Lab 3– Depth Camera

MIT Beaver Works Racecar Curriculum

https://matthewcalligaro.github.io/RacecarWebsite/

Lab Objectives

Main objective: Use the Intel RealSense camera to do depth sensing.

Learning objectives

- Use RVIZ to explore different depth visualizations
- Use the depth information from the RealSense to add a safety stop feature
- Use the additional depth information to complete the cone slaloming challenge

Depth Sensing

What is depth sensing?

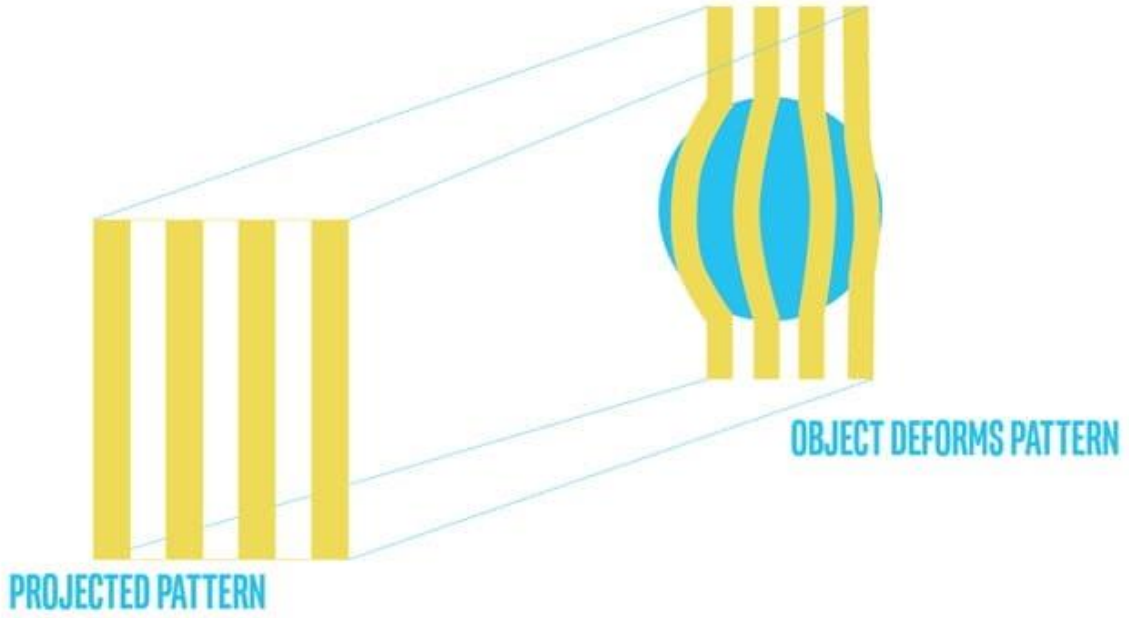
A color depth camera has pixels which have four numerical values associated with them. The first three are the RGB values, and the final corresponds to the distance/depth measurement

Depth Sensing Technologies:

