

PRODUCE SEGMENTATION BOT

Team 6

Amrut Phadke , Sudarshan Athreya Suresh, Soumadeep Basu

AGENDA



Introduction and Inspiration

Methodology

Roadblocks

Demo

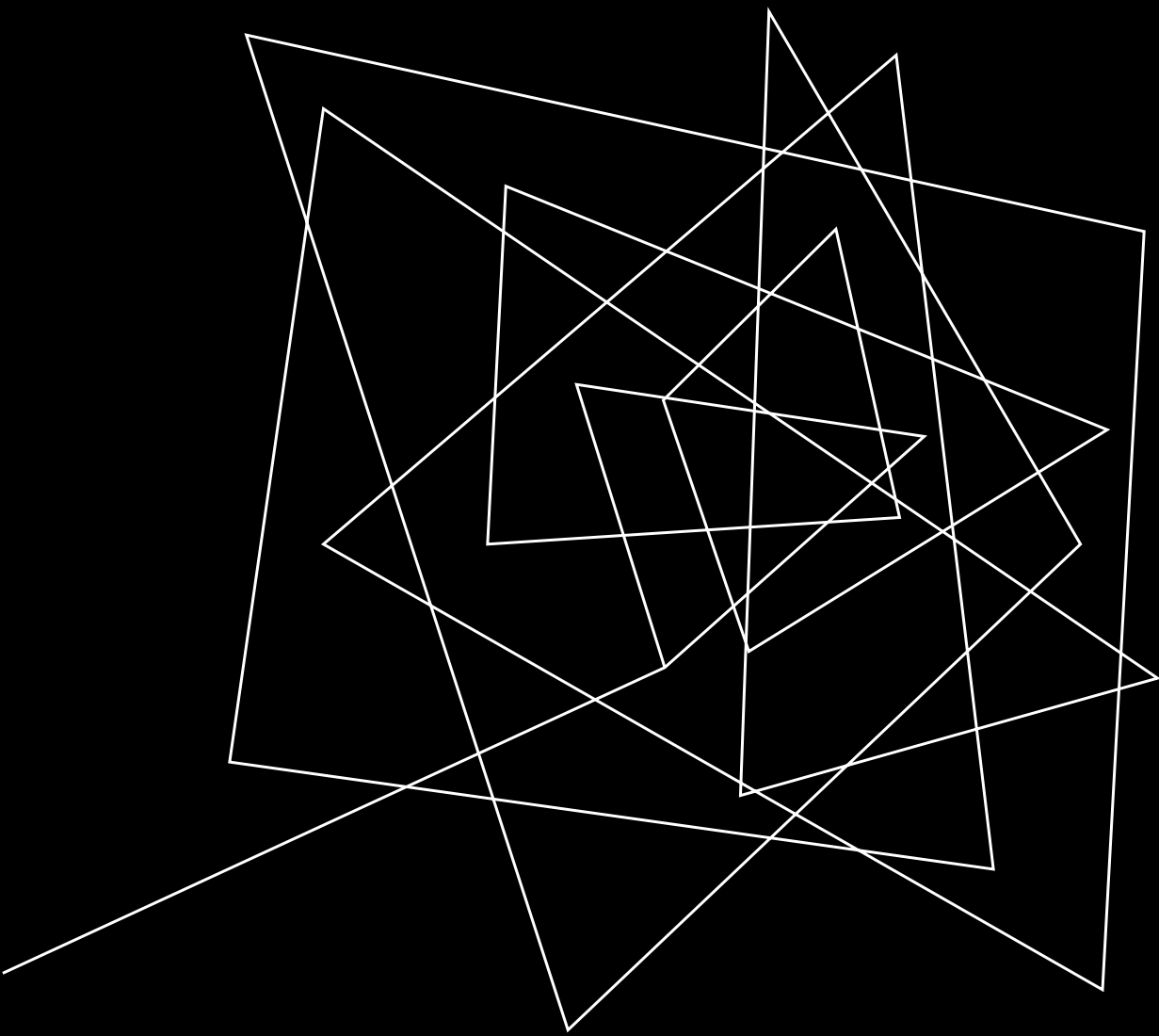
Further Work

INTRODUCTION AND MOTIVATION

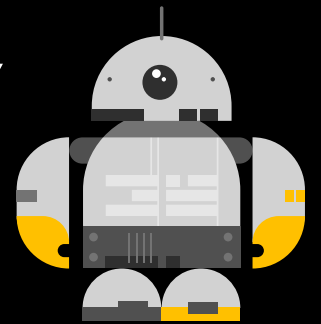


- With the agriculture industry being at the forefront of today's economies, innovation in the realm of agriculture and specifically agricultural supply chains go a long way.
- Although a lot of farms and factories use automated robots today, they focus on large scale robust segregation while not focusing on gripping and form sensitive segregation.
- In areas where you want to maintain the shape of the produce or are dealing with fragile / form sensitive produce, humans and manual intervention is still needed today.
- We tried to tackle this as our primary problem statement.

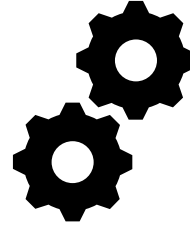




METHODOLOGY



HOW WE GET THERE ?



