BIRD-EYE

a feeder that captures bird photos

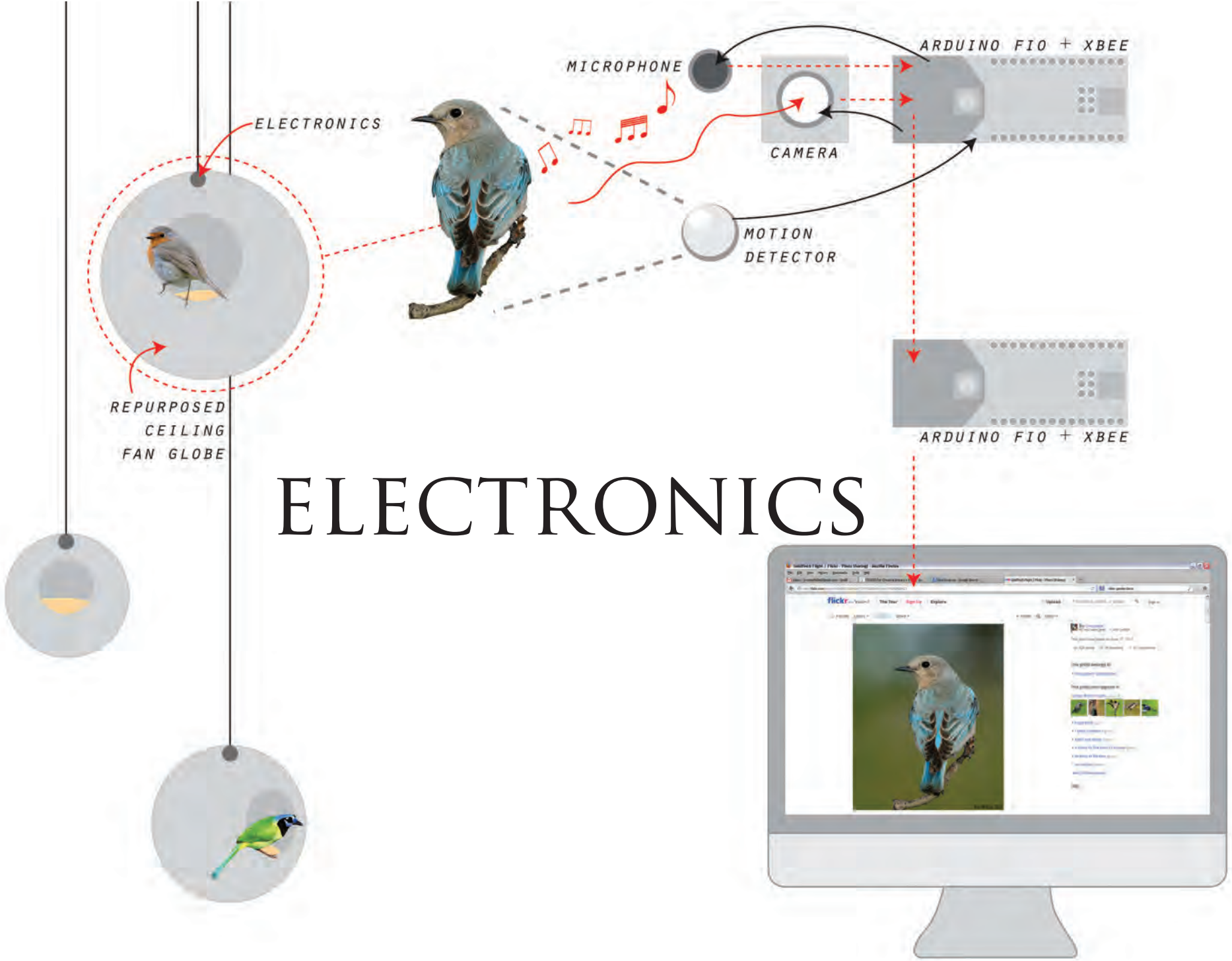
Tangible Interaction Design :: M. Yvonne Hidle

ABOUT

a little bit about this project

Bird-eye is an augmented bird feeder that allows users to capture pictures of visiting birds and other wildlife. Users can now get up close and intimate with birds and they can create an album of local wildlife to show friends and family. Bird-eye enables children and curious adults to learn about the local birds, their feeding habits, and their social quirks. Wild birds become more like pets, with images that allow people to develop connections with resident birds and understand their different personalities without trapping them in a cage. The goal of this project is to increase interaction with wild-life so that people will develop a better appreciation for and understanding of the importance and beauty of nature and the lives of other animals.

