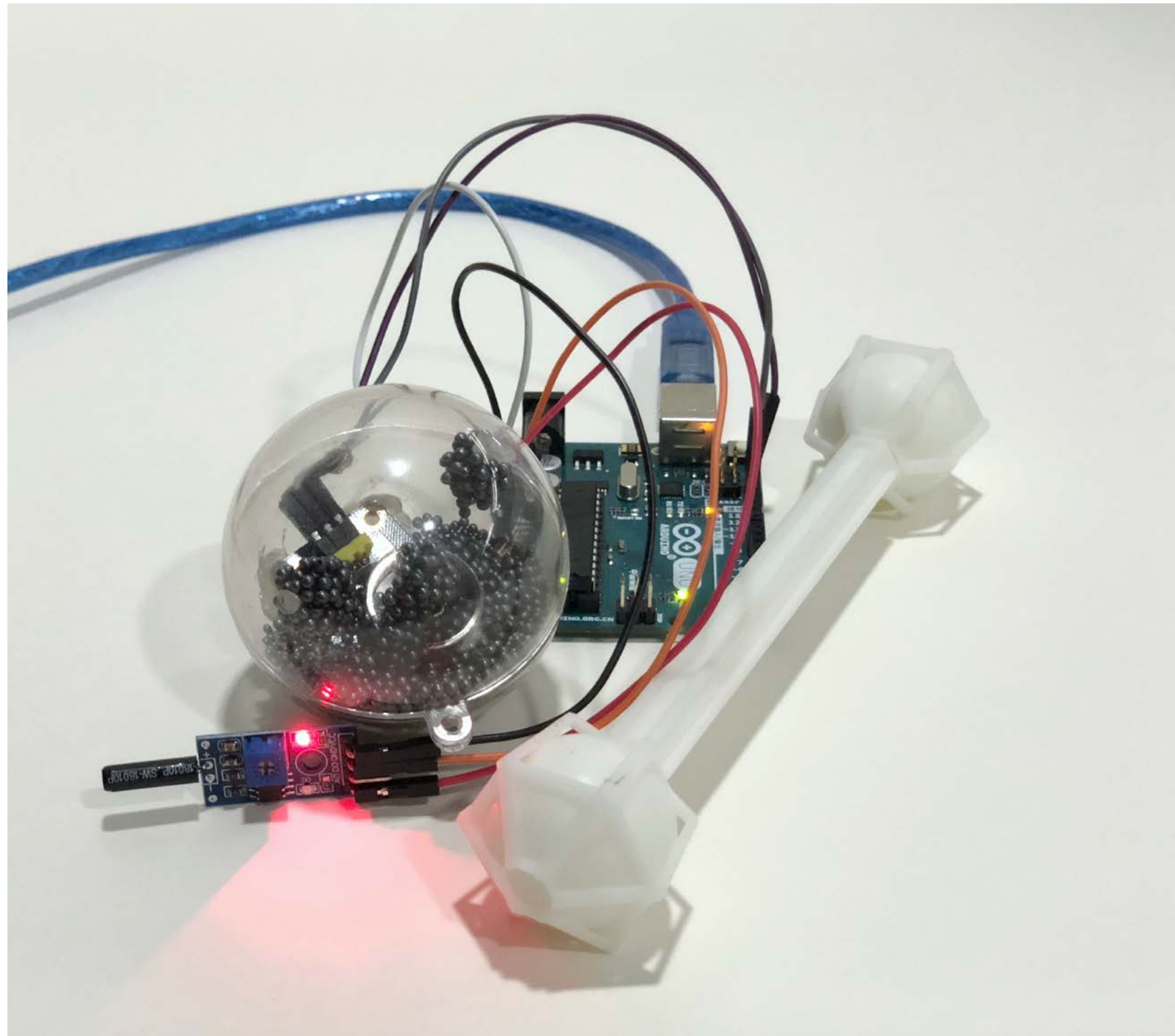# THE MAGNET PEN

A process art inspired fidgeting toy

Inspired by the Process Art and Conceptual Art movement the Magnet Pen is designed to maximize people's fun. It is designed to present its users with high customization as well as the contingency of results.


INTRODUCATION

The magnet pen transfers its user's motion into visual imagery. The imagery presented in the transparent balls is created with an electrical magnet that releases different levels of attractions based on the user's force of use.

