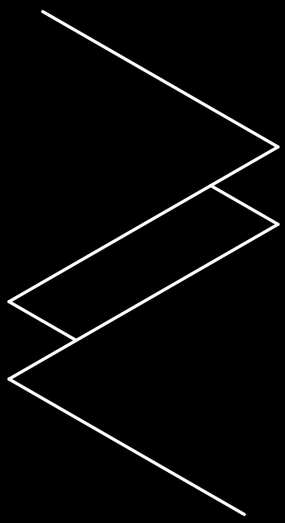
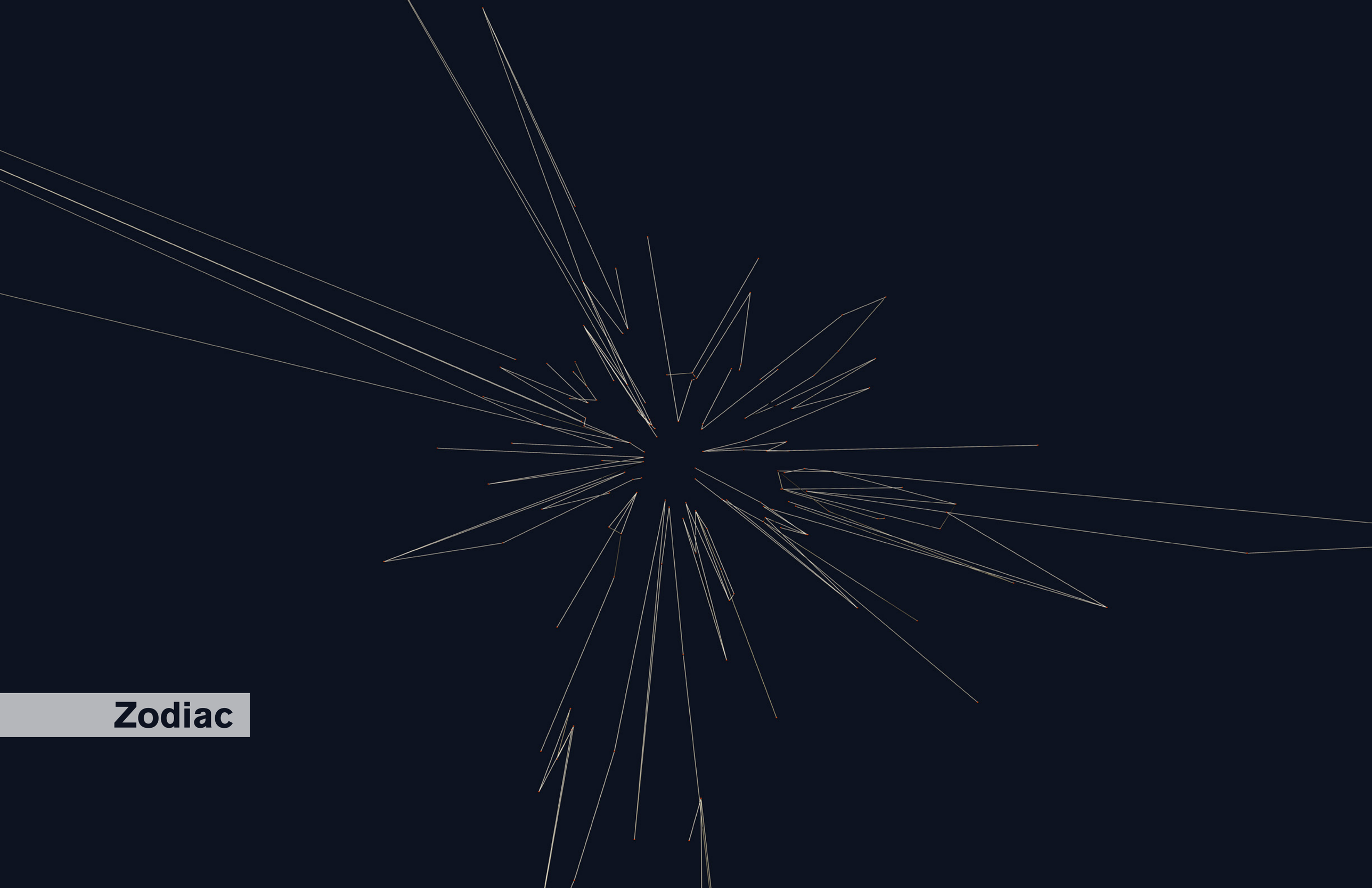
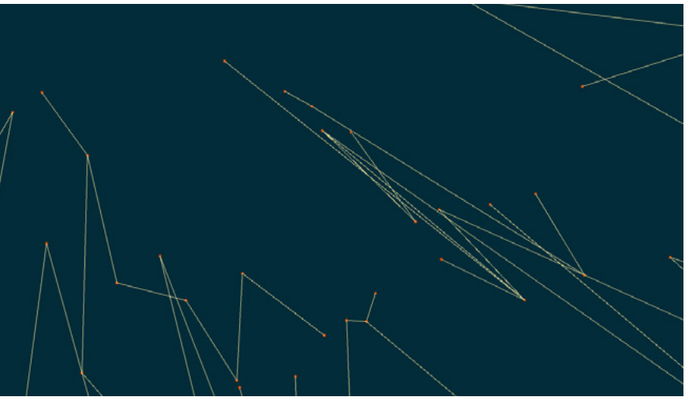