Bird-Eye is part feeder, part stage, part hanging garden art, part social interaction, and part environmental awareness.



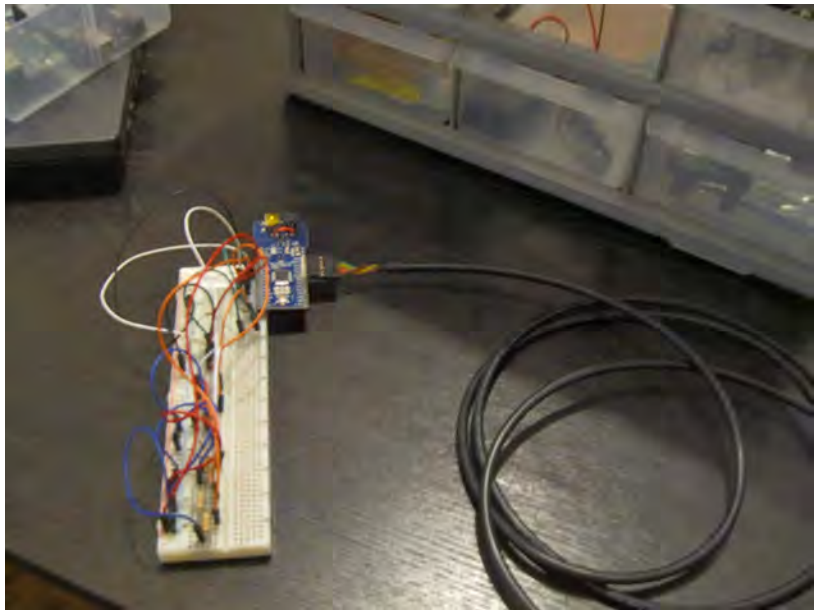
ELECTRONICS

PROTOTYPE 1

arduino fio + xbee

Intially I started working with an Arduino Fio and two Xbees. I wanted the electronics to be compact so I would not have to worry about a large casing that would distract from the simplistic beauty of the feeder.

The original plan was to have the camera take a snapshot upon detecting motion. Once the snapshot was taken it would be transferred to my computer using the Xbees. Unfortunately this did not work because Xbees are made for transferring small packages of serial data, not large JPEG files. In addition, Arduinos have limited memory and cannot store large files awaiting transfer.



PROTOTYPE 2

arduino uno + arduino wireless shield

The next idea was two fold. It was suggested I try using an ethernet shield with its built-in microSD card reader. This worked fine, but I needed to have an ethernet cable to transfer the photos onto my computer. So, I decided to try a wireless shield.

The wireless shield worked but I had difficulity transferring the images in an easy automated way. I found one tutorial on how to make a database for my content but it was not very clear and thereby difficult.

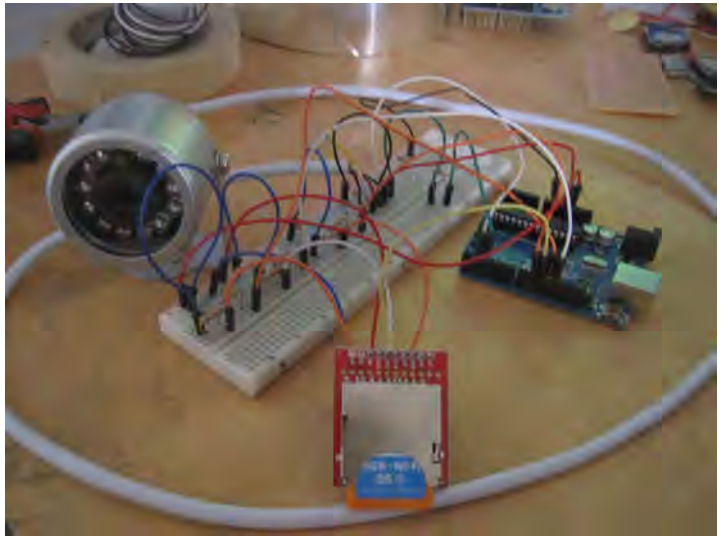
Ultimately I dropped this in favor of using a more streamlined and portable method: a wireless SD card.