INSPRATION

The ancient eastern artifacts and architectures are the primary source of inspiration. I design the device into two sections and can balance on hand. There are two transparent compartments, inspired by the Lidded Saltcellar, from Sierra Leone at each end for displaying the result imageries. The center pillar, inspired by the Qutb Minar and Taj Mahal of Delhi, has a textural pattern that provides friction.
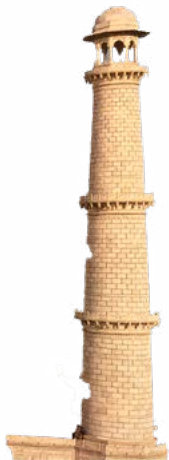
SKETCHES

Sketched are made based on the shape of a pen with two sphere chambers attaching on the opposite ends. The thought is to create distinct feedbacks of every single use. I come to three final concepts, then. The first design is the one I finally chose to persist. It has an outer frame holding the hollowed out structure. I also plan to set a sensor in the center cylinder and fluid materials in the two transparent spheres.
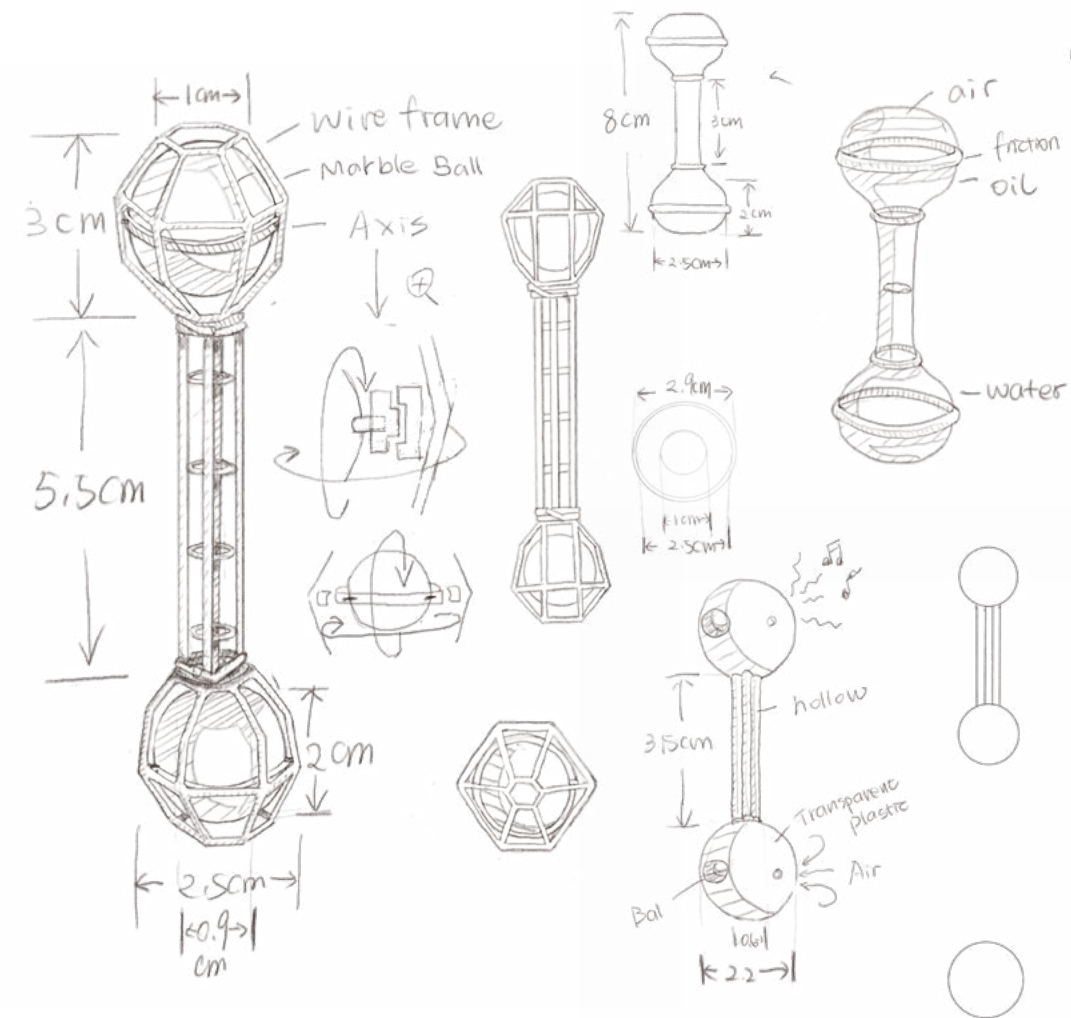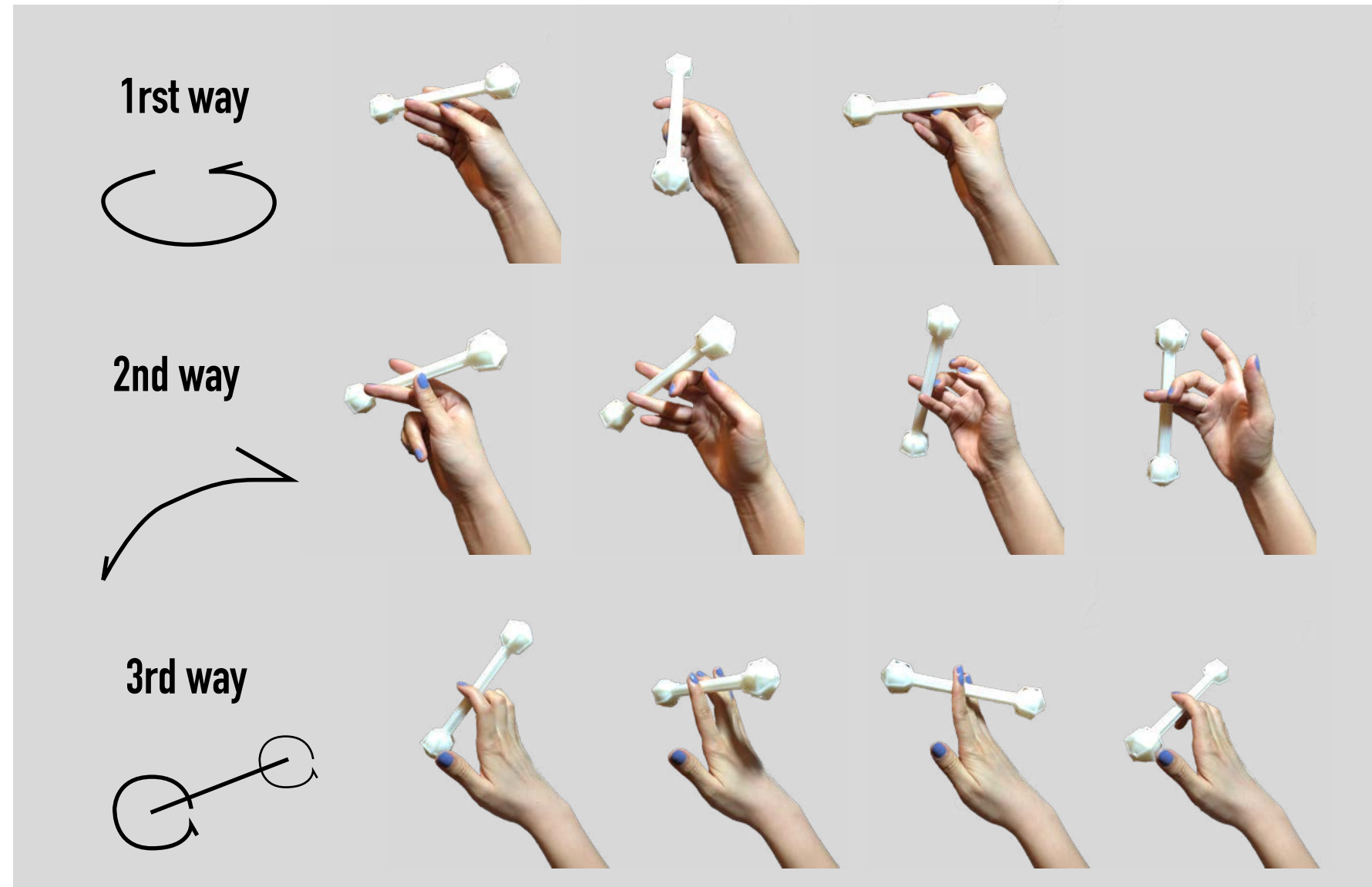

