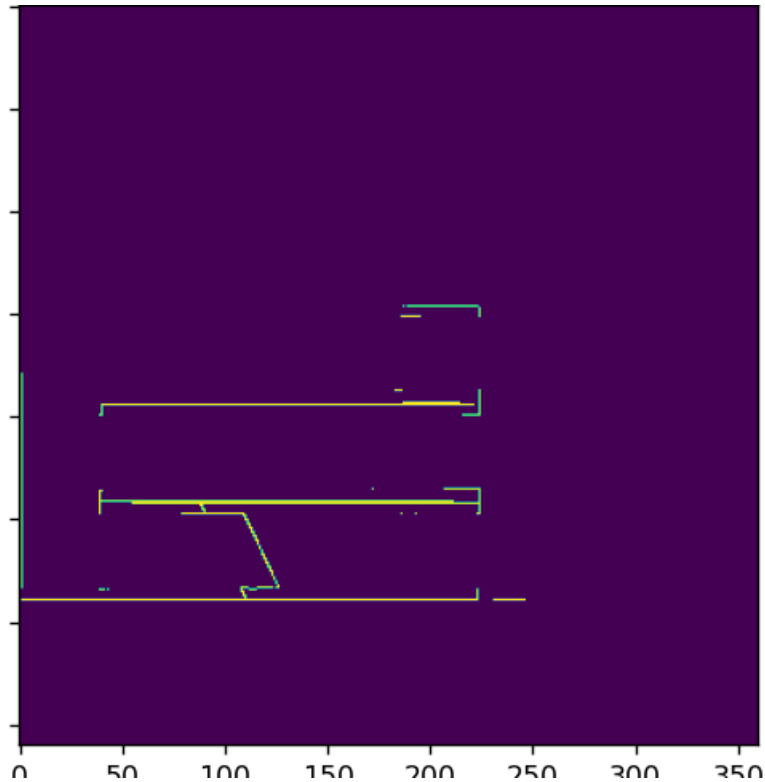


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We have completed mapping and localization. For mapping we are using manual control for now and using the lidar code from our previous labs. For localization we are using the robots GPS. We have just started computer vision. We will use the RRT code from the homework, all that is left to do for navigation is implement the code. For manipulation we have been able to get the hand to move.

Screenshot of mapping result:



Screenshot of snippet of RRT code

```
# TODO: Your code here
# TODO: Make sure to add every node you create onto node_list,
for x in range(0, k):

    #source to wikipedia and lecture slides for psuedocode for

    #get a random point in the map that is valid
    q_rand = get_random_valid_vertex(state_is_valid, state_bou

    #if we have goal point then sometimes set q_rand to goal p
    if(goal_point is not None):
        if(random.random() < .05):
            q_rand = goal_point

    #find the closest node that we already have in the list
    q_near = get_nearest_vertex(node_list, q_rand)

    #find a path from our old node in the list to are new new
    q_new = steer(q_near.point, q_rand, delta_q)

    #checking to see if the path goes over any obstacles
    if check_path_valid(q_new, state_is_valid):
        nn = Node(q_new[-1], parent= q_near)
        nn.path_from_parent = q_new
        node_list.append(nn)

        if goal_point is not None:
            if np.linalg.norm((nn.point - goal_point) / 10) <
                return node_list
```

Going forward I think that we need to focus on getting the computer vision and the manipulator working as these are the things we are most of unsure of working with.