Mian Wei

All works presented
in this portfolio were
done individually.



Zodiac



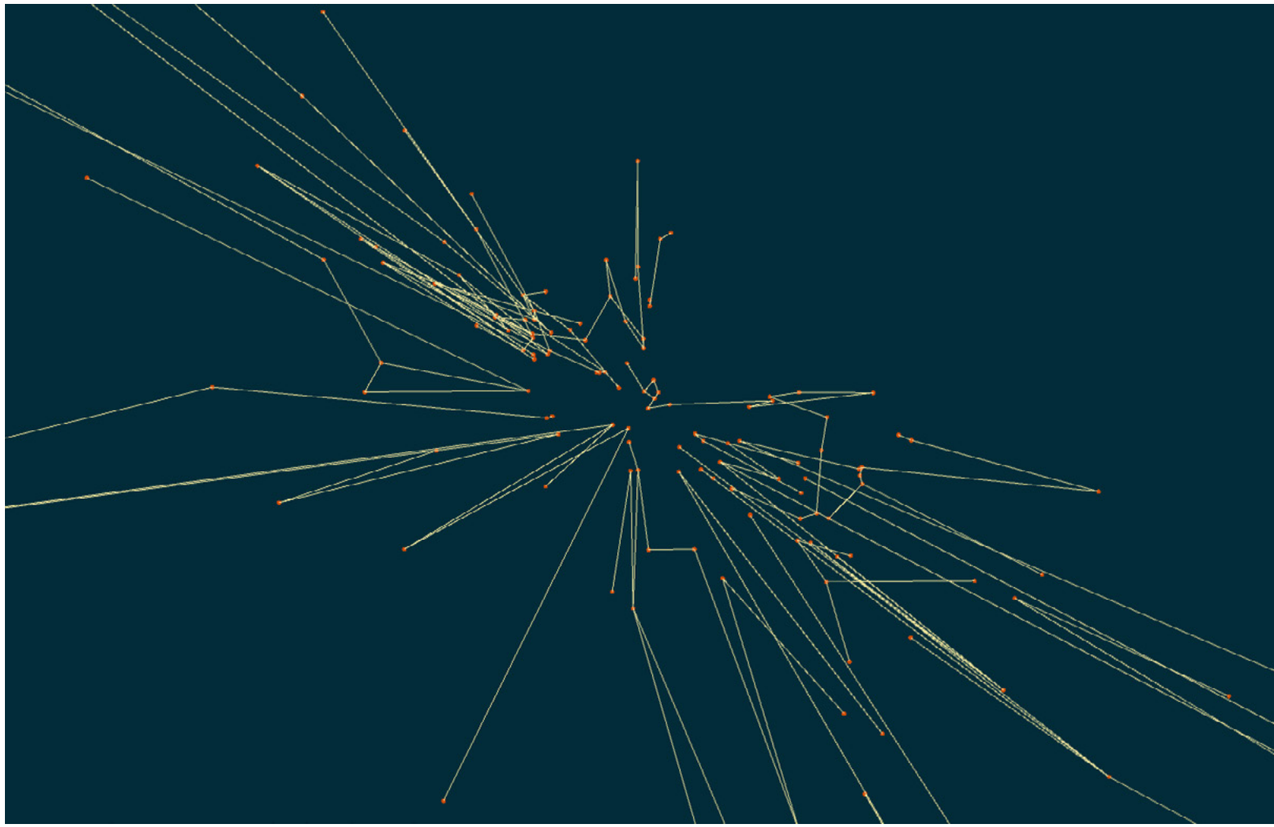
We always see stars from a single perspective: we watch them far away from earth. For thousands of years, we only see them as dots on the inner surface of the celestial sphere. This single perspective has prevailed our culture for so long that even today, the horoscope is still widely trusted. However, in reality, these stars sit in three-dimensional space, even stars in the same constellation are widely separated from each other.

