Red Herrings Mystery Morph

The Mystery Morph user experience was designed to shock participants in a Mystery Mansion with a picture of their face swapped onto a victorian era painting. This was a group project completed for 2.744 (Product Design).

Images were secretly captured by hidden cameras. These images were then processed using the OpenCV image processing library to extract faces from the images and map them onto a victorian era photograph.

Next we need to be able to display these digital images in a way that makes them resemble paintings. The most obvious visual cue that something is a monitor is that it serves as its own source of light. Most monitors are backlit, whereas other objects rely on external sources of light for illumination. By turning the brightness as low as possible we can make it look plausible that the monitor is relying on refracted light for illumination. Rotating the monitor into a vertical orientation and placing a frame around the screen helps to support the illusion.

A distinguishing feature of paintings associated with this era is that you can see the brush strokes. A very successful method for texturing a screen was to apply mod podge in a thin layer on a thin piece of clear plastic. Smaller brush strokes tend to result in a more convincing results as a tighter pattern is less likely to result in strokes that cross color boundaries in very noticeable and unnatural ways.

As the effect is dependent on the picture being displayed in the appropriate context to provide visual cues we built a section of wall behind which to place the display monitor for the final presentation. This is the team celebrating a successful term! Fsdsa asdaf

**Misc**

**Blanket**

I had a box of old t-shirts from a high-school student leadership organization I was involved with, my time as an undergraduate engineering student, and my time working with the Dalhousie Student Union. To keep these memories around I cut the t-shirts into squares, ironed interfacing onto the back, borrowed a sewing machine, taught myself how to use it, and made a quilt backed with fleece so the blanket could keep me as warm as the memories.

Name Tag

For 2.744 (Product Design) I had to create a nametag which contained elements of who I was as a person. The result is a laser cut piece of wood in the shape of the elevation profile of the Presidential Range of the White Mountains of NH, laser etched trees in the foreground, and a rather poorly painted name.

Flashlight

MIT is working on standardizing training across shops and the training to use mills and lathes is making a working flashlight out of metal using the two machines. The training originated in the edgerton center but can now be done across campus in various locations. I completed this training in the Beaverworks Shop.

Jewelry

I tried my hand at making jewelry converting some traditional climbing protection (referred to as <i>stoppers</i> or <i>nuts</i>) into pendants. To do this I removed the original wire they were slung on and experimented with various gauges and hardness of silver wire to determine what worked best for re-threading the stopper as a pendant.

**Location Aware Trekking Pole**

#1 Final prototype.

#2

#3

#4

#5

#1

While taking MAS.863, the MIT Media Lab class better known as <i>*How to Make (Almost) Anything</i>* I individually developed and prototyped a location aware trekking pole. The final prototype was built using 3D printing, casting, composite thermomolding, and custom circuit board design and production via milling. The custom circuit boards were my own design consisting of arduino compatible boards built around an Atmega328P, using an nRF24L01+ for RF communication and the MTK3339 GPS Module alongside an OLED screen for output.

#2

Trekking poles give users increased stability, confidence and speed while traveling through uneven terrain and are popular with hikers, backpackers and mountaineers. As something that is always already in your hands, they are an excellent target for technological augmentation. While an experienced navigator has a whole handbag of tricks to draw from when determining direction of travel, sometimes the only way to be sure is by constantly being aware of subtle clues such as the position of the sun. An augmented trekking pole could be useful for maintaining awareness of direction of travel for experts in safety-critical situations and recreationalists while learning and practicing basic navigational skills. The individual pieces were modeled in solidworks, modified from a commercially available pole, while developing the concept.

#3

The body of the trekking pole was fairly small, and I needed to design a circuit that would be able to both talk to the OLED screen and the communications module. This was challenging but fun. I used a few tricks to make the board small, the most notable being running a few traces under pins on the processor to reduce some of the routing that would have otherwise had to run outside of the board. Being able to mill and hand solder my own boards from copper-coated sheets allowed me to rapidly move through board revisions.

#4

This prototype receives GPS information from another processor through the RF module. The information is then used to indicate which direction north is with an arrow. The GPS chip outputs latitude, longitude, altitude, time, date, speed and (true) heading. The GPS module has built in logging functionality called with enough on-board storage to record 16 hours of position and elevation information (a point every 15 seconds). My early prototyping included successfully logging an 11-hour drive to Canada.