MOCKUPS
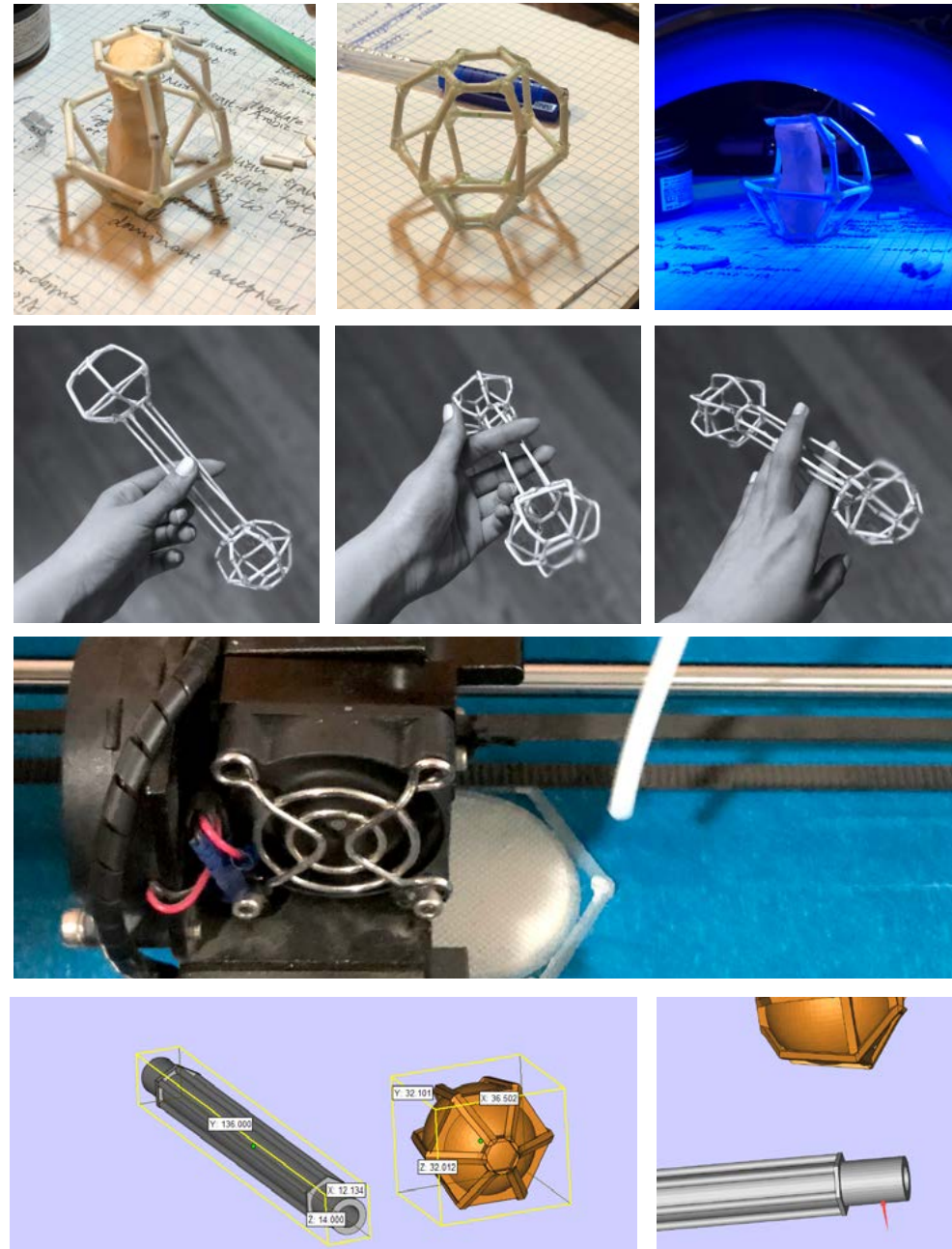
USABILITY TESTING

After testing on the weights, size, comfort when using, and the surface texture of the toy, the final model is shown as presented. There are many ways to spin the "pen," but listed below are the most common tricks of playing. Each move creates different motion orientation and intensity of vibration to the sensor.