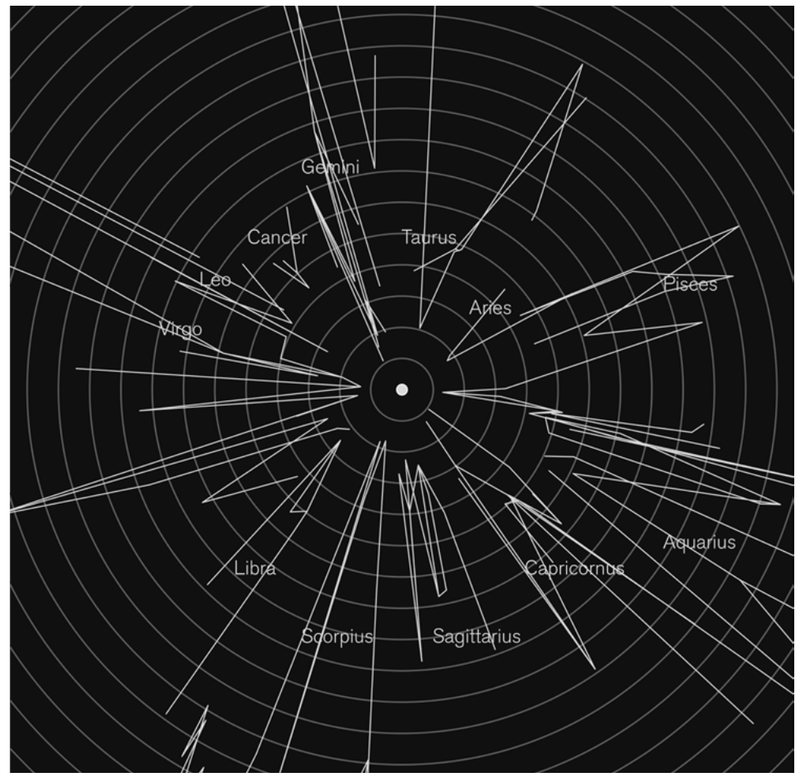
This project is a three-dimensional map of the zodiac that provides a different perspective of seeing the stars – a perspective from outside the earth. Each star is placed on the map with their coordinates, in relation to earth and its equatorial plane.

An online viewer of every zodiac constellation in 3D can be found through the link below.

