Odor Tracking with an Electronic Nose

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Bi-Weekly Report for: 03/27/03 - 04/09/03

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Progress Made During Last Two Weeks

In the last two weeks, we have accomplished most of the goals we set out for ourselves two weeks ago. The odor-tracking algorithm has been fixed, which involved removing a global variable. The dispersion model is now behaving correctly as well. It will properly calculate and display an odor source at any location on the map, and will also take wind from any direction into account. The dispersion model graphics are currently being integrated with the robot odor-tracking graphics. Presently, we can display an odor source as the background, but this is not necessarily the same source as the robot is tracking. However, we are making significant headway in this area.

We created a module that will take the odor concentrations from our Gaussian dispersion model, and convert them to relative concentrations so that the e-nose hardware can create the proper odor response. This module operates by sampling the concentration at a given point, and comparing it to the maximum concentration, which is at (0,0) in the Gaussian model.

We also created a module that will take the average voltage response from the Dilution system and out put the concentration. The output concentration is actually just the inverse of the input average voltage. The concentration that it produces is not an actual concentration, but a relative concentration.

Individual Achievements

- Greg created the model to convert Gaussian concentrations into relative concentrations for the e-nose hardware.
- Ninh created a module to interpret the response from the dilution system. He ran the dilution system with different profile and recorded the output average voltage.
- Jason worked on integrating the dispersion display with the odor-tracking display. He was able to display a dispersion model as the background for the odor-tracking chart. He also removed the global variables from the code, and enhanced the odor-tracking chart and system model.
- Simon fixed the dispersion module. It now displays the odor source and plume correctly. Simon helped Jason integrate the dispersion module graphics with the odor-tracking graphics.

Plans for Next Two Weeks

In the next two weeks we are planning on doing the following:

- Integrate our code with dilution system code.
- Complete the integration of the graphics.
- Enhance the usability and correctness of the system as a whole.

Problems Encountered

The major challenge that we are facing at this time is mapping the dispersion model graphics onto the odor-tracking chart. Although it is not a hard concept, the logistics of the situation are quite complex. We are having difficulty getting all of the data coordinated. For example, right now we can display an odor source on the odor-tracking chart; however, it is not the same odor that the robot is tracking. Ironing out these details has proven to be a cumbersome task.

Assistance from TA/Instructor

These past two weeks, we received help from Marco concerning the following:

- Augustin helped Ninh figure out how to interact with the existing E-nose system.
- Dr. Gutierrez-Osuna informed us of SHIFT registers, which enabled us to remove all global variables. He also got us a key to the room where the dilution system is kept.
- Steve helped us design a moving average algorithm. However, implementation of this algorithm will have to wait until the current system is fully functional.