Structured light, Time of Flight, Stereo triangulation

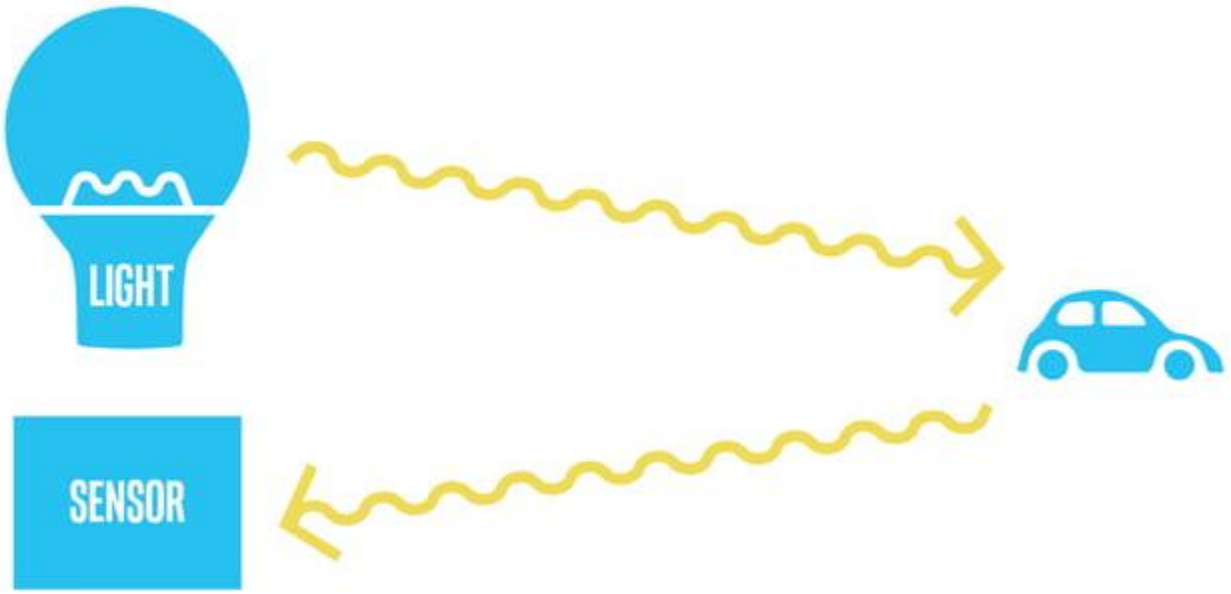
Structured Light

- Illuminate scene with specific light pattern, only requires one image
- Ex: Original Kinect



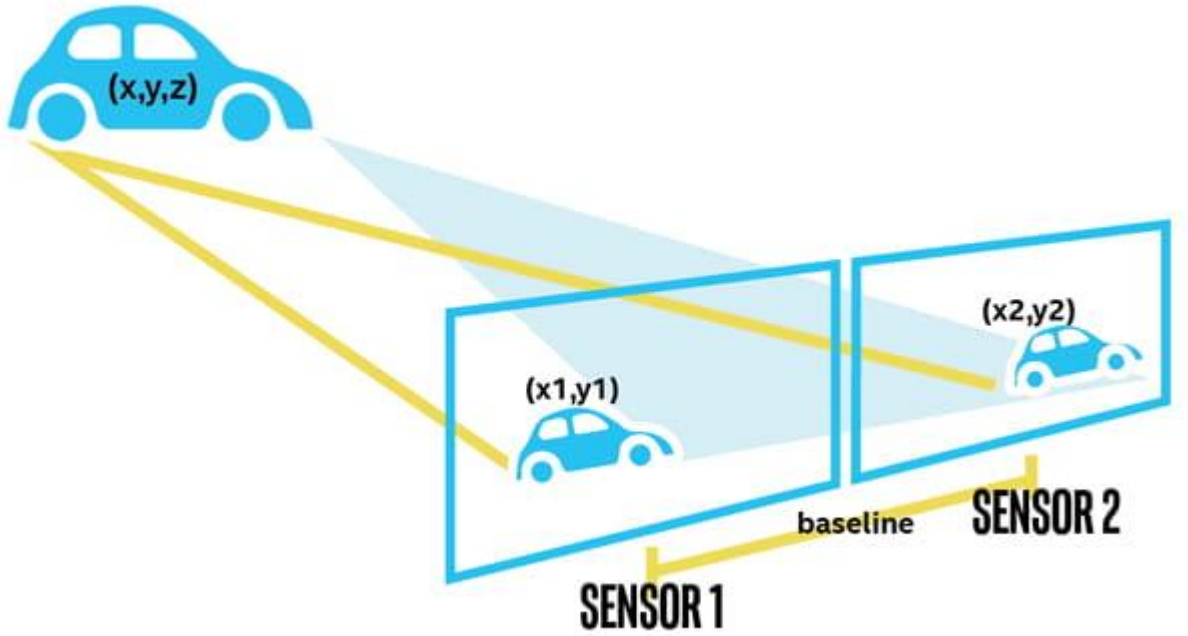
Time of Flight

- Radar technology that emits a light pulse instead of RF
- Ex: Kinect for Xbox One