1rst way

2nd way

3rd way

FINAL PROTOTYPE

The outlook of the toy is inspired by the spin pen that is popular among Chinese students. The "pen" itself can be spun in various ways as preferred, but to maximize the customary results, I attach two transparent sphere chambers on each end of the sick. In the chamber, there is an electromagnet, two small magnets, and iron balls. There is also a vibration sensor inside the stick connects to the electromagnet to release multiple intensity of absorption according to the way it spun. As a result, the iron balls build up between the magnets and the electromagnet in different shapes.
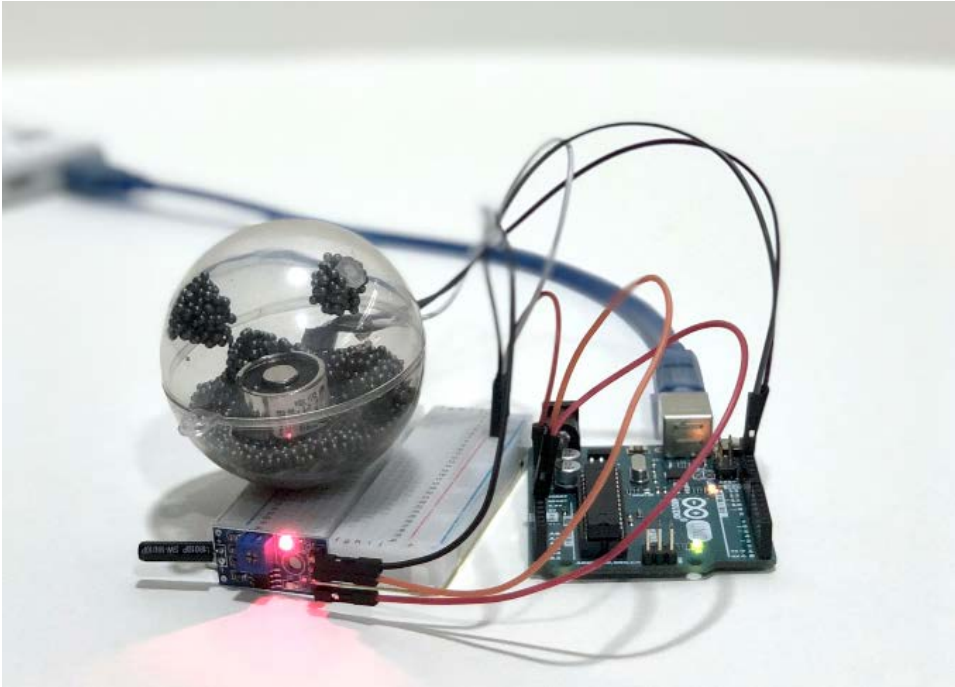
The programming is coded with Arduino setting the intensity of the attraction of the electromagnet according to the hardness of the shake on the sensor.

```
sketch_sep09a | Arduino 1.8.4

sketch_sep09a
int XI = 7;
int ZHEN = A0;
int n;


void setup() {
  pinMode( XI,OUTPUT);
  pinMode( ZHEN,INPUT);
  Serial.begin(9600);

}


void loop() {
  n = analogRead(ZHEN);
  Serial.println(n);
  delay(1000);
  if (n<800)
  {
  digitalWrite(XI,HIGH);
  delay(1000);
  }
  else
  {digitalWrite(XI, LOW);}