Project Date: 2014 Freshman Year
Duration: 3 weeks

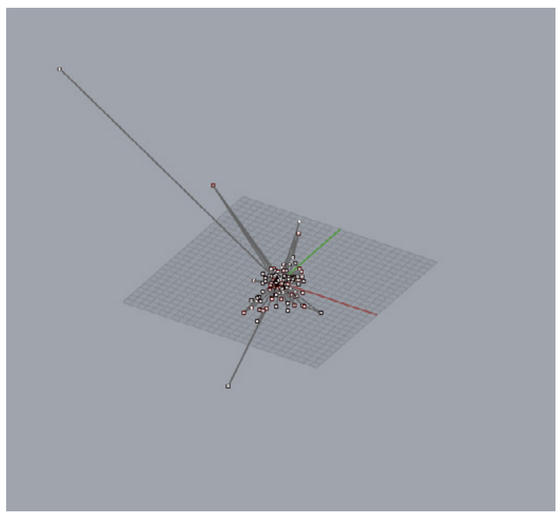
Video
Online Viewer

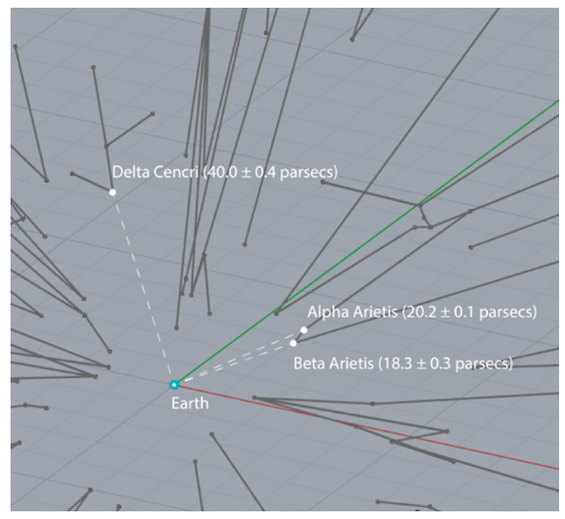




A Map of 12 Zodiac Constellations Projected on the Equatorial Plane.

PROCESS





The map is developed by processing multiple databases, including Yale Bright Star Catalog and HYG database. Each constellation is mapped in Processing with iGeo, and connected in Rhino3D. The image on the left demonstrates the accuracy.

IDENTITY

Identity is a counter-surveillance fingerprint kit. A box of *Identity* comes with 21 fingerprints, each with a unique pattern embedded in the silicone that can be read by any fingerprint imaging device. Contrary to real fingerprints, they are easily replaceable and will not leave traces anywhere.

Fingerprint recognition has become one of the most popular authentication methods in the world due to its convenience. People often perceive it as the most advanced and secure technology used to unlock their digital devices, and many companies are collecting fingerprints from their customers. However, they do not recognize the potential security risk. As humans, we are constantly touching things and leaving fingerprints everywhere. It is easy to steal fingerprints from anyone. Fingerprints are also irreplaceable. If a person's fingerprints get captured and leaked, the person can never use them as security keys anymore.

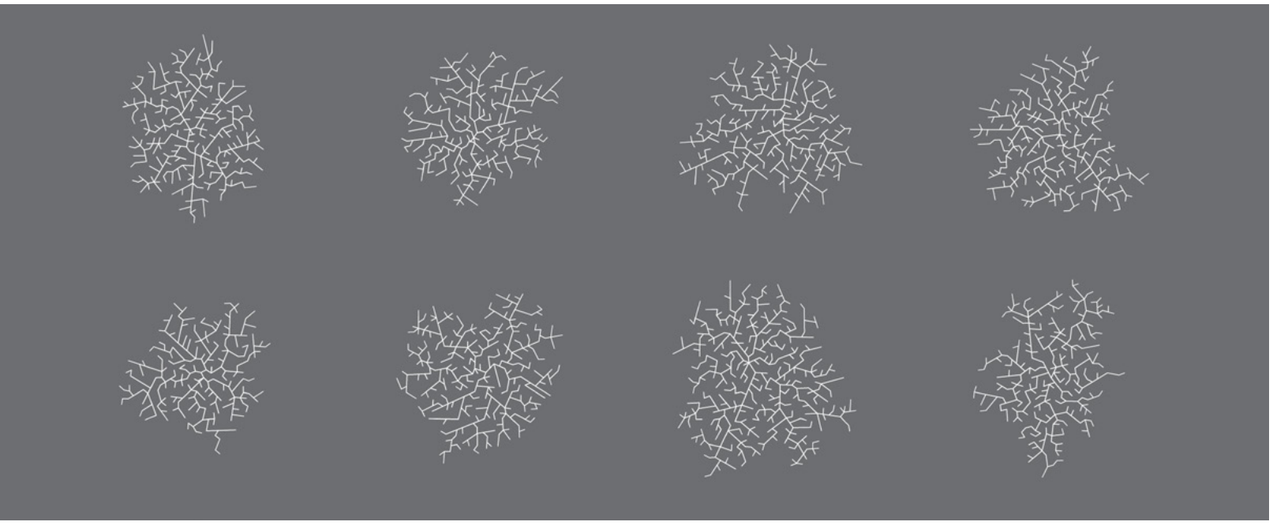
This project is aimed to develop an alternative solution that takes advantage of the convenience and the sophistication of fingerprint imaging without the security compromises, and at the same time raise awareness of the danger in over-trusting fingerprints.

Project Date: 2016 Junior Year
Duration: 2 months

The final prototype was reviewed by Vice Motherboard and reported on BoingBoing, Core77, and Csmonitor.

