MRT Assignment II

Annirudh K P

210070009
Electrical Engineering, IIT Bombay

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Summary

First I created a workspace `robodash_ws`, followed by creation of a package called `dash`. I built the package using `catkin_make`. Following this, I started making the world `room.world` using Gazebo. I created the room environment using the Building editor and created Aruco Marker objects by adding material to cube objects.

Again using Gazebo I made my robot model, a simple cylinder with a cube (to be camera) attached to it. I saved this model as a `.sdf` file and edited this to add the gazebo camera plugin. The camera cube was attached to the main link using a joint. The camera plugin from the `gazebo` node was to publish frames as standard ros message into the `\camera\rgb\image_raw` topic.

The subscriber node python script, `img_subcriber.py` initiates the subscriber node `arvision`. Also it is subscribed to the rostopic `\camera\rgb\image_raw`. Every time a message is received by this node, we call a `callback` function, which

- Converts the standard ros message into `OpenCV` image for handling.

- Applies ArUco Marker Detection algorithm using `cv2.aruco` module. Using `cv2.aruco.detectMarkers` we are returned the IDs and the corners of these markers. Using `cv2.aruco.drawDetectedMarkers` I draw the bounding boxes and label the markers in the feed itself.
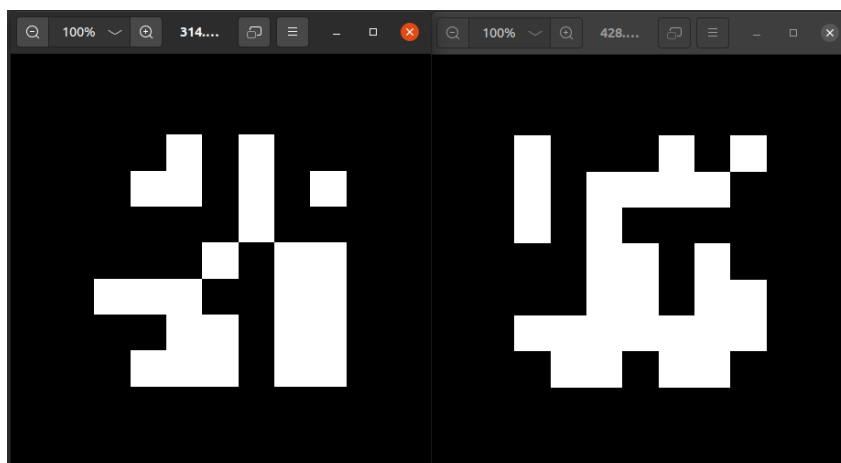
Using `cv2.imshow`, I display this labelled continuous feed. I used `world.launch` file to launch the world, spawn the robot in the world, and also run the subscriber node. Below are some example feeds and the `rqt_graph` which shows the connection between the nodes.
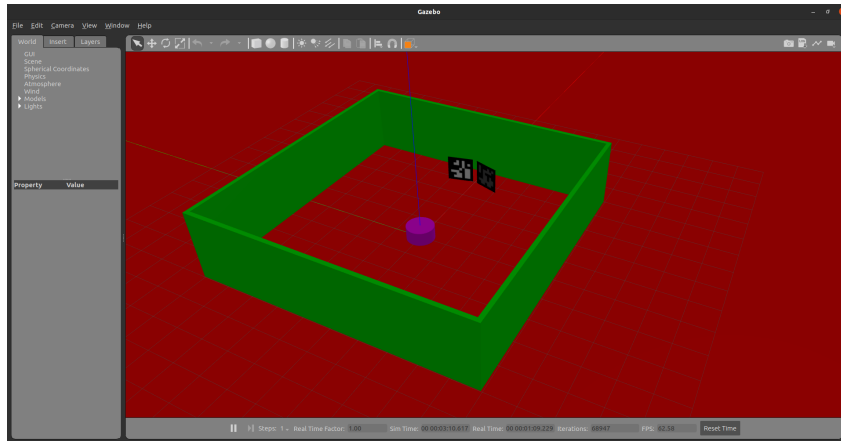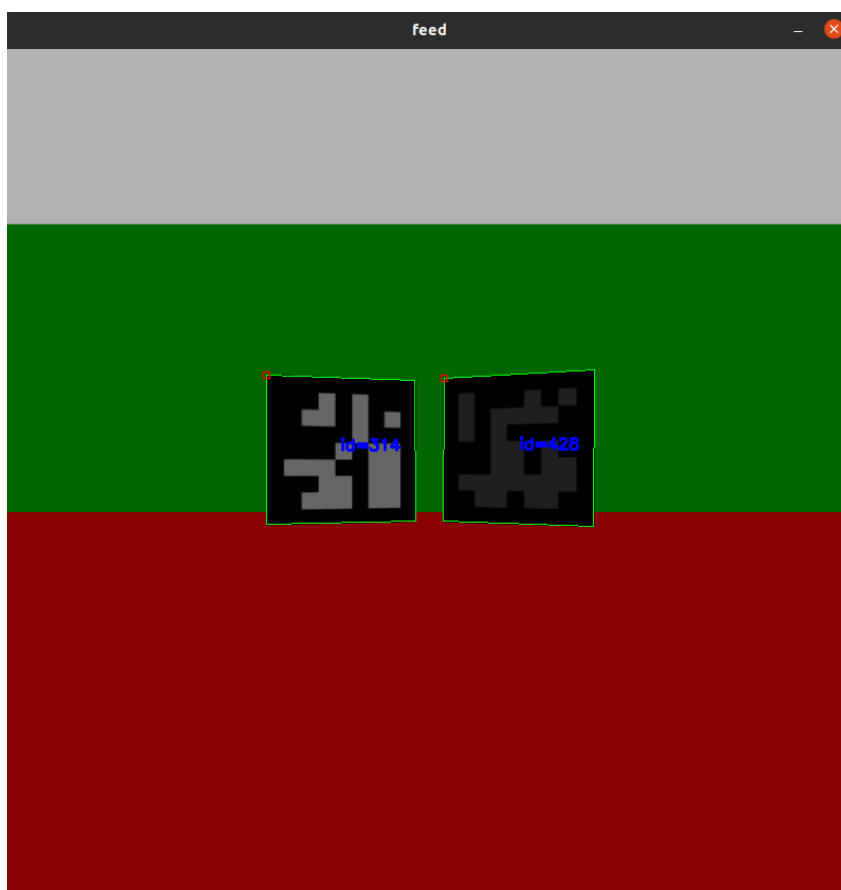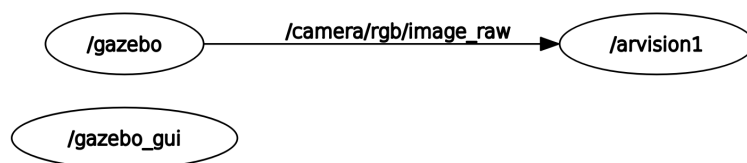
Robot spawned in room.world, gazebo
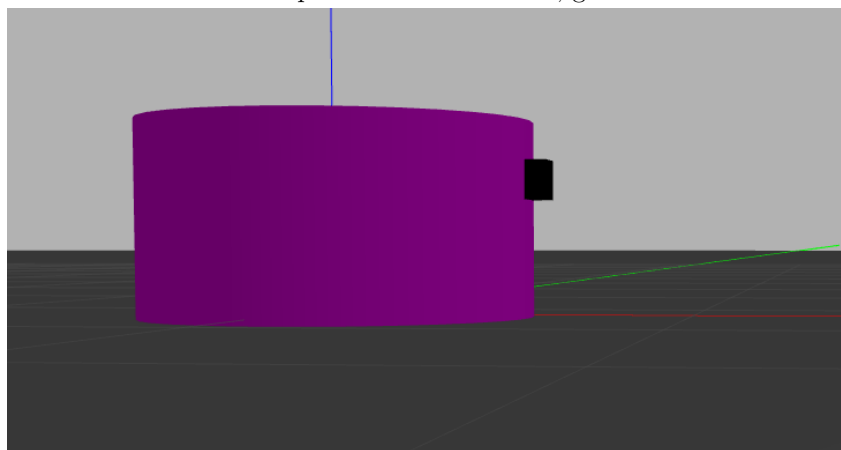
Robot - Dash

Aruco Markers - 314 & 428

Feed showing IDs for markers

rqt_graph showing connections