PixeLight Communicator

An interactive lightly display which allows users to create and send messages using blinking LEDs and long-exposure photography.

Summary

One of the goals of this project is to explore the subtleties of hidden communication: how the medium of a message can affect its content. A user can create a PixeLight message by turning on “pixel” buttons displayed on an iPad interface which are mapped out to a corresponding display of LED lights. By nature, the messages displayed by the PixeLight are indecipherable at first glance– their meaning is “hidden”– someone just walking by would not be able to decode the set of blinking LEDs into any meaningful information. However, when someone intentionally steps behind the camera and takes a photo of the display, the message is suddenly revealed. Even though the LEDs are free for anyone to look at, it is only the person who chooses to interact with the whole PixeLight setup that gets the full experience. In effect, the content of PixeLight messages gain a unique sense of privacy. The corresponding assumption to this is that people who create messages using the PixeLight will be more likely to write things that are authentic, honest, or even vulnerable.

Component Parts

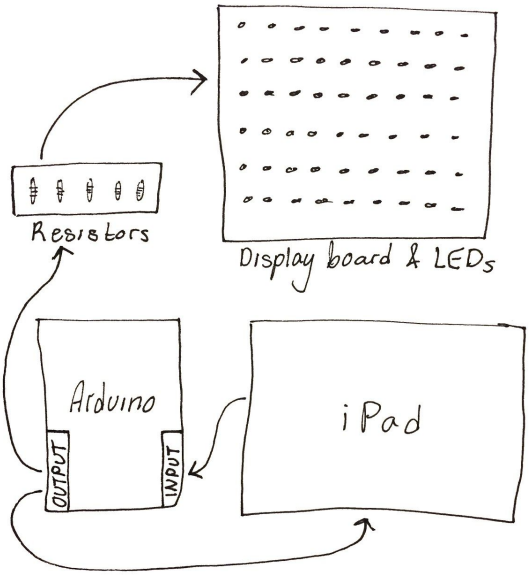
Hardware:

- White LEDs (200)
    - *I have somewhere between 50-100 of these already but will need to buy the rest*
- 100 Ω Resistors (200)
    - *Will need to buy*
- Long female-to-male wires (400)
    - *Will need to buy*
- Mounting board for display (material doesn’t matter just as long as it’s ¼” or less)
    - *Will buy or find board and then laser-cut holes for each LED*
- iPad
    - *Will checkout from Hybrid Lab*
- Digital camera & tripod (function separately from arduino system)
    - *Already have, but can also check out from Media Center*

Coding:

- Inputs
    - digitalRead for buttons pressed on the iPad interface
- Outputs
    - digitalWrite to light up buttons on iPad interface
    - digitalWrite to turn on (or blink) LEDs on display board

Basic diagram



Challenges

The most fundamental challenge I anticipate for the project will be figuring out how build a functioning Charlieplexed matrix for all the LEDs – controlling 200 individual LEDs using only 10 arduino pins.

Another challenge I anticipate will be figuring out how to integrate using an iPad with the arduino and learning any extra coding that may be needed to build a responsive interface on the iPad.

Timeline

Week 1: Write proposal
Week 2: Research Charlieplexing & build rough prototype
Week 3: Research iPad integration & implement in 2nd prototype
Week 4: Refine LED random blinks
Week 5: Present

References/Inspiration

The Pixel Stick
http://www.thepixelstick.com/

Arduino Forum on Charlieplexing
http://forum.arduino.cc/index.php?topic=11148.0