Video

PROCESS



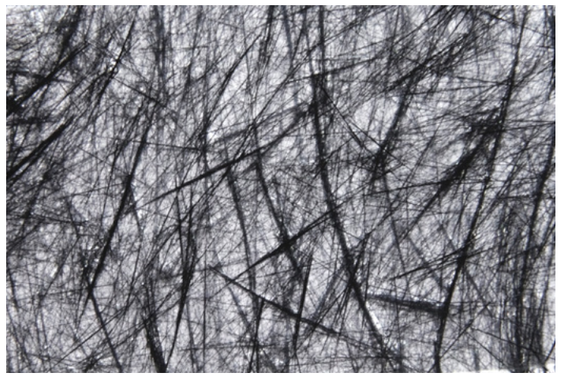
Acrylic mold

First prototype

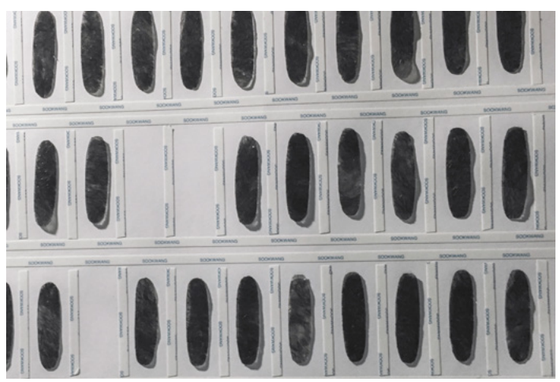
The first method I developed was software centered. I wrote an algorithm that generates random organic patterns. The micro patterns have the similar density to real fingerprints but are very different in composition, which makes them distinguishable. The patterns were then laser-etched onto a clear sheet of acrylic and made into molds. A conductive silicone rubber mixture was then poured into the molds. The result is a piece of conductive material that has a unique texture on the surface.

However, I didn't consider this method secure enough because the fabrication process left traceable 'footprints' both digitally and physically. Also, the surfaces of the fingerprints were not flat that they might leave marks just like real fingerprints.

PROCESS



Final prototype material detail



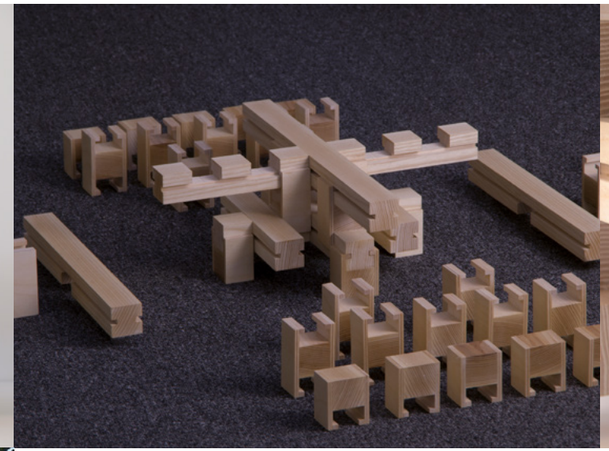
Packaging process

Unsatisfied with the first method, I started to develop alternatives for a better solution. I eventually realized that the complicated physical surface created on the first method was not necessary. Since fingerprint sensors read the differences in capacity to differentiate air gaps from skin, a blend of conductive and non-conductive materials would work just as well. I then started combining materials of different conductivities.

The final prototype was made by encapsulating conductive fibers inside non-conductive silicone rubber. The fibers broke up and formed unique patterns naturally in the molding process. The material was formed into a large sheet and then die-cut out into small pieces. Each piece has its own unique pattern and can be wrapped around fingers comfortably. The surface of this material is completely flat, and therefore will not leave traces anywhere.

Review Photo: Evan Rodgers/Motherboard

Dougong



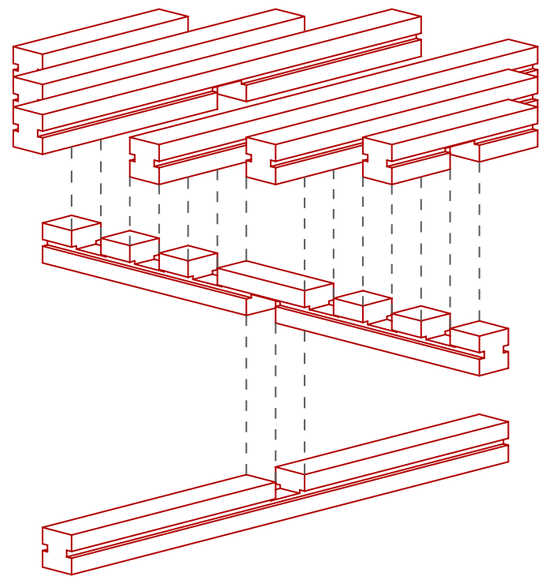
Confucius Temple of the town of Fencheng