#5

To make a custom composite shaft that could integrate with a commercially available lower pole section and also contain the AA batteries used to provide power I wrapped a 3 layer thermoplastic and fiberglass shaft that I melted together in an oven. The inner and outer wraps were made tightly around a steel rod by hand, and the middle wrap consisted of fibers running up and down the length of the shaft to give it strength along its main axis. A wrap of silicone around the outside provided compaction against the inner surface and while the thermoplastic was baked for an hour at 450 degrees.

POTENTIAL FEATURES

* Magnetic Direction Awareness - A constantly visible reminder of where North is can let you know if you are starting to subtly travel off course. Magnetic direction can be adjusted to provide true geographic direction. You may also be interested in traveling in a specifically defined direction.
* Position Awareness - Current GPS technology allows for incredibly accurate positional awareness. While I don't want to replicate the features of a GPS, knowing current position and desired endpoint could provide a direction vector that could be followed. Position information can also be used to keep track of how far you have travelled.
* Speed Awareness - Sampling position over time can be used to keep track of instantaneous and average speed.

Smartphone graffiti to explore place and space

Exploring with Collaborative Smartphone Graffiti

Outer Space is exciting - who didn't want to be an Astronaut at some point in their lives? - but what about the terrestrial terrain that surrounds us? For most of us - this inner space is really as exotic and foreign as any location in outer space.<br /><br />

Location is a really interesting thing. Today we often have our phone relaying left and right turns if we need to get from A to B - but how many of us could point towards North, or know when we've walked a mile. <br /><br />

#2

While smartphones have made it easy to land in a new city and instantly navigate to a desired location they have also destroyed our relationships with direction. Since the standard GPS navigation feature is to have the direction of travel as up on the screen - we have lost our relationship with North. With this project I wanted to change the way smartphones are used for navigation while at the same time taking advantage of modern technology. <br /><b />The website uses the HTML5 geolocation API which should work across most browsers and smartphones. The interface is a Mapbox GL JS website using geoJSON data structures to record and store data. It is meant to be used on smartphones and allow users to explore moving around in the world and collaborate with strangers while needing to master some navigation related skills.

#3

The website lets you start and stop recording a path that you are moving along, and then save your path such that when other people visit the website you'll be able to see the messages and drawings that other people have left behind! <br /><br /> This is a cup of coffee beside the popular coffee shop Flour on Mass Ave.

#4

The interface to change color has you walk in a cardinal direction to select a color from the color wheel and then confirm that selection. When you record a track the color is also preserved when other people visit the site.

#5

The application is available <a href=”<https://saulnier.scripts.mit.edu/drawing.html>”>here</a> however it requires MIT certificates to access as browsers are unhappy with geolocation information being accessed not over HTTPS. This has limited activity to a few squiggles around Boston.

**Stitch-and-Glue Sea Kayak Design and Construction**

During the summer of 2015 we developed a new design class that would have students design and build electric boats that they would race around the charles river as an 8-week class. I took on the task of determining how quickly a hull could reasonably be designed and constructed. To accomplish this I first built a sea-kayak from a prefabricated kit in approximately 2 weeks (John Brisson did most of the finishing over an extended period) to learn stitch-and-glue construction techniques. I then modeled my own kayak in Rhino3D and built the front section as a teaching model using a ShopBot to cut the required plywood shapes.

The main rate limiting step was waiting for epoxy to dry. The flat plywood pieces are first stitched together with copper wire to achieve the desired shape, and then the joints are locked into place with a mixture of epoxy and wood flour. Fiberglass tape is used to reinforce the joints, and the entire hull is fiberglassed to give the structure strength.

After constructing the bottom hull, the top can be affixed and also received a layer of fiberglass. Constructing the hull took approximately 80 hours with no previous experience while paying careful attention to having the finished product look beautiful and fixing mistakes along the way. Another 80 hours was spent finishing the kayak *bright* (sanding and applying finishing coats). Being less concerned with final appearance and/or simply painting the hull would require much less time and effort.

Having demonstrated that a hull could be constructed in a reasonable amount of time it was necessary to also demonstrate that custom hull shapes could be designed and fabricated. Using Rhino3D It is easy to model surfaces into the desired shape of a hull and *unroll* the surfaces into flat shapes for cutting on a ShopBot.

I decided to construct the front 4-feet of a kayak as a teaching model. I further divided the model into 3 sections separated by bulkheads, the left demonstrating the stitching stage of fabrication, the center demonstrating the use of epoxy to lock in the shape, and the right (bow) section the hull after it had been sanded into its final shape.

**Mystery Mansion Portrait Face Swap Gag**

This was a group project.