PROTOTYPE 3

arduino uno + sd-mmc + eyefi

I first learned about wireless SD cards when I found a tutorial on how to make a simple wireless security camera. Wireless SD cards have a built-in receiver that allows them to transfer data wirelessly. Instead of following the tutorial to the tee, I decided to improvise and use a cheaper SD card reader rather than a data logger.

I managed to sucessfully write onto a normal SD card. Although, admittedly that was nothing special because I got a normal SD card to work on my last prototype. The Eye-Fi (wireless SD card) failed to save photos despite my best attempts. That's when I decided it was time to buy a datalogger.

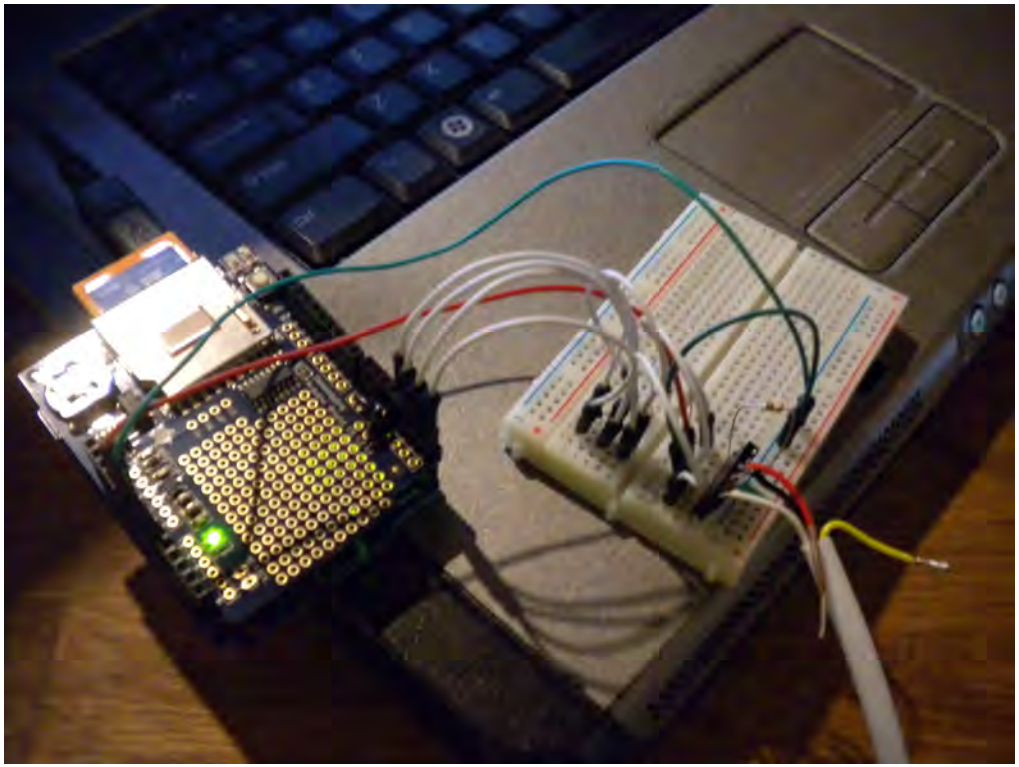


PROTOTYPE 4

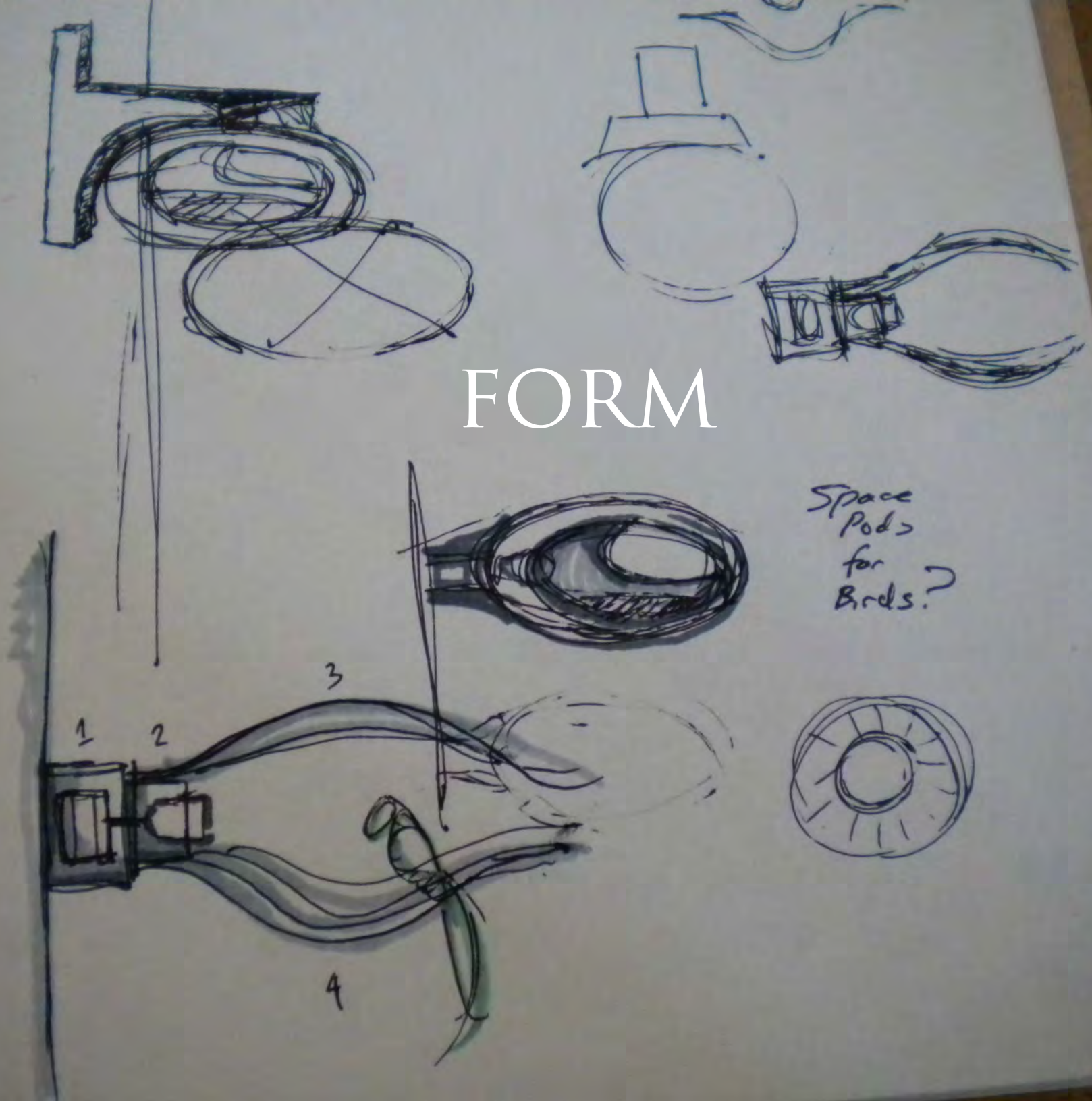
arduino uno + adafruit datalogger + eyefi

After much trial and error I eventually caved in and decided to make the wireless camera using the tutorial. I ordered a datalogger and started wiring at home because CMU kept blocking my Eye-Fi card.

A lot of blinking error lights later and I had a fully functional wireless camera that would take snapshots when motion was detected.



FORM



CASING 1

hand blown glass globes