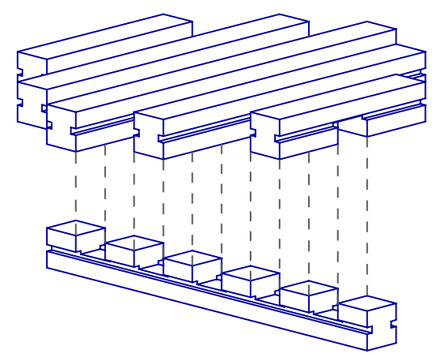
This project was developed for a woodworking class; the requirement was to make a table. My own goal of the project was to design and fabricate a modular structure derived from traditional Chinese architecture.

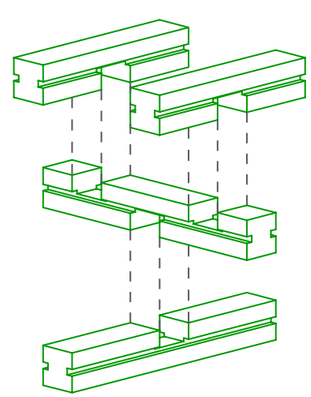
Dougong is a structure of interlocking wooden blocks used in traditional Chinese architecture. The structure was invented in the late centuries BC, and had been further developed throughout Chinese history. Dougong is essential to the timber frame structure of traditional Chinese buildings, as it distributes weight and extends the roof.

Project Date: 2015 Junior Year
Duration: 5 weeks

The final structure is composed of 18 pieces of Dou, the long beams, and 30 pieces of Gong, the brackets that connect the beams, to form a stable structure.



