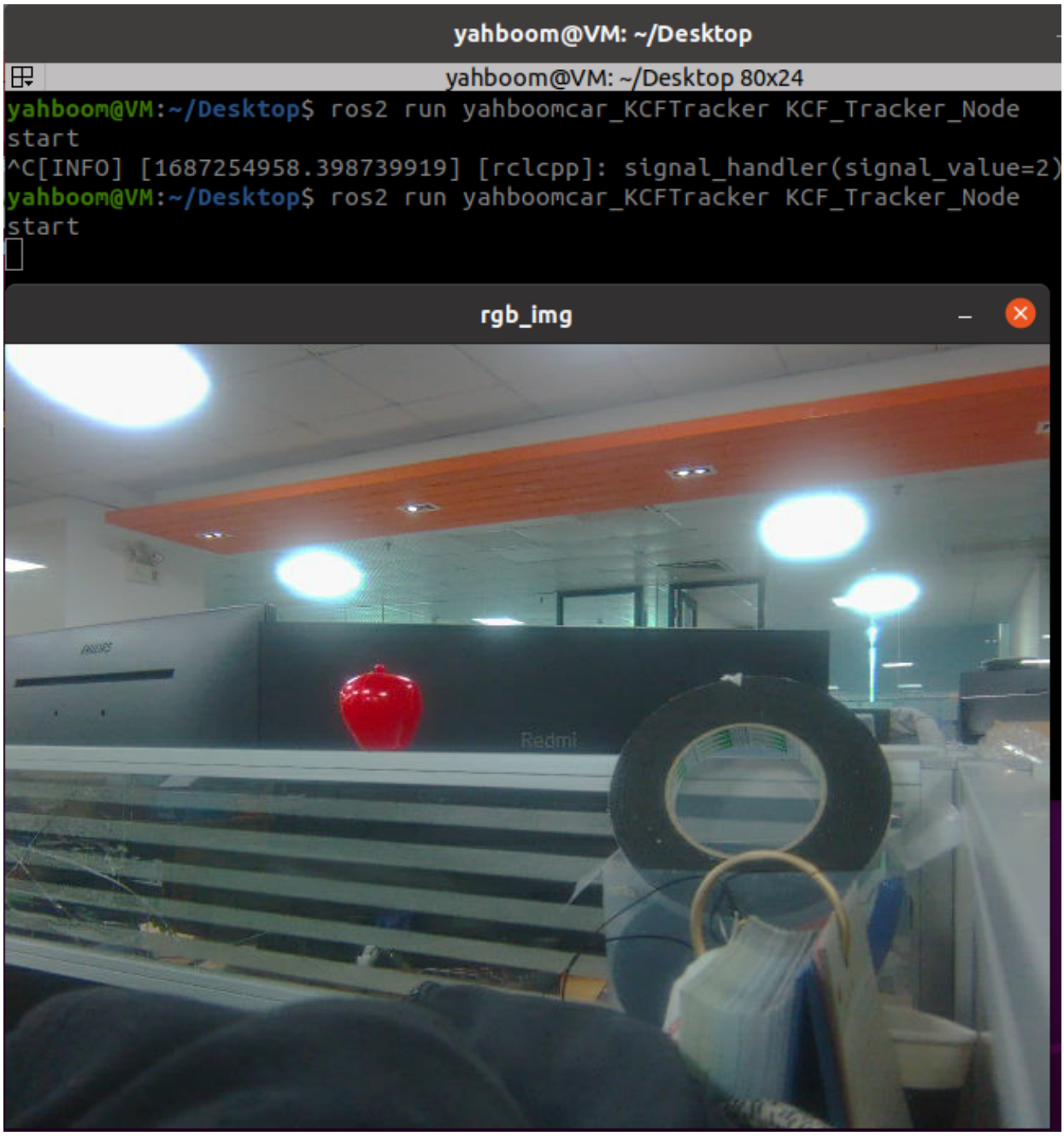