The first idea was to blow glass but I didn't have access to glass blowing facilities nor the expertise or training. So I decided to try something easier and more accesible to me.

CASING 2

repurposed ceiling fan globes

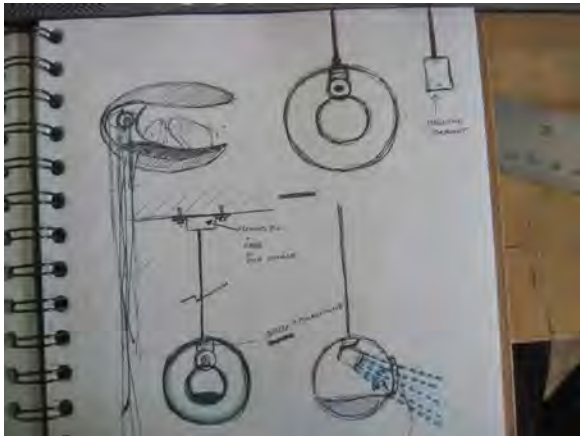
Re-purposed globes, I bought 3 globes, two of which were glass and one of which was plastic.

a. The first attempt was to make a hole in the glass globe from Construction Junction using a gas torch. Unfortunately the glass cracked and the globe broke before an adequately sized hole could be made.

b. Fortunately while at construction junction I also purchased a plastic globe and was successfully able to melt a hole of adequate size for a camera data cable and suspension connection.

c. After successfully creating the plastic casing I thought that I would try to make one out of glass again. I purchased a ceiling globe from Home Depot and attempted to make a hole in the same spot. Unfortunately that globe also cracked and could not be used.

d. With only one globe to use I began to get the electronics together. Unfortunately the plastic globe did not work because camera needed more distance from the seeds in order to be able to see a bird. This also would have been an issue with the glass globes I bought due to their size. I was unable to find any larger plastic or glass globes to use.

