

Sensor Testing

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Research Experience for Undergrads

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NEXT GEN

S Y S T E M S

- Project: OctoCan

- Final Goal:
 - To use skin (pressure) sensors to manipulate the position of the robot arm

- Issues:
 - Patch 1 not recognize
 - Zero division error

- Why sensor testing:
 - Make sure each cell works correctly
 - Calculate “sensitivity” of each sensor

- ❑ What's the challenging part for calculating positions?
- ❑ Target Range: 0-1000
- ❑ x : recorded (actual) data
- ❑ c_0, c_1, c_2 : coefficients for transformation
- ❑ x' : data after transformation
- ❑ b : baseline calibration (noise)

$$x' = c_0 + c_1(x - b) + c_2(x - b)^2$$

- ❑ HOWEVER:
- ❑ That's too complicated.

- ❑ What's the challenging part for calculating positions?
- ❑ Target Range: 0-1000
- ❑ The closer c_1 to 0, the more sensitive the cell
- ❑ Linear

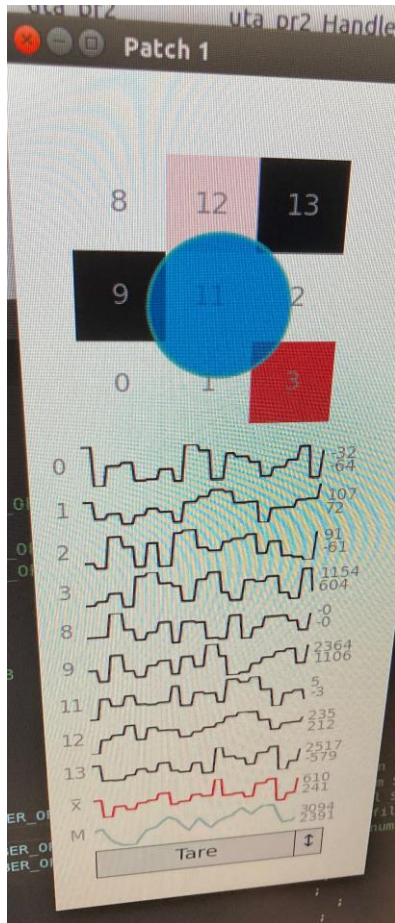
$$x' = c_1(x - b)$$

*target data = sensitivity coefficient * (recorded data - noise)*

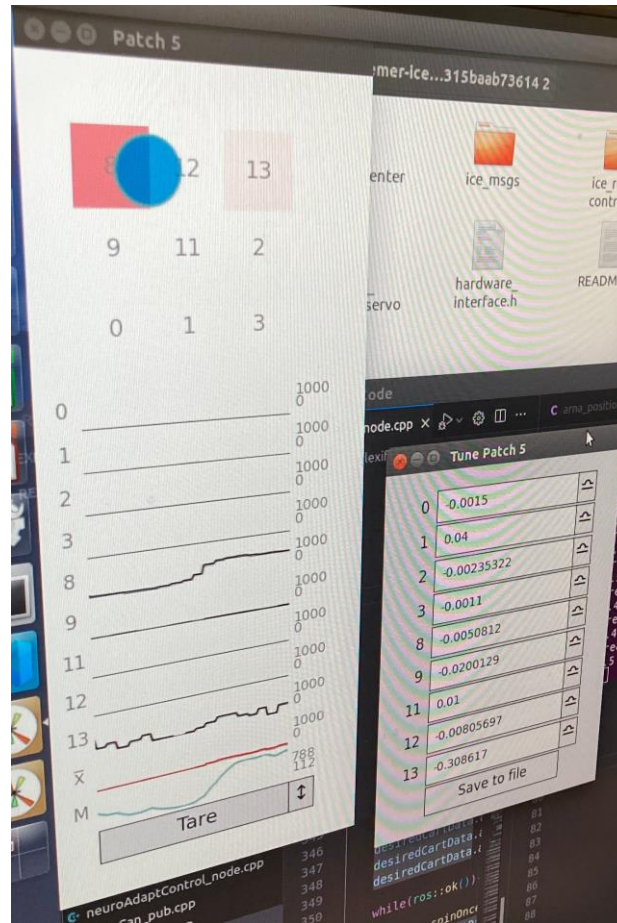
- ❑ Example:

$$1000 = c_1(200 - 100)$$

Sensor Testing



Patch 1



Patch 5: set range from 0- 1000 and when I pressed cell 8

- Get the average noise in 4 seconds: click TARE
- Determine if the cell gives negative feedback
- Auto-tuning / adjust manually
- Blue bubble:
- center of pressure
- Make sure the min & max keeps from 0 - 1000 after transformation

Problems found

- Patch 1: short circuit
- Many cells not working

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- Sensor damaged
- SPI interface of the ADC is probably damaged

- (Credit goes to Dr. Roshi Zhang)

Future Plan

- Replace the sensor on patch 1 & Try to fix it
- Start with subject testing at the end of this week
- (Those c1 values are recorded, saved, and will be used in the code)