Milestone Project Report

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1 Task Description and Analysis

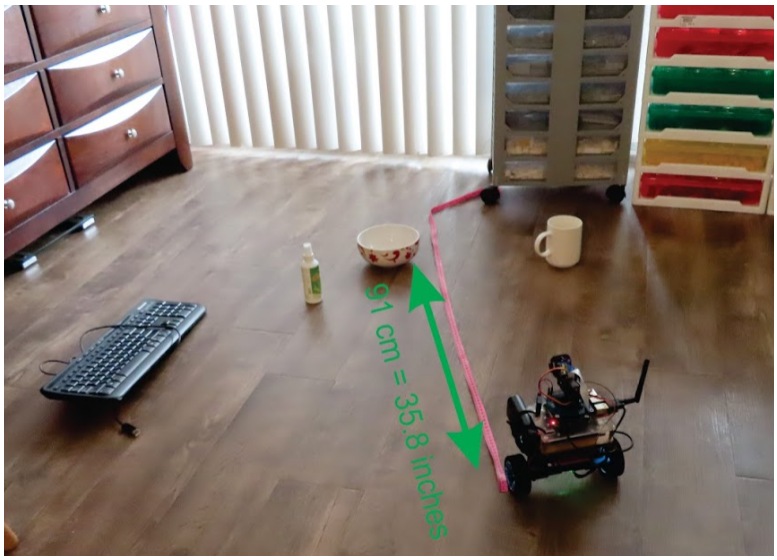
The task is to describe how far we go on the project by looking at how well the robot can recognize/label objects, respond to a voice command from the user and move itself to a target from the origin. Our MVP is to have and evaluate the robot move itself from a 1 foot away location to the target after listening and understanding the voice command from a user. To accomplish this particular goal, we will need to look into three main modules: Computer Vision, Audio Command, Motion Planning.

2 Current progress

2.1 Computer Vision

Goal: The robot can recognize what kind of objects it sees and labels them with their label. In addition, the robot can determine the location of each particular object and determining how far from itself to the target

Done by: Andres, Ethan
Completed: We have completed this goal as expected



Evaluation: The robot can recognize and label objects as long as the objects are within the range of the camera

2.2 Audio Command

Goal: The robot can process the voice commands and it should respond to the command by moving itself and making a voice response such as “turn left”, “turn right”, ”move forward”, ”move backward” ...

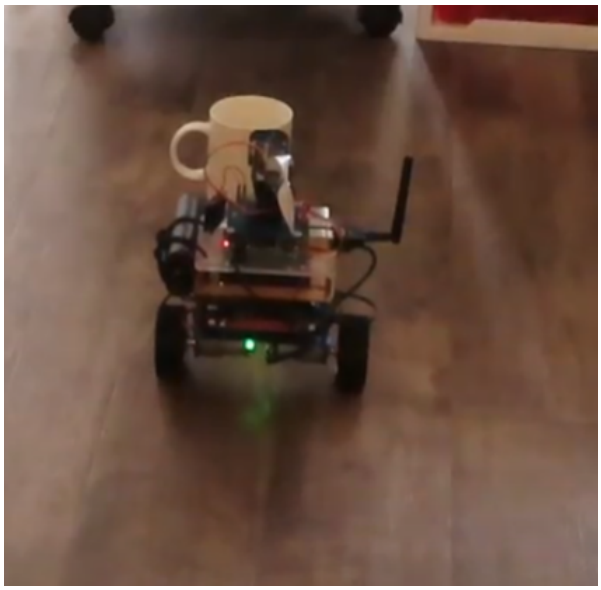
Done by: Ninh, Khanh
Completed: We have just completed the goal partially. Commands such as ”go pick up the cup”,or ”go to the cup” are still complicated for the robot to understand.

Click HERE to see demo
Evaluation: The robot sometimes cannot recognize the voice because of the noise from surrounding environment, so user needs to repeat the command. Some commands such as ”go to the cup” is

more complicated for the robot to understand. It needs to extract the voice to two sub-commands: ”find the cup” and ”move itself to the cup”.

2.3 Motion Planning

Goal : The robot can move itself to the target object after listening to the voice command
Done by: The whole group
Completed: We have just completed this goal by manually controlling the robot to the target, but not from a more complicated command like ”go to the cup”



Click HERE to see demo

Evaluation: The robot can do some basic motion commands (left, right, forward, backward). However, with commands that require multiple steps, the goal has not been accomplished yet due to the accuracy from Audio Command module

3 Plan for the rest

3.1 Computer Vision

We will need to increase the accuracy of this module by training the model with smaller number of objects. By doing this, the robot can process and recognize objects much faster.

Our group members, Andres and Ethan will be responsible for this part. We expect to complete this part by the end of week 8.

3.2 Audio Command

So far, this module is the key. We will need to process/extract these commands containing multiple stages of processing. If we can do this, we can make the robot execute each stage sequentially so that the robot can execute the command as expected.

Our group members, Ninh and Khanh will be responsible for this part. We expect to complete this part by the end of week 9.

3.3 Motion Planning

This module is the output module, which is directly connected and controlled by the Audio Command module. Once we can process the Audio Command module accurately, we can send the output to the Motion Planning so that the robot can understand how it needs to move itself to the target by converting the output from the audio input to the sequence of steps (move forward-left-right-move forward-target).
For this part, the whole group will need to collaborate and test the final product by the end of week 9. We expect to see the robot be able to move itself to the target object after listening to and processing a voice command.

3.4 Documentation

Once all goals are achieved, we all have the knowledge of how to build this RD-1 from the scratch. We're supposed to write out final documentation and prepare for the presentation. Everybody in the group is expected to have their best understanding about the parts they have been working on. This task will done by Thursday of week 10