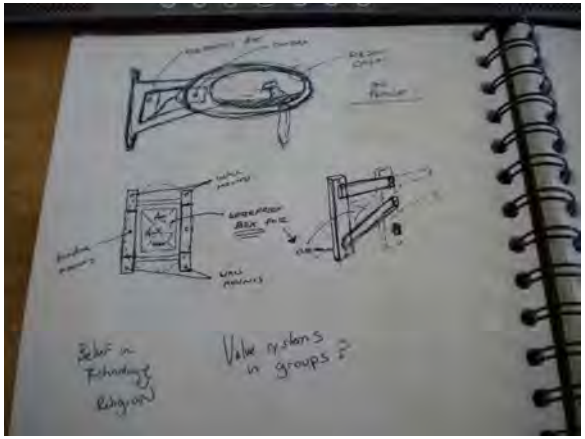


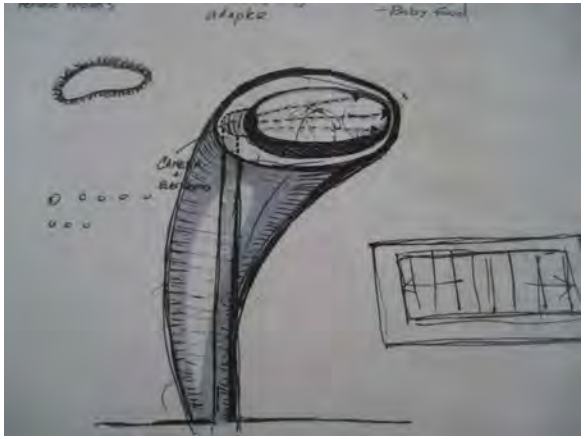
CASING 3

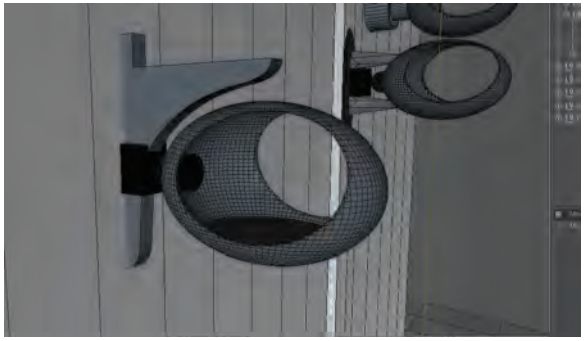
3d printed form

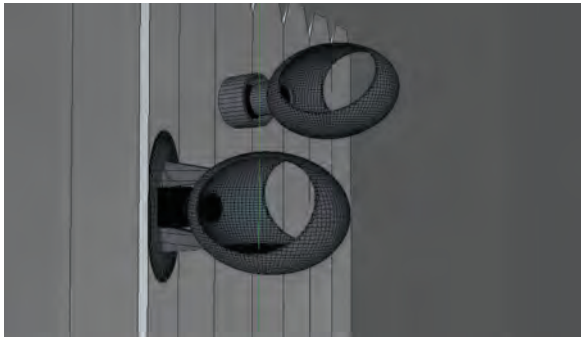
This led to the third casing idea which was to 3d print a bird feeder bowl and cover to fit the electronics.

a. After realizing that existing globes would not be large enough for the camera and electronics necessary for the bird feeder, I tried making my own custom bird feeder from scratch in order to fit the electronics. To this end I created several 3d computer models, but was unable to print them due to the size necessary to create a bird feeder of sufficient size.







