Robot Report

Vacuum Cleaner Robot (Stupid Dog)

Student name: Su Pu
Email: soupsoup88@ufl.edu
Instructors: Dr. A. Antonio Arroyo, Dr. Eric M. Schwartz
TAs: Andy Gray, Jake Easterling, Ralph F. Leyva
Date:11-Jan-28

Abstract:

I will design a vacuum cleaner robot and named 'dog cleaner', I will inject some dog behavior into this robot~ It can patrol around the room and suck the dust and may even bark at person and can response to human calling.

Introduction:

If you are lazy at home, you always want to have an automatic cleaner to help you clean the room. I watched the previous videos and see some students build a dust bin, that help me to create the idea to make a vacuum cleaner.

In this project, I will implement the algorithm based on an Arduino board. In addition to the traditional robot action like obstacles avoidance. I will also use the Ultrasonic Transducer Sensors to let the robot know where is the person and come to it.

After talked to TA Jake, he provided me with some ideas of ultrasonic location.

Main functions:

Obstacles avoidance:

- The most basic function, I will use one sonar or IR sensor to detect the obstacles of the robot moving direction. And together with enough bumper sensors to detect the obstacles and make a contrary turn.

Inhale rubbish:

- This is the special part of my robot, I will install a vacuum bump into the circuit and turn it on during the way when the robot is patrol around.

Sensing people who call it:

- I will use three same type microphone to help me locate the person. Once the robot finds the direction, it will turn to that direction and move slowly, with the IR sensor in front of it, it should locate the person and come to it.

making sound:

- Since the robot have its name 'Stupid dog', it should make some sound~ Every time it finishes the work or the rubbish get high, it should make a sound to alarm people. This part requires speaker.

Sensing commands:

- When the dog can manage to come to the people who call it, it can also response to different command, such as, 'clean', 'come', 'good', the stupid dog will follow this order and do the associated behavior, clean the whole room, come to the master, finish its job and back to the its original place.

Remembering the map (if I have time).

- I just want to download a matrix to the robot first, 0 and 1 represent the whether there are obstacles. I bought a 9 degrees' sensor to help me calculate the location of the robot. The place where robot go will be marked in the matrix and prevent the robot go to the same place.

Component:

1. Arduino MEGA 2560 R3
2. Vacuum pump

- Not expensive on the Sparkfun website, require 12V voltage, the process how to adjust the voltage should be take seriously.

3. Sensors

- IR sensors (2)
- Temperature sensor (1)
- Bumper sensor (2)

4. Sound reception device and microphone

- Speaker (1)
- Ultrasonic transducer sensors (4)

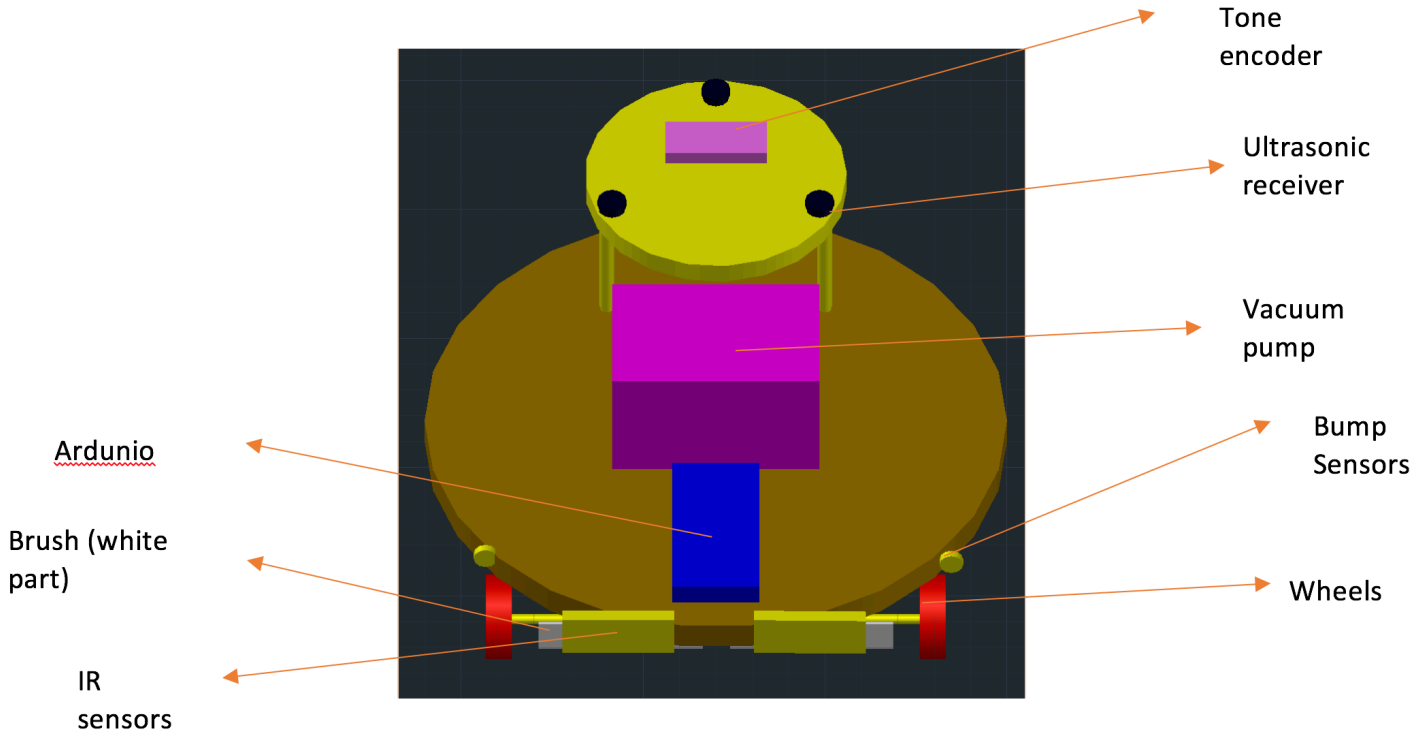
5.Motor system

- two motors with encoders
- duel motor drive controller
- two caster wheels

6. Battery

- LIPO (2200mAh,20C, 11.1V)

Main structure and how to realize the function:



Structure specified:

- The sensor will be put in front of the car to detect the obstacles and people.
- There is a vacuum pump in the center of the robot body.
- In order to better suck the dust on the floor, I will implement some teeth in front of the robot.
- Three ultrasonic sensor to detect the frequency command.

Reference: http://www.pocketmagic.net/detecting-an-ultrasonic-beacon/