Deep pseudo-color image

This lesson uses the Raspberry Pi 5 as an example. For Raspberry Pi and Jetson Nano boards, you need to open a terminal on the host computer and enter the command to enter the Docker container. Once inside the Docker container, enter the commands mentioned in this lesson in the terminal. For instructions on entering the Docker container from the host computer, refer to **[01. Robot Configuration and Operation Guide] -- [5.Enter Docker (For JETSON Nano and RPi 5)]**.

For Orin boards, simply open a terminal and enter the commands mentioned in this lesson.

1. Program Functionality

> Upon startup, the program converts the subscribed black-and-white depth image into a pseudo-color image, displaying varying shades of color based on the depth information.

2. Program Code Reference Path

```
~/yahboomcar_ros2_ws/yahboomcar_ws/src/yahboomcar_depth/yahboomcar_depth/Basic/depth_to_color.py
```

- depth_to_color.py

This function converts depth data into a pseudo-color image by subscribing to depth image information.

3. Program Startup

For the Raspberry Pi 5 controller, you must first enter the Docker container. The Orin controller does not require this.

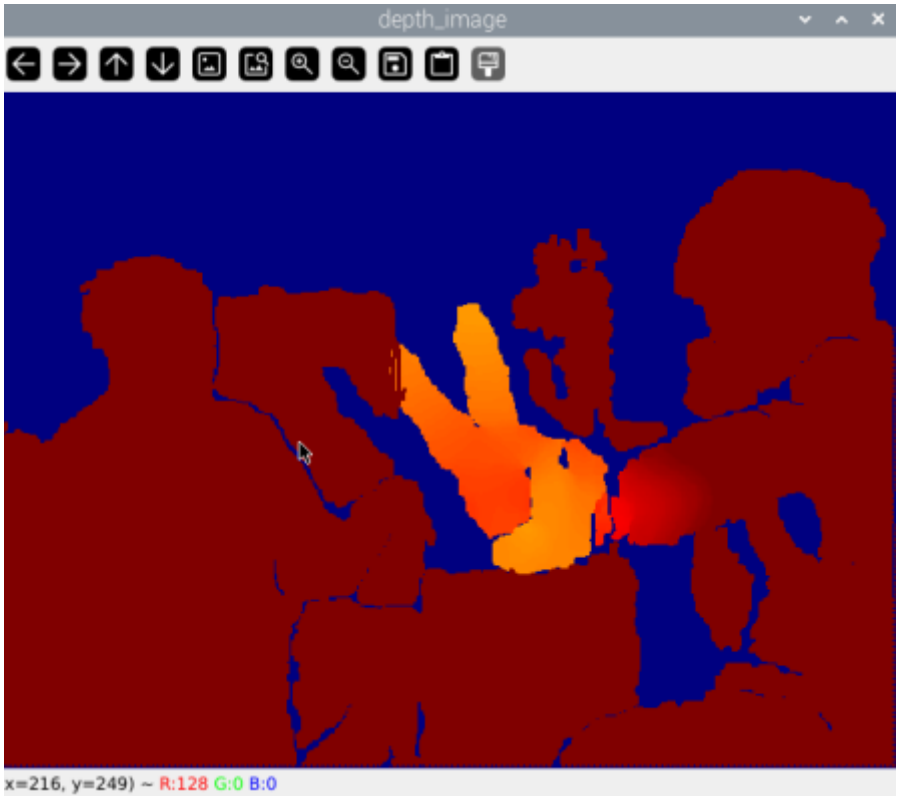
Enter the Docker container (for steps, see [Docker Course] --- [4. Docker Startup Script]).

All of the following Docker commands must be executed from the same Docker container in the Docker terminal.** (For steps, see [Docker Course] --- [3. Docker Submission and Multi-Terminal Access]).**

Enter the terminal:

```
ros2 launch ascamera hp60c.launch.py
ros2 run yahboomcar_depth depth_to_color
```

A successful startup will generate a window displaying a pseudo-color image, as shown in the figure below.



As can be seen from the actual distance, the difference in depth information is clearly reflected in the color.

4. Core Code

depth_to_color.py

This program has the following main functions:

- Subscribes to the original depth image topic
- Converts a single-channel (grayscale) depth image to a pseudo-color image (Jet color mapping)
- Displays the converted color depth image in real time in a window

Part of the core code is as follows.

```
def topic(self, msg):
        # 将ROS图像消息转换为OpenCV格式 Convert ROS image messages to OpenCV format
        depth_image_orin = self.depth_bridge.imgmsg_to_cv2(msg, encoding[1])

        # 深度图像处理： #Deep Image Processing:
        # 1. 调整深度值范围：使用convertScaleAbs缩放深度值
        # 2. 应用伪彩色映射：使用COLORMAP_JET（蓝->绿->红）
        # 1. Adjust the depth range: Use convertScaleAbs to scale the depth
values.
        # 2. Apply a pseudo-color map: Use COLORMAP_JET (blue->green->red)
        depth_to_color_image = cv.applyColorMap(
            cv.convertScaleAbs(depth_image_orin, alpha=0.45),
            cv.COLORMAP_JET
        )

        # 显示处理后的图像 Display the processed image
        cv.imshow(self.window_name, depth_to_color_image)

        # 保持窗口更新（1ms延迟） Keep the window updated (1ms delay)
```

```
        cv.waitKey(1)
```