Team CompBot

What is the main idea of your project? What topics will you explore and what will you generate? What is your MVP? What is a stretch goal?

- Working on the class-wide competition:
    - create a map of the environment as we find objects
    - find and recognize objects
    - set the object's position in the map we have created
- Further exploring both vision and mapping with the lidar to combine the two into a useful map of the targeted objects

What are your learning goals for this project?

- Achieve object recognition for several objects
- Determine the correct orientation and position of robot while creating a map dynamically
- Use git more effectively.
- Implement our code with multiple scripts and a launch file. No more will we have a giant script with everything in it...
- Learn how to unit test

Given that the project will be five weeks long, describe what you'd like to have complete at the end of each week.

- Week 1:
    - Look at what we have from the past two projects.
    - Create structure for the rest of the code.
        - Determine what scripts we will have. Start a launch file.
    - Create a git repository and set up branches
- Week 2:
    - Create base code that runs on the robots and gets information back.
    - Map making. Shouldn't take too long as we have done this before.
        - I take this back. Oh god, dynamic path planning.
    - Create a database of objects to look for.
    - Do some unit tests.
- Week 3:
    - Filtering for objects. Also shouldn't take too long as we have a bit of experience doing this already.
- Week 4:
    - Placing objects in the map.
- Week 5:
    - Integration, catch up, finish up, trouble shooting, perfecting. Hooray. Chaos.

What frameworks / algorithms are you planning to use? (if you don't know enough yet, please outline how you will decide this question during the beginning phase of the project)

- SLAM

- Keypoints and Color Histogram
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What do you view as the biggest risks to you being successful on this project?

- Not sticking to the schedule and working on the project mostly in the later part of the semester. We can hopefully avoid this by creating a solid schedule with good goals we can validate our progress against.

What might you need from me for you to be successful on this project?

- We need to know what objects we will be trying to find. We will also need pictures of them from the Neatos point of view or the objects themselves so we can take the pictures. Size of the objects would also be great.

Paul's Description of the Project:

A Potential Class-wide Competition:
A problem of huge importance in robotics is searching for objects of interest in a novel environment (i.e. one the robot has no experience operating in). One particular area of application of this technology is creating robotic first responders that can identify survivors in the case of some disaster (e.g. an earthquake, bombing, hurricane, etc.). I know several teams are interested in doing some sort of class-wide competition. What I think would be a fantastic culminating experience for the course would be to have teams work on the problem of having the Neatos search for objects of interest in the old star center.
The basic idea would that the robot would be placed at the door of the old star center, and the robot would have a fixed amount of time to search for several objects whose appearance would be known to the teams *a priori* (these objects would probably be colored in distinctive ways to aid their identification). At the end of the time, the robot would have to produce an estimate of where each of the objects was in the environment. The team's final score would be determined using some yet to be determined scoring metric based on the accuracy of the predicted object locations.
I like this task for several reasons:

- There is a compelling real world application
- In order for teams to be successful the team would need to make use of many of the techniques learned in this class (both in the mobile robotics and computer vision spaces).
- It would be fun, and if several teams work on it there would be a lot of opportunity to share ideas / insights.