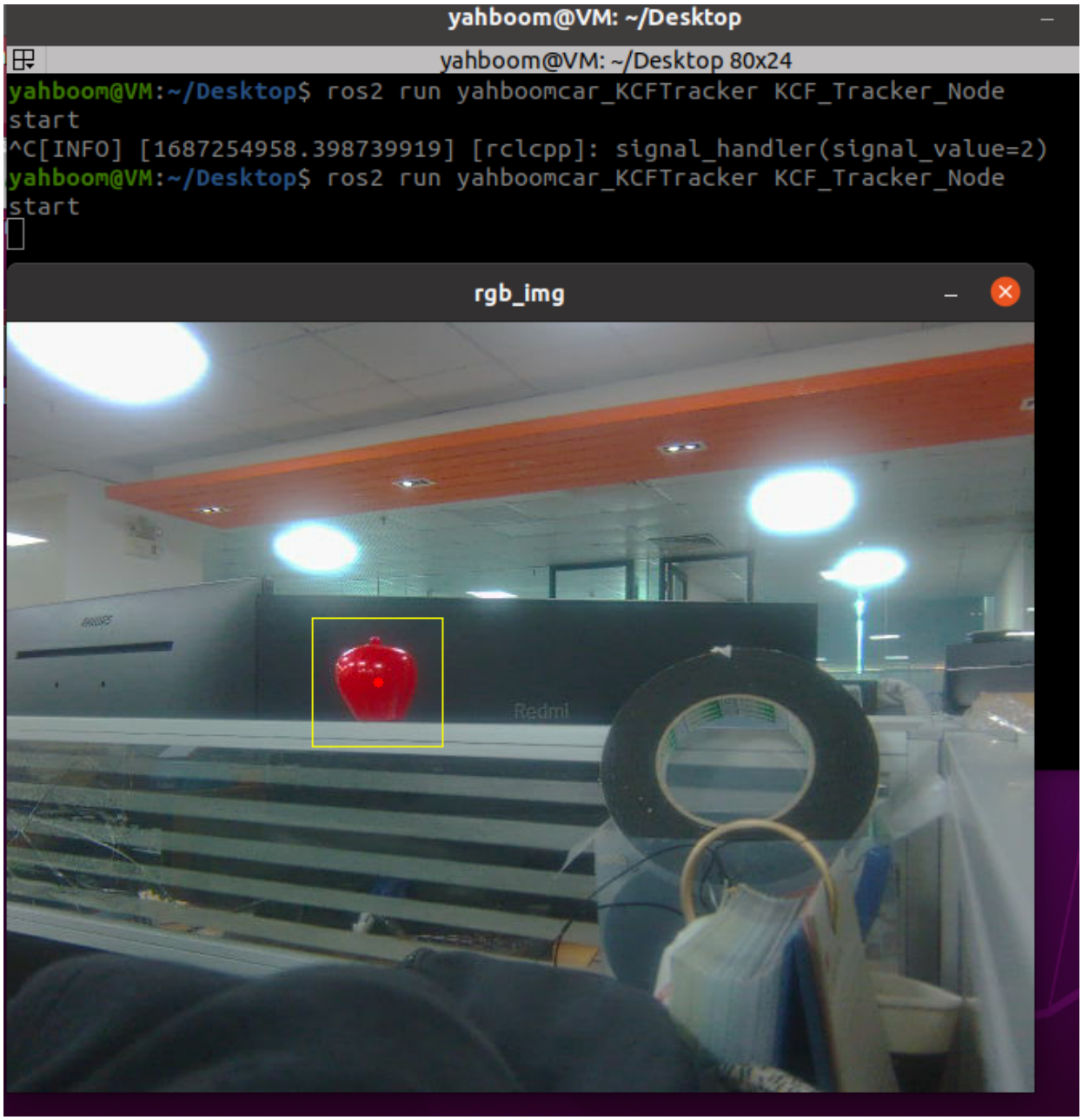
6、KCF object tracking