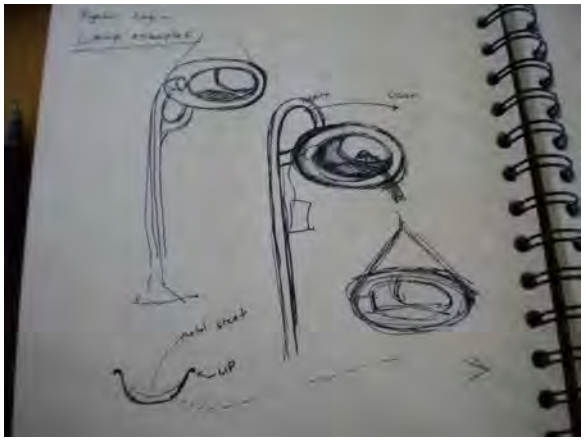


CASING 4

resin cast

Resin cast on cnc routered plywood.

a. After realizing that the 3d printer was unable to create an object large enough for the camera and electronics, I made a file for the cnc router that could be used to create a resin cast. However I was unable to pursue this option because I was unable to access a cnc router and vacuum former.

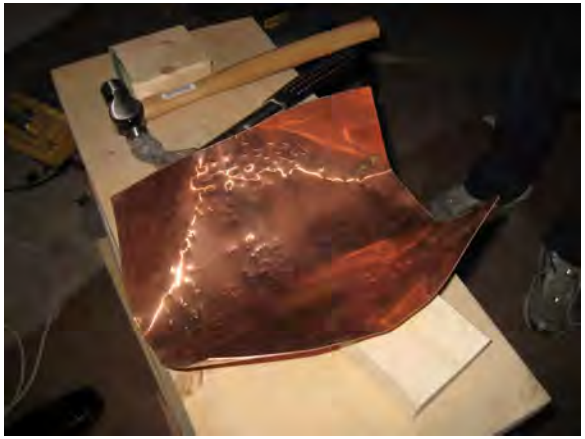


CASING 5

hammered copper

Hammered Sheet copper.

a. After realizing that I would be unable to create a resin cast I bought copper and attempted to hammer the copper into a leaf-like shape. Unfortunately the copper sheet tore when I was only part way towards accomplishing a leafy form and I was unable to shape it as desired. Fortunately the sheet could still be used and the torn area now functions as a drain that allows water to flow out of the bottom of the casing so the seeds stay dry.



FINAL PRODUCT

A STORY ABOUT BAD DESIGN

the casing sucks

The aesthetic of the bird eye casing did not turn out as I had hoped. I was very disappointed with the final product since I was unable to mold the shape of the copper into the leaf shaped form that I desired. I think it would have turned out a lot more elegant if I had been able to use a more manufactured and smoother form. The hammering required to create the form desired left too many marks on the metal and the final look simply does not accomplish the elegant aesthetic I was going for. However, I do like the copper material and think that it will age well in the weather. Unfortunately not enough time has passed for the copper to age visibly. Perhaps if I had a custom die stamp mold made, or much more experience with copper hammering, the final product would be more elegant.

BIRDS ARE FAST

cameras are annoying

My struggles with the camera are also far from over. While I was finally able to get the camera to take images and download them onto my computer, I was still unable to speed this process up enough to take video footage of birds. There are also several problems even with the still camera photography in that the camera is not fast enough to catch birds that swoop past the feeder, and it takes the arduino a long time to process the data and transfer it to the wi-fi. The time between pictures taken is almost one minute. I was also unable to get to recording bird sounds which would have completed the experience and gone much farther towards bringing people closer to nature.

AND DON'T LIKE COPPER

...and birds hate it

Probably the most disappointing aspect of the project was when I put the bird feeder up and only got one photo of a bird in the bird feeder over the course of two weeks. For the first week we thought that birds were not going into the bird feeder because it was a new bird feeder that the birds were un-familiar with. However on the weekend, we found that our cats were excited about visiting the window adjacent to the bird feeder. Figuring that our cats had probably scared the birds that were adventurous enough to brave the bird feeder in such close proximity to our cats, we decided to lock the room so that the birds could eat in peace. While we witnessed several birds flyng past the bird feeder, none landed while we in the room, and we still only have a few photos of birds flying past and one photo of one bird's back inside of the bird feeder.

IMAGE CREDITS

[1] Images of electronic components
http://www.sparkfun.com
[2] Repurposed ceiling fan globe image
http://blog.2modern.com/wp-content/uploads/2011/11/fan2.jpg
[3] Resin examples
http://www.3-form.com/
[4] Eva Solo Bird Feeder
http://www.relaxtribe.com
[5] Hanging Globe Terrarium
http://www.etsy.com/listing/107582521/hanging-glass-terrarium-or-christmas

* All other images were taken by me.