}

上传成功。

项目使用了 2364 字节，占用了（7%）程序存储空间。最大为 32256 字节。
全局变量使用了190字节，（9%）的动态内存，余留1858字节局部变量。最大为2048字节。

14                                    Arduino/Genuino Uno 在 /dev/cu.usbmodem145131
```
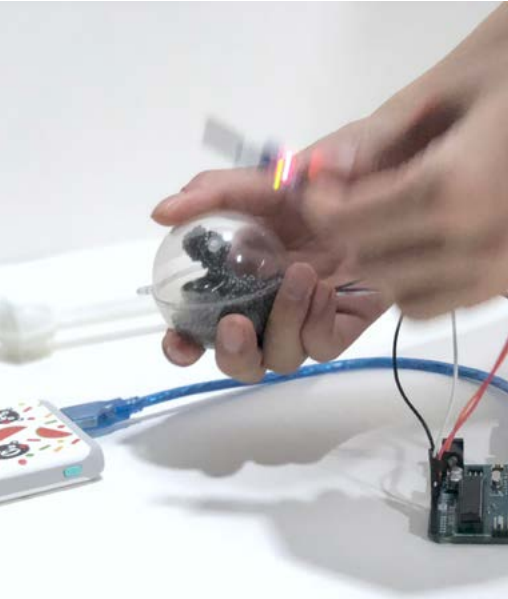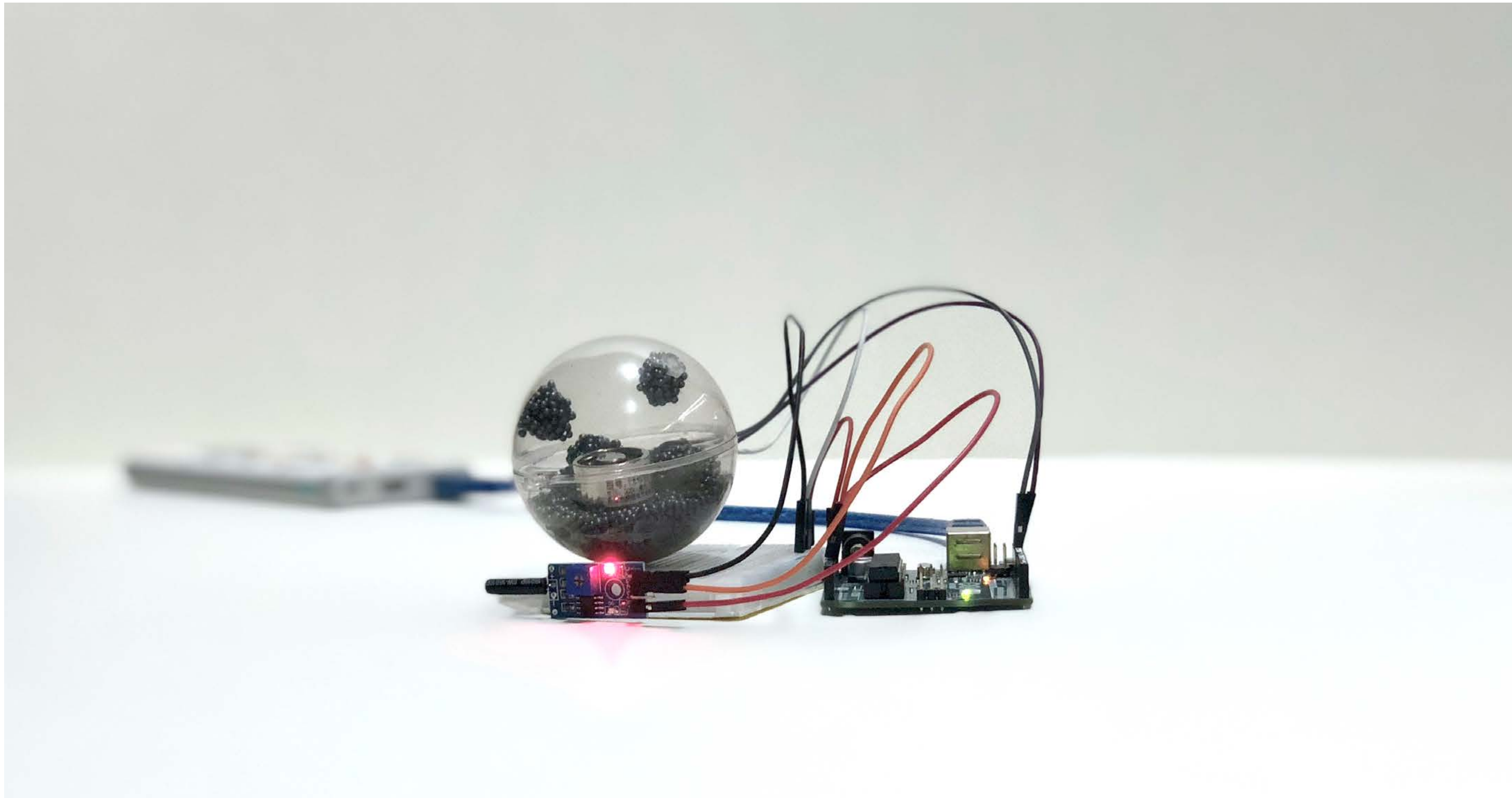
FUTURE PLAN

I made the first ever attempt to incorporate Arduino into my creative process. The project is for art sake rather than for a human-centered purpose that involves a system of finding and resolving questions. As an artist who is unfamiliar with programming, I devoted a large portion of my time to learning the C language and testing for the final prototype. In the process of making this project, I have made multiple mockups. From this project, I adapted a non-linear process, in which I research, test, 3-D painting, incorporate more technical supports, get user feedback, and finally achieve the most desirable result. The project may seem to be effortless for people with a background in computer science, but it is quite challenging for me. Thus, I am very satisfied with the outcome as my first project using Arduino and I surely will apply the device in my future creative process.