- Depth Perception. Using the fetch camera, we get a depth image.
- From the depth image, we extract the point cloud.
- The point cloud contains the objects, the surface. We then differentiate between the objects and the surface.
 - Then iterating through the objects, the robot plans the pickup plan.
 - Once the gripper lifts or picks up the object, it then plans the place phase.

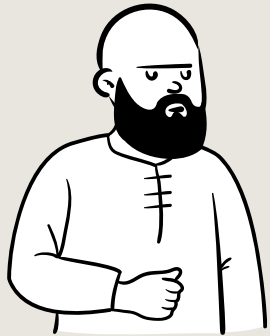
Notes

- Once the Gripper picks up the object, there is a chance that the joint orientation does not allow for the place phase.
- In such a case, the gripper drops the object and carries out the pick and drop phase again.



ROADBLOCKS





PUBLISHING POINT CLOUD MESSAGE TO RVIZ

DEPTH PERCEPTION AND SEGMENTATION

MOTION PLANNING TO BINS

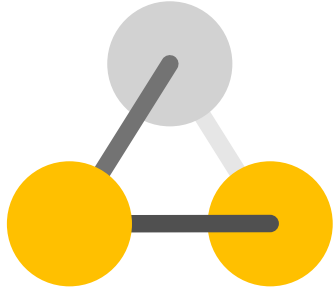
DEALING WITH MULTIPLE CUBES

EXTRACTION OF SHAPE POINT CLOUDS

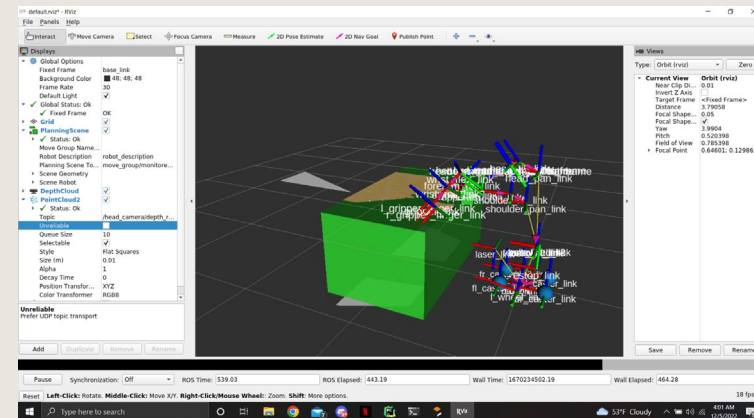
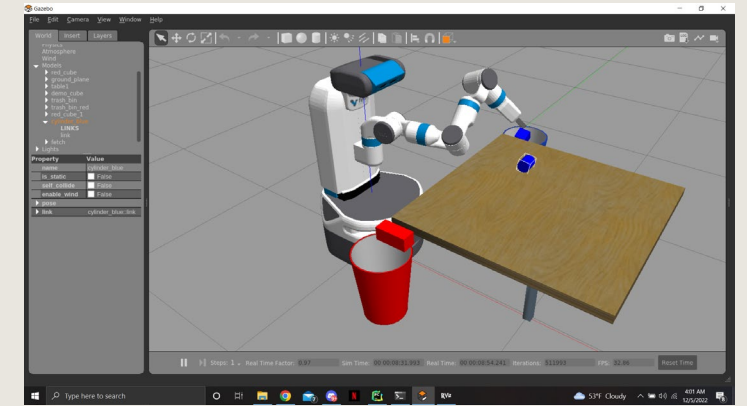
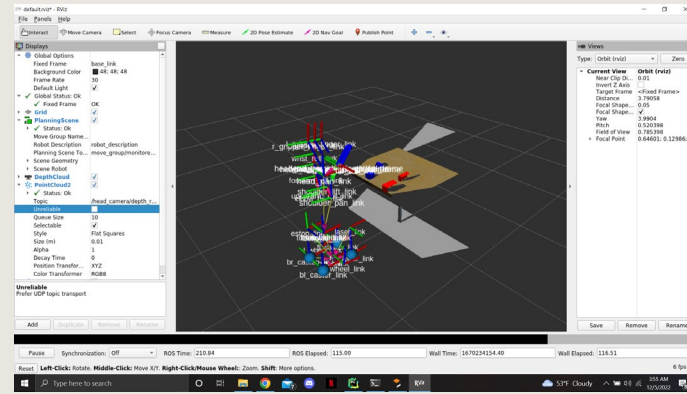
GRASPING OBJECTS OF VARYING SHAPES

SEGMENTATION BETWEEN MORE THAN 2 OBJECTS

FINDING THE CORRECT MOTION PLAN AND GRASP IN THE FIRST
ITERATION



DEMO



FURTHER WORK



- Grasping Objects of Different Sizes
- Adding or Dealing with Texture
- Instead of Bins, Implement a spatial rearrangement algorithm
- Add more properties to segregate by. (Color, Shape, Size etc.)
- Grasp sometimes can't map to destination, this causes retries.
- Use a more complex model, preferably a custom model
- Add grip strength into the gripper abilities. This will allow for more varied applications in the real world.

QUESTIONS