Stereo Vision

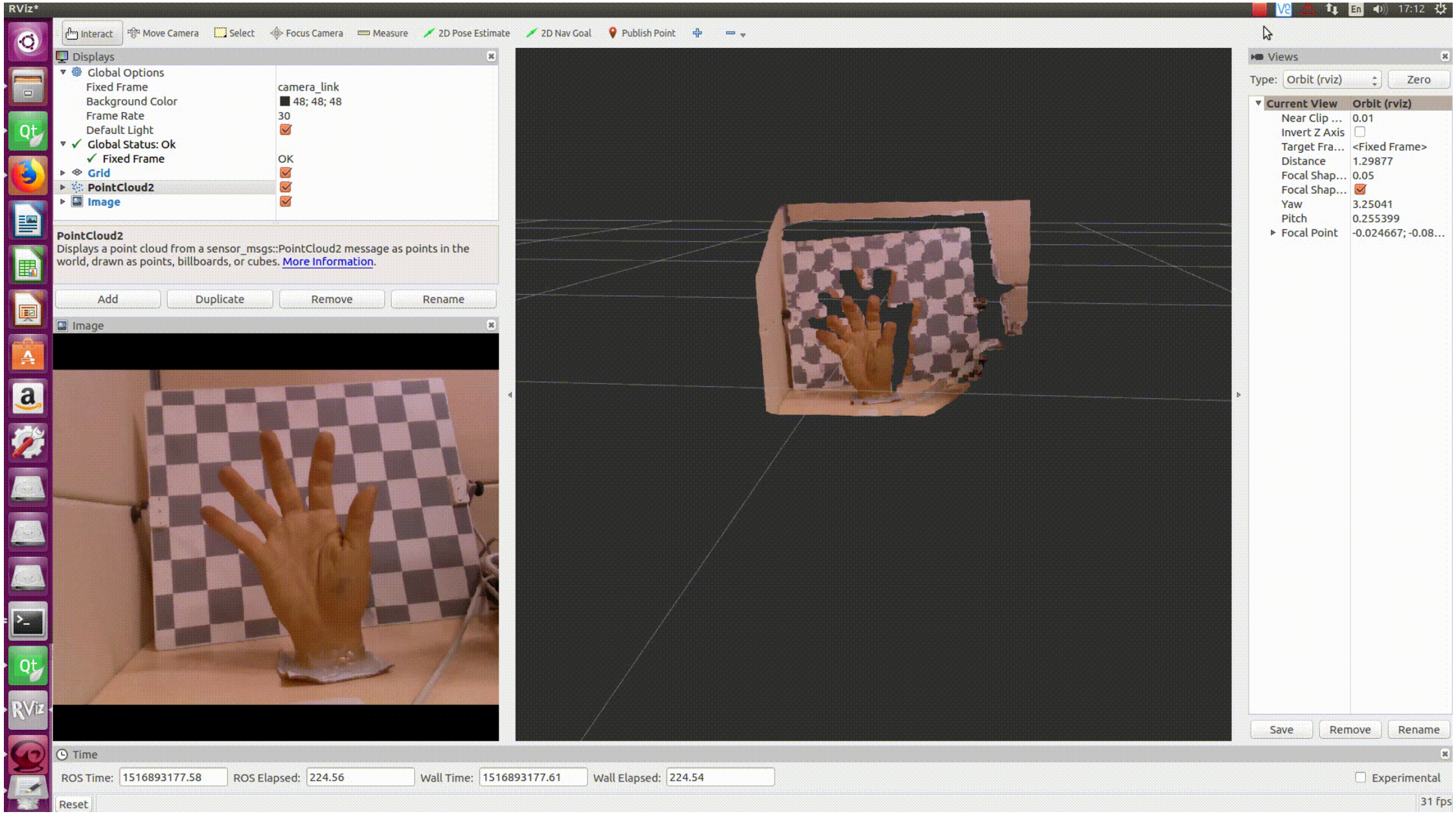
- Find corresponding points on a stereo camera system
- Ex: Intel RealSense



