NASA LEC Robotic Mining

Milestone Four Progress Evaluation

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01 TASK ONE

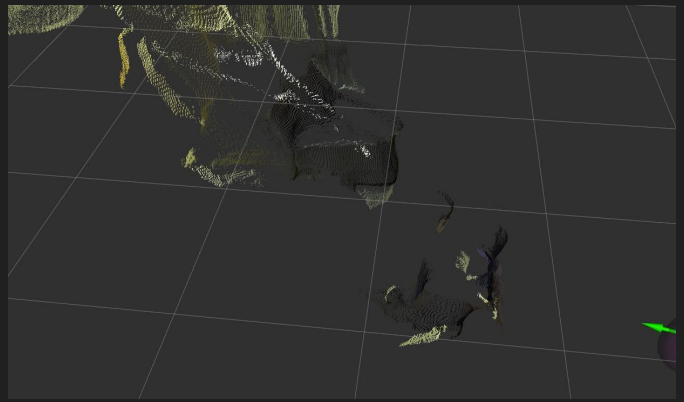
ZED Camera feature testing

ZED Camera Feature Testing

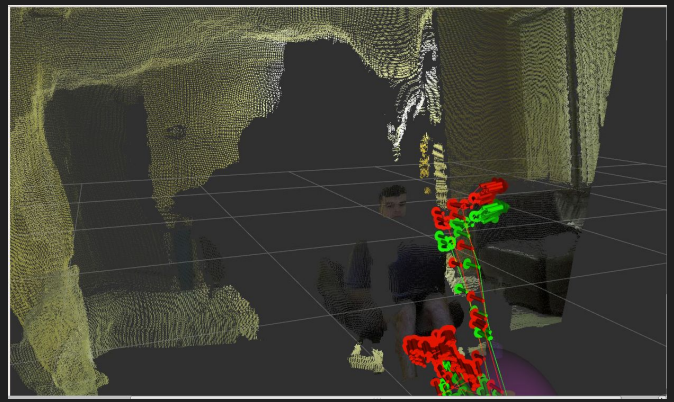
- Depth Sensor
- Pre-built ROS wrapper samples
- Created our own tests

Depth Sensing Example Photos

Initial Vision of Room



Vision of Room After Moving Camera Around



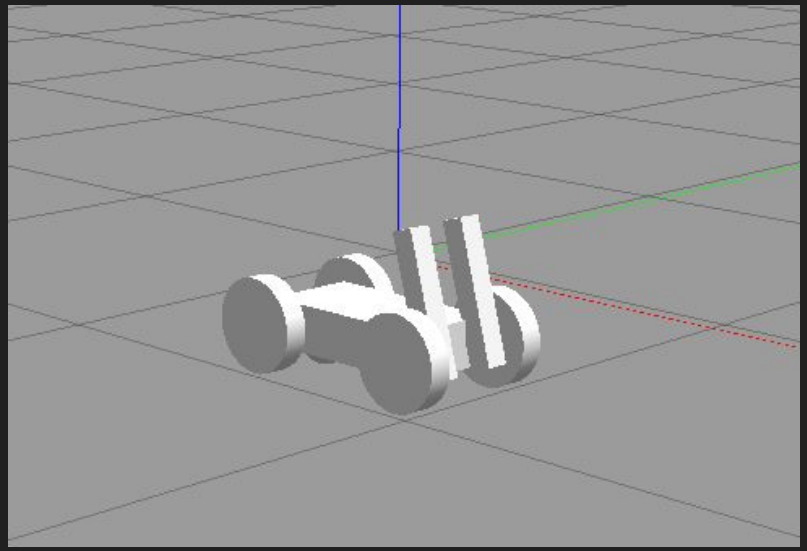
02 TASK TWO

Updated simulation model

Updated Gazebo Simulation Model

- Added two arms to the front of the robot that are able to move on the z-axis
- Simulates the movement of the conveyor belt arms on the physical robot that are used for mining
- In the future, looking to add more parts so that more of the physical robot can be simulated

Updated Gazebo Simulation Model



03 TASK THREE

Orientation tracking demos

Orientation Tracking Demos

- First Demo - modified ZED ROS wrapper to become familiarized with library
- Second Demo - utilizes the depth feature of the camera to accurately give the distance between the camera and the specified object
- Determined that the camera’s accuracy slowly degrades as the object gets out of it’s rated field of distance

Estimating Distance Example

Actual Measure Distance

Distance Estimation

```
INFO] [1613099827.001344039]: Center distance : 1.73731 m
INFO] [1613099827.068147025]: Center distance : 1.73411 m
INFO] [1613099827.132274329]: Center distance : 1.71048 m
INFO] [1613099827.201431842]: Center distance : 1.70319 m
INFO] [1613099827.266744633]: Center distance : 1.70934 m
INFO] [1613099827.332866842]: Center distance : 1.71285 m
INFO] [1613099827.400112394]: Center distance : 1.71631 m
INFO] [1613099827.467357563]: Center distance : 1.71351 m
INFO] [1613099827.533484444]: Center distance : 1.70864 m
```

Milestone Five Plan

01 Further testing with the ZED camera code

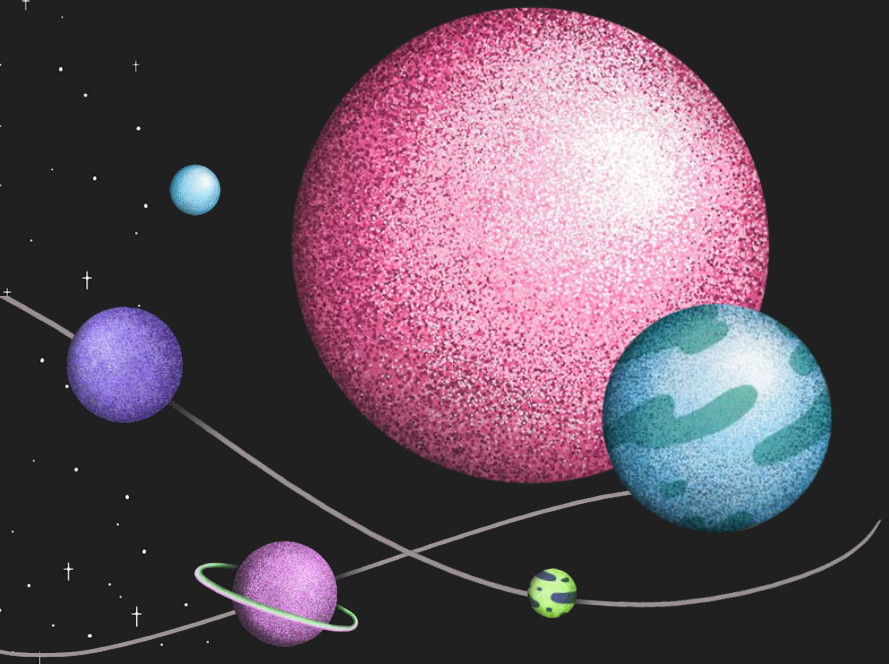
02 Use camera with physical robot

01

- Find and use more tutorials as a basis
- Understand how the physical camera works with the machine
- Start making new code for use of the robot

02

- Attach camera
- Hook up camera to the Jetson
- Use our written code to implement camera in real simulation



THANKS!