

Feedback For Numeric Input

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Abstract

Systems for providing meaningful response to numeric input, including generative content.

Creating meaningful feedback was my impetus for learning programming, which since become an important language in my intellectual life.

After developing an interest in memorizing π , it was clear that having a means of testing my accuracy was imperative. I initially used a generic typing test. While that worked, it invited the question how can the experience of practicing change how I understand the numbers themselves?

Programming allowed me to quickly — and comprehensively — form correlations between each number and a visual or audio stimulus. For example, in one early experiment I took pictures of the view I would have turning my head at various angles. That idea was inspired by research in head direction cells, which — being housed in the hippocampus — are associated with memory. Other experiments included topics like Gabor stimuli, sequential images, and movement.

After dozens of experiments in visual and auditory feedback, I expanded this research into haptic feedback. Equipping an Arduino, I created an array of vibration motors that responded to the digit of π that had been input. As an interface, I playfully made a plaster mold from a real pumpkin π that I had stuck my hand into, then cast it in rubbery silicone. This interface was also entered into a pie baking contest, where it was awarded an honorary mention.

Looking to gain tighter control over my experiments with visual feedback, I created a sheet metal mask that blocked a much higher percent of light than fabric masks or eye patches. Inside I housed LEDs that were programmed to respond to various conditions, such as correctness, number identity, and so forth.

This was turned into an even more ascetic interface in which solenoids were programmed to respond to errors by clanging on the mask itself.

This research has continued in my practice, for example in `number.games`, which features apps with audio feedback to numeric input. It has also led to a wide variety of experiments in input and generative feedback.

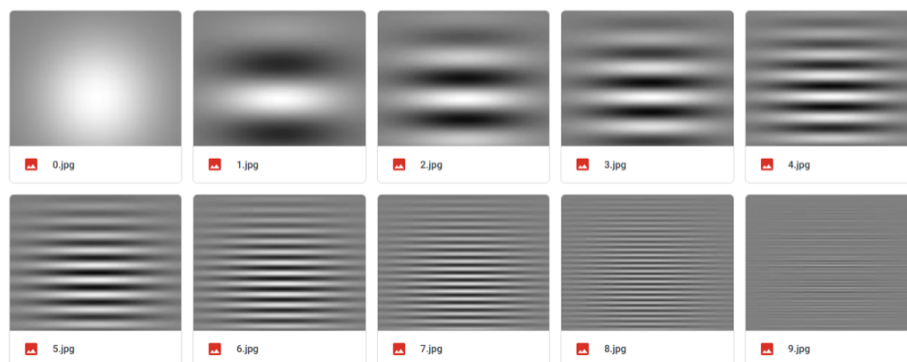


Figure 1: Gabor stimuli as used in an experiment: programmatically, I associated these images with different numerical values in π recitation.



Figure 2: *Pi-e*: silicone pie that vibrates the digits of π .



Figure 3: *Pi-e* in use.

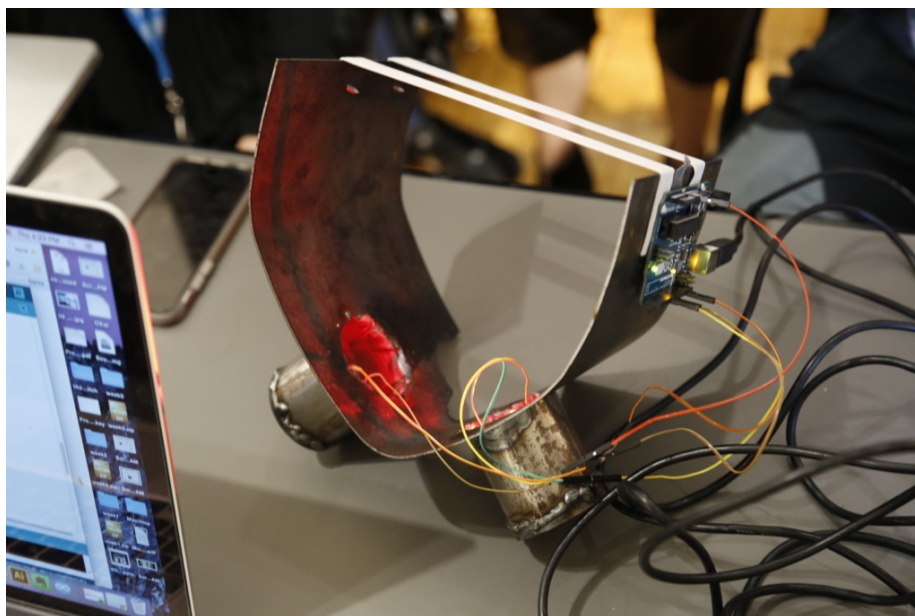


Figure 4: A speculative training device for feedback reciting numbers; the metal mask blocks light out completely, while the lights inside respond to input.



Figure 5: Wearing the device.

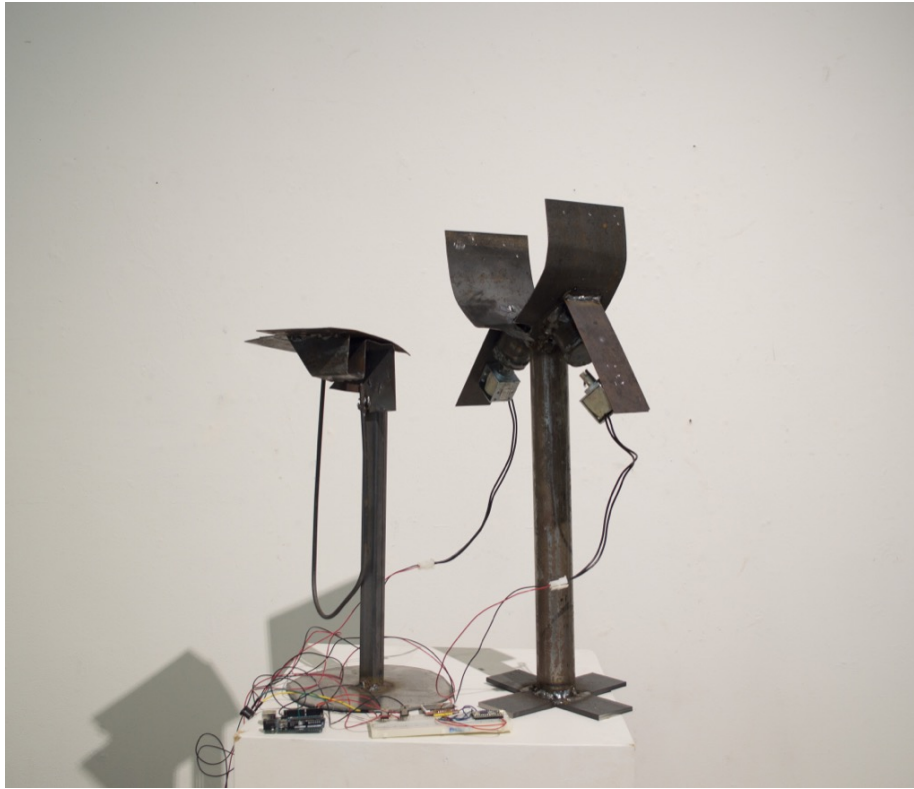


Figure 6: An assembled version of the device with solenoids attached.