

cpSC 543 Lab 3: Communicate Something!

Learning Goals:

- Know how to solder (well enough to build a simple motor driver board from a kit)
- Practice making a motor move (at all), using Adafruit motor drivers and shields
- Be able to read into Arduino both analog and digital sensors).
- Have built a simple feedback control loop (sensor input influences motor output)
- Have explored use of feedback motor control to create movement that expresses or communicates the sensor input through physical movement.

The Assignment:

- **Create a small vocabulary of communicative movements with three “words”** by programming a motor’s response to at least two sensor inputs (one digital, one analog), and connecting that motor action to a physical display of your construction.
- The communication should be “**ambient**”, i.e. strive to operate in the user’s attentional background. You can use one mechanism (sketch) or multiple.
 - The nature of the communication is up to you, but a more interesting sketch will go beyond a very straightforward transmission, and it will convey something about the sensed quantity(s). Here are some dimensions to think about: *functional-emotional; personal-public; local-global*. What are some others?
 - You can use the sensors in your kit, or any others you’d like. Sense anything – touch, sounds, temperature, motion, light, etc. You can even drive it remotely if you can figure out how. The ski report, a motion sensor on your dog’s collar or the cat door...?
- **Choose your three-item set of words or phrases before you start.** These comprise the language you will strive to express. When you’re done, you’re free to revise these words to reflect where you ended up - you’re not tied to your starting goal, but do document the journey on your blog.
- Work in pairs or individually.
- As for previous labs, video/photo document your work and describe on your blog (every individual creates own documentation). State if you worked with a partner. Post the blog link onto the course twiki (labs posting page), as linked from course deliverables webpage for this assignment.

Suggested Steps

Before lab:

- 1) Set up your Adafruit motor driver – for guidance, see [MotorDriverSetup.pdf](#) on course deliverables page (Lab 3 resources).
- 2) Read up about “ambient interfaces (543 bibliography). These aren’t required reading, but might give you some ideas.
 - Weiser 1996: Designing Calm Technology
 - MacLean 2009: Putting Haptics into the Ambience.
- 3) Bring laptop + full kit to class / lab.

At lab and on your own:

- 4) If you haven’t by now, work through a sampling of the other Sparkfun or Adafruit (depending on which kit we’re using) guide tutorials supplied with your kit, to make sure you’ve mastered hooking up all the sensors in your kit (analog and digital)
- 5) If haven’t already, make sure you can run at least a subset of the the motor shield examples given in the motor shield assembly notes – DCMotorTest, StepperTest, MotorShieldCommander – and understand how they work.

Note: We have observed in past that some kit servos cannot reach 180 degrees of motion. Plan for this.

- 6) Do the assignment! Spend some time brainstorming about the vocabulary and how you’d like to express it before you start.

Resources

Find more resources on the course twiki.

Lab 3 Mark Sheet (completed by instructor)

Name: _____

Partner (N/A if none): _____

Term: 2015/16 W2

 (5%) Your planned 3-word vocabulary (describing communicative movements), identified, with some rationale (20%) Two sensor inputs identified and used

Actuation achieved & documented

 (15%) Word 1 (15%) Word 2 (15%) Word 3 (20%) Quality of emotion achieved reflected upon (10%) Documentation adequate (visual and words) Multiplier applied for late hand-ins, as described on course homepage.**OVERALL MARK:** **Great (100%)** Entirely satisfied and exceptionally well done **Good (85%)** Entirely satisfied and well done **Fair (70%)** Largely satisfied, few major issues **Poor (54%)** Some worthwhile, comprehensible effort, with substantial issues **Zero (0%)** Little to no real comprehensible effort; not handed in or otherwise unacceptable