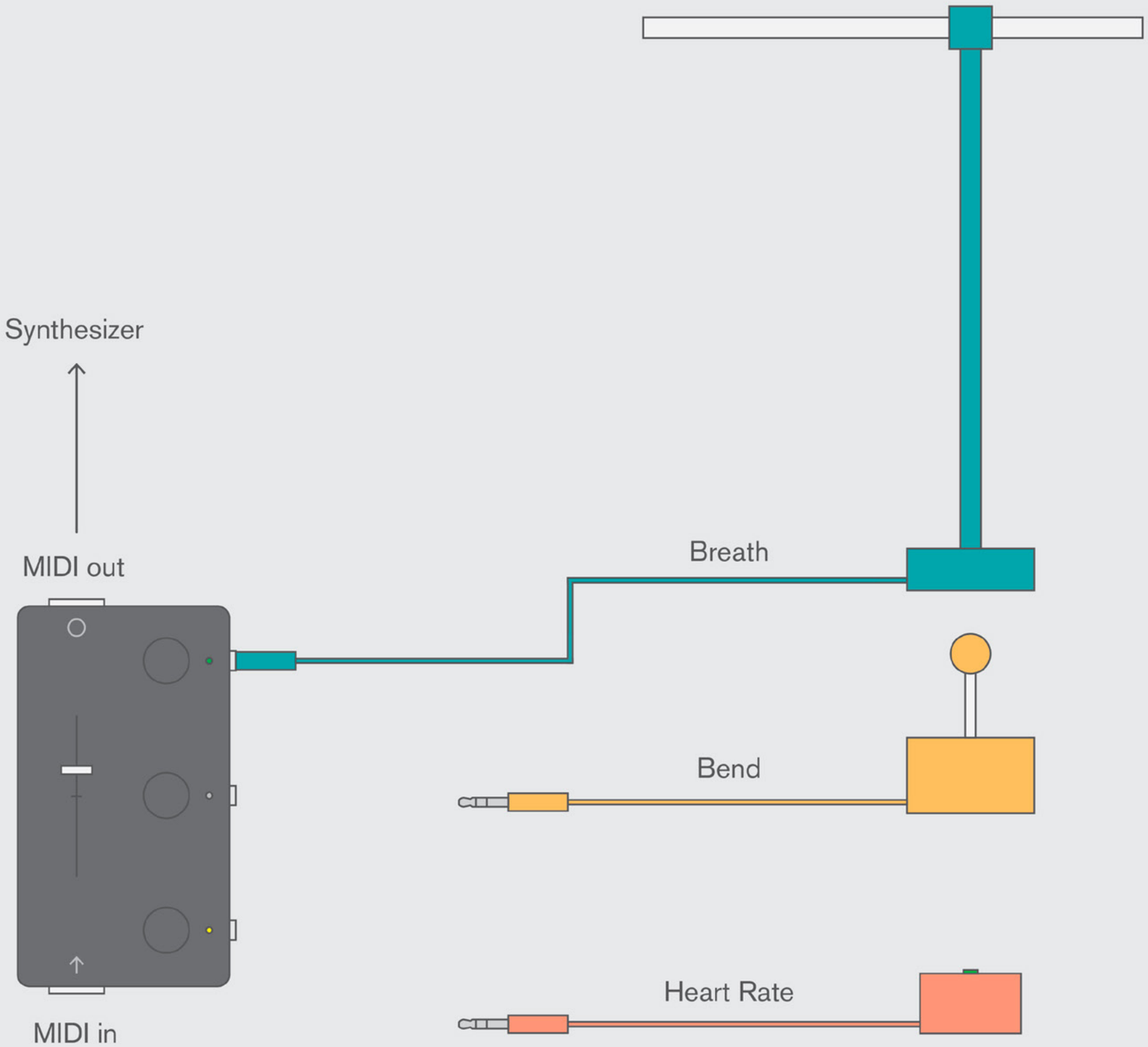




PROCESS

The fabrication process is completely modern and can be scaled for mass production. With plywood, the bracket (Gong) could be made easily with machine procedure, and it locks both the upper and the lower beams (Dou) by the side rails. This structure minimizes the footprint for the table and gives it a unique expression.

Express



This is a prototype of a modular system for music performance and production, which enables the users to have expressive controls over the sound and rhythm. Three modules were produced for the system so far, and more might be developed in the future.

The Breath Module measures the air flow when you exhale air into the tube. It can be configured to modulate LFO frequency or send notes to a synthesizer.

The Bend Module takes flex stress as the input. It can be used to modulate LFO frequency or filters on a synthesizer.

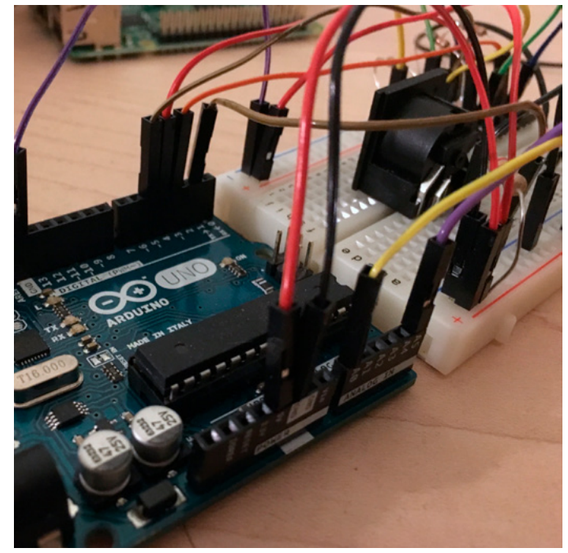
The Heart Rate Module takes in heart rate and matches the tempo of the connected sequencer to the user's heart rate.

A prototype of this system was demoed during a live performance. A short video can be found below through the link.

Project Date: 2015 Junior Year
Duration: 3 weeks

Video

PROCESS



The prototype's MIDI controller was developed using an Arduino board. It uses MIDI cc and SysEx to communicate with synthesizers and change its parameters. It also passes and receives MIDI clock information to sync with other devices through USB or MIDI. The expressive control modules are connected to the board through standard 3.5mm connectors.

Breath

Breath is an interactive light installation. Built using Arduino, the light breathes and adapts like a living organism. By using a temperature sensor, the installation senses the touch of a viewer or the rise of room temperature. The higher the temperature is, the faster it breathes.

The installation explores the connection between humans and other living organisms by simulating an organic relationship.

Project Date: 2014 Freshman Year
Duration: 3 weeks

Video

More works can be found on Mian-Wei.com.