- Adjust the focus of the objective lens so that the white surface of the shipping box is in focus. If your image is too dark or too bright, you may have to change the camera settings to get suitable lighting levels. Check the frame rate, exposure time and gain on the `camera tool` interface.

Field Calibration

It is important to take a field calibration image regularly and we recommend doing so before each data capture session to ensure the best results. This image helps the software adjust for any physical changes that might affect the accuracy of the spectral information.

- Press the cog or crosshair icon (depending on the SDK version installed) on the left-hand toolbar of the `camera tool` and follow the prompts. Wait a few seconds and a confirmation message will appear stating the field calibration has completed.
- Your field calibration is now complete and you can continue the tutorial below.

Note:

This field calibration does not persist once the camera tool has been closed. Please repeat the process above every time the camera tool is opened.

Live spectral visualization

The camera tool features a live spectral viewer function. We will use this to check the spectrum of the LED torch colors.

- Open the spectral viewer by pressing the button shown in the image below.

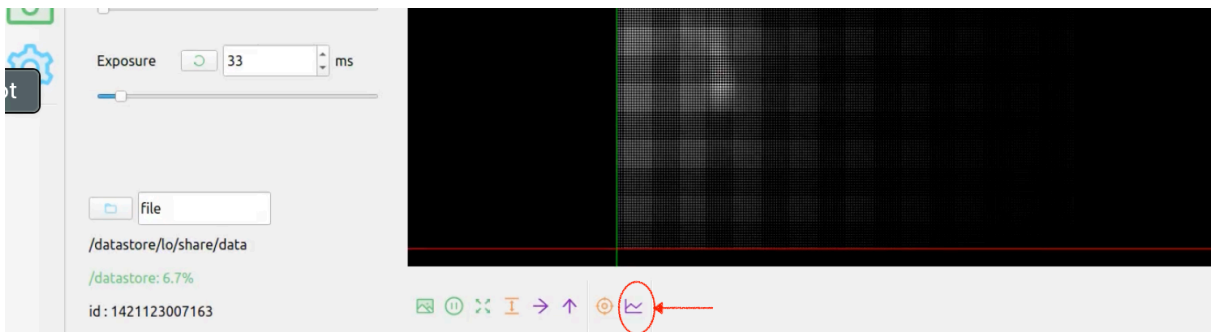


Figure 3: Spectral viewer

Overlays with representative spectra of the LED torch have been added to the spectral viewer at the following five torch color settings (1-Red, 2-Green, 3-Blue, 4-Brown, 5-Pink) as an approximate reference guide.



Figure 4: Torch remote

Note that the Living Optics Camera will show you the spectra of any color available on the LED torch remote but the reference overlays have not been provided beyond the 5 colors above.

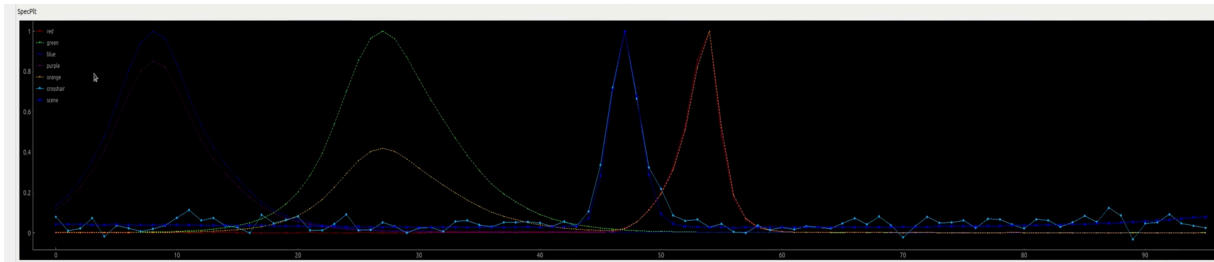


Figure 5: Torch spectra reference

Steps

- Press the Red button on the torch and check the spectral viewer to see the scene and crosshair lines are overlapping with the Red overlay line.
- Cycle through the rest of the colors listed in the context above, and see that the scene and crosshair plots are approximately overlapping with the overlays.

This concludes the tutorial. It shows how mixing just three LED colors can create a vast array of colors that the human eye can perceive, and that the Living Optics Camera can reveal the spectral details behind this color mixing.

For a fun and easy experience of the above tutorial, try the breath button on the LED remote, which cycles through various preset colors of the torch, and watch the spectra change with each color.

Next steps

Next, you are ready to start using the camera tool in earnest to explore and record hyperspectral data of the world around you.

Further details and guides on the camera tool can be found at (<https://docs.livingoptics.com/sdk/tools/camera/tool-guide.html>)

If you want to perform some analysis and run some applications, see our analysis tool at (<https://docs.livingoptics.com/sdk/tools/analysis/tool-guide.html>)

Further guides, tutorials and examples can be found at (<https://docs.livingoptics.com/sdk/index.html>)