1、program start

```
ros2 launch orbbec_camera gemini2.launch.xml
ros2 run yahboomcar_KCFTracker KCF_Tracker_Node
```



After the program is successfully started, it will appear as shown in the figure above, select the object to be tracked with the mouse, and it will be framed after releasing it, as shown in the figure below：



Then press the space bar to start tracking the object. The terminal will print out the center coordinates and distance of the tracked object,

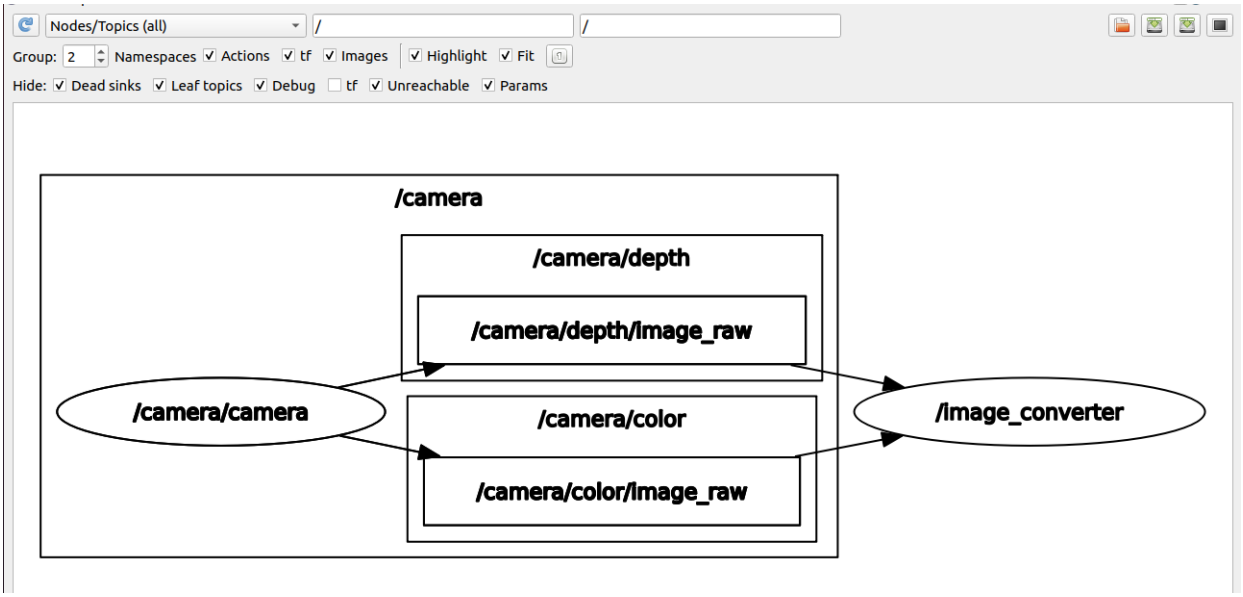
Similarly, since there is no robot chassis driver, the phenomenon of object tracking cannot be seen intuitively, but the object tracking can be reflected sideways through the terminal information and the change of /cmd_vel topic data. To view the speed topic data, enter the following command,

```
ros2 topic echo /cmd_vel
```

```
yahboom@VM:~/Desktop$ ros2 topic echo /cmd_vel
linear:
  x: -1.215250015258789
  y: 0.0
  z: 0.0
angular:
  x: 0.0
  y: 0.0
  z: 0.4450000524520874
```

Moving the tracked object, the speed data here will also change.
View the communication between nodes, terminal input,

```
ros2 run rqt_graph rqt_graph
```



2、core code

code reference path,

```
~/orbbec_ws/src/yahboomcar_KCFTracker/src/KCF_Tracker.cpp
```

The principle of function realization is similar to that of color tracking. It calculates the linear velocity and angular velocity based on the center coordinates of the target and the depth information fed by the depth camera, and then publishes it to the chassis. Some codes are as follows,

```
//This part is to get the center coordinates after selecting the object, which is
used to calculate the angular velocity
if (bBeginKCF) {
result = tracker.update(rgbimage);
rectangle(rgbimage, result, Scalar(0, 255, 255), 1, 8);
circle(rgbimage, Point(result.x + result.width / 2, result.y + result.height
/ 2), 3, Scalar(0, 0, 255),-1);
} else rectangle(rgbimage, selectRect, Scalar(255, 0, 0), 2, 8, 0);
```

```
//This part is to calculate the value of center_x, distance, used to calculate the
speed
int center_x = (int)(result.x + result.width / 2);
int num_depth_points = 5;
for (int i = 0; i < 5; i++) {
if (dist_val[i] > 0.4 && dist_val[i] < 10.0) distance += dist_val[i];
else num_depth_points--;
}
distance /= num_depth_points;
//Calculate linear and angular velocities
if (num_depth_points != 0) {
std::cout<<"minDist: "<<minDist<<std::endl;
if (abs(distance - this->minDist) < 0.1) linear_speed = 0;
else linear_speed = -linear_PID->compute(this->minDist, distance);//-
linear_PID->compute(minDist, distance)
}
rotation_speed = angular_PID->compute(320 / 100.0, center_x /
100.0);//angular_PID->compute(320 / 100.0, center_x / 100.0)
```