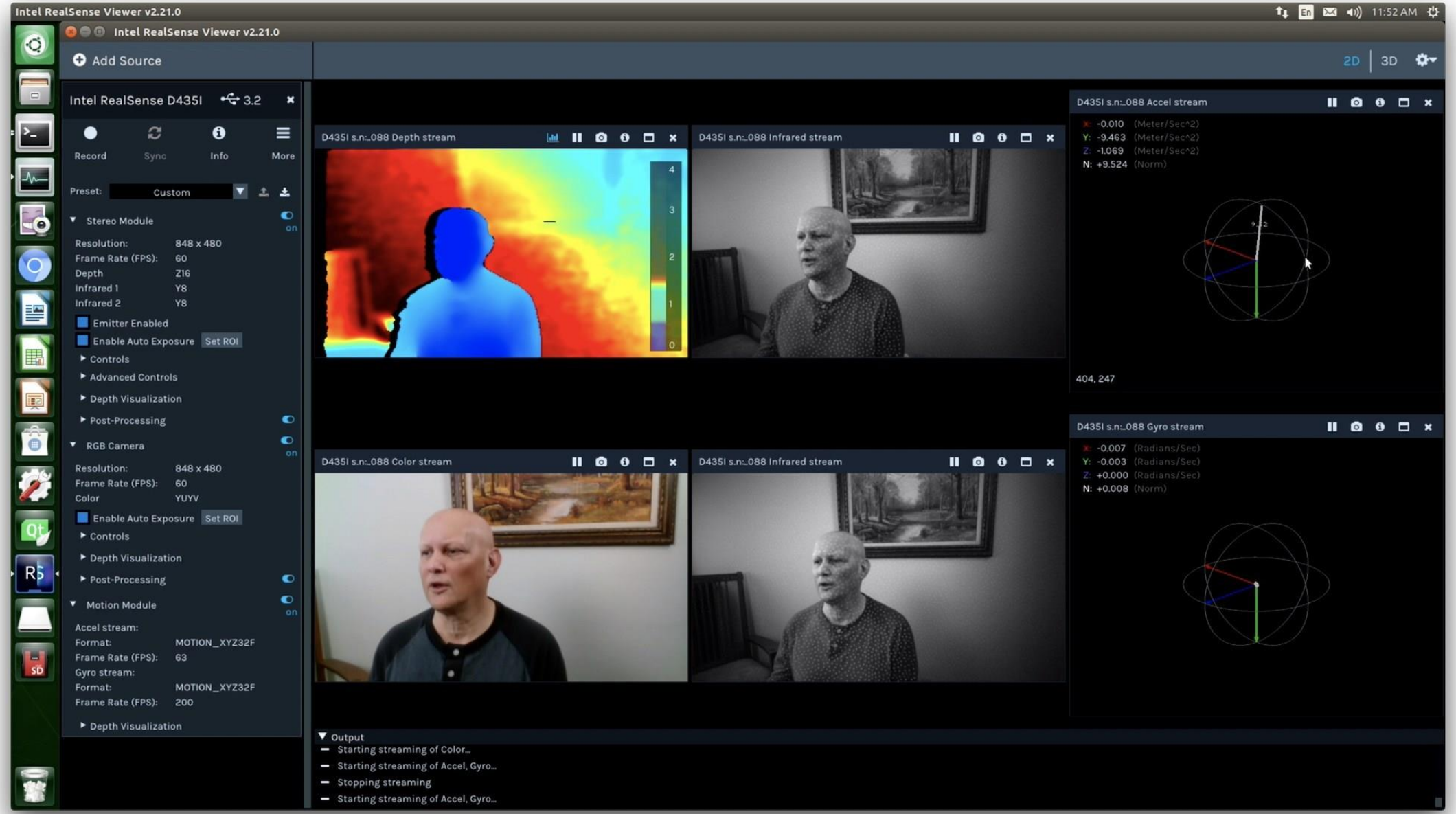
Intel RealSense – Active Stereo

- Active stereo camera actively employs an **IR projector** to simplify the image matching issue
- Helps with dark scenes, or scenes without texture

RVIZ


RViz*
Interact
Move Camera
Select
Focus Camera
Measure
2D Pose Estimate
2D Nav Goal
Publish Point
Displays
Global Options
Fixed Frame
camera_link
Background Color
48; 48; 48
Frame Rate
30
Default Light
Global Status: Ok
Fixed Frame
OK
Grid
PointCloud2
Image
PointCloud2
Displays a point cloud from a sensor_msgs::PointCloud2 message as points in the world, drawn as points, billboards, or cubes. More Information.
Add
Duplicate
Remove
Rename
Image
Views
Type:
Orbit (rviz)
Zero
Current View
Orbit (rviz)
Near Clip ...
0.01
Invert Z Axis
Target Fra...
<Fixed Frame>
Distance
1.29877
Focal Shap...
0.05
Focal Shap...
Yaw
3.25041
Pitch
0.255399
Focal Point
-0.024667; -0.08...
Save
Remove
Rename
Time
ROS Time:
1516893177.58
ROS Elapsed:
224.56
Wall Time:
1516893177.61
Wall Elapsed:
224.54
Experimental
Reset
31 fps

RealSense-Viewer



Good luck and have fun!

Let us know if you need any help during the lab