
# 山水長卷膠帶

徐誠開

## 基于音频生成的可定制的中国山水画风格胶带

## Shanshui Tape

Generative Customizable
Chinese Landscape Paintings Style Tapes
based on Audio Clips

by Chengkai Xu 1928278

# Background
# 背景

徐誠開

至於山水
質有而靈趣

宗炳《畫山水序》

As for landscape,
while possessing substance,
it tends to the spiritual.

Zong Bing, Hua Shan Shui Xu

看此畫令人生此意
如真在此山中
此畫之景外意也

郭熙《林泉高致》

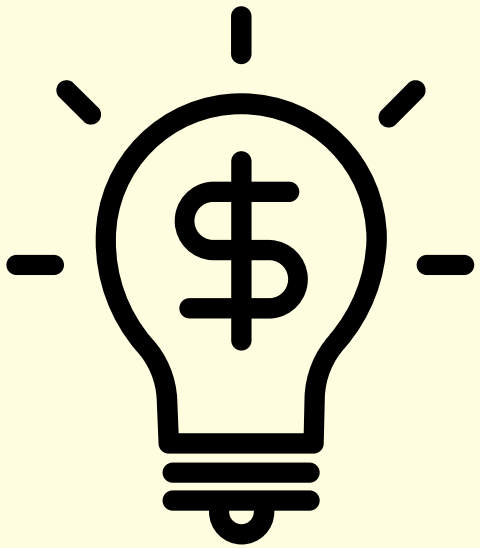
Looking at the painting makes the audience feels as if they are in the mountains—the intention of the painter is beyond depiction of the scenery.

Guo Xi, Lin Quan Gao Zhi

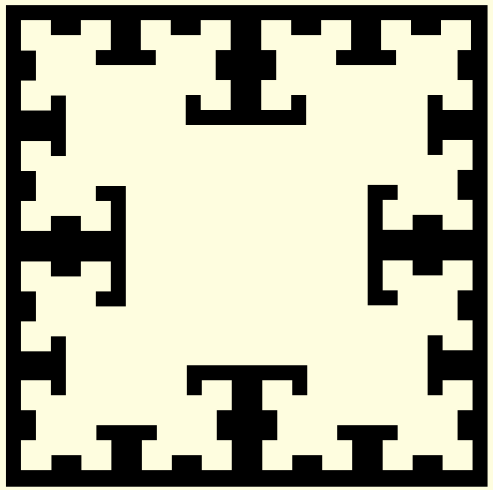
# Genesis
# 缘起

After doing some research on the cultural and creative product market, decorative adhesive tapes appear to be one of the best-selling products. Personally, I have a unique interest in generative arts.

What if I combine the two concepts together?



&



徐誠開

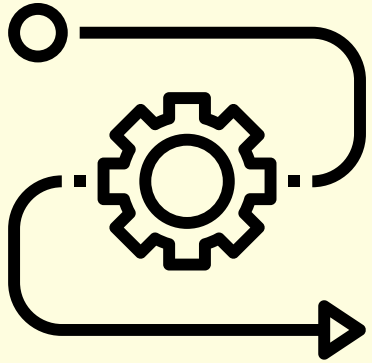
# Main Idea
# 主旨

## 绘声入画
## Translate any audio files into Shanshui Paintings

徐誠開

昆曲
古诗词朗诵
消费者录制的音频

Kunqu opera
Recitation of ancient poetry
Consumers' audio recordings



青绿山水画

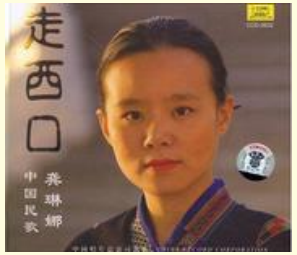
Blue-green
Shanshui Paintings

# Plan
# 企劃

徐誠開

# Methodology
# 術

徐誠開




## Minim


Based on Processing, the whole project is written in Java. Since one of the requirements of this assessment is to find the link between traditional Chinese culture and modern Chinese culture in southern regions of the Yangtze River, I choose *Jasmine Flower (《茉莉花》)* sung by Gong Linna, who also combines Chinese traditional culture with international culture perfectly, as the music for test.

I use two Java libraries called “minim” and “peasy gradients” in this program. Minim, initially created by Damien Quartz, helps to analyze the audio clips and return data based on the amplitude at certain time point. Peasy gradients, created by Michael Carleton, helps to colorize the contour of the mountains with gradient color from blue to green.

# Methodology 術

徐誠開

There are mainly three parts in the program: audio analysis, mountain generation and tree generation. At first, a function will cut the audio into several random clips. Then, audio analysis will analyze these clips and return 5 weights in an array for mountain generation. Using curveVertex() function, mountains with smooth contours are drawn. With the help of peasy gradients library, the contours of mountains are used as masks to give the mountains the gradient color from blue to green. As to the tree generation, I refer to the Lindenmayer system to study the mechanism behind the plant structures. Based on the Lindenmayer system, trees are generated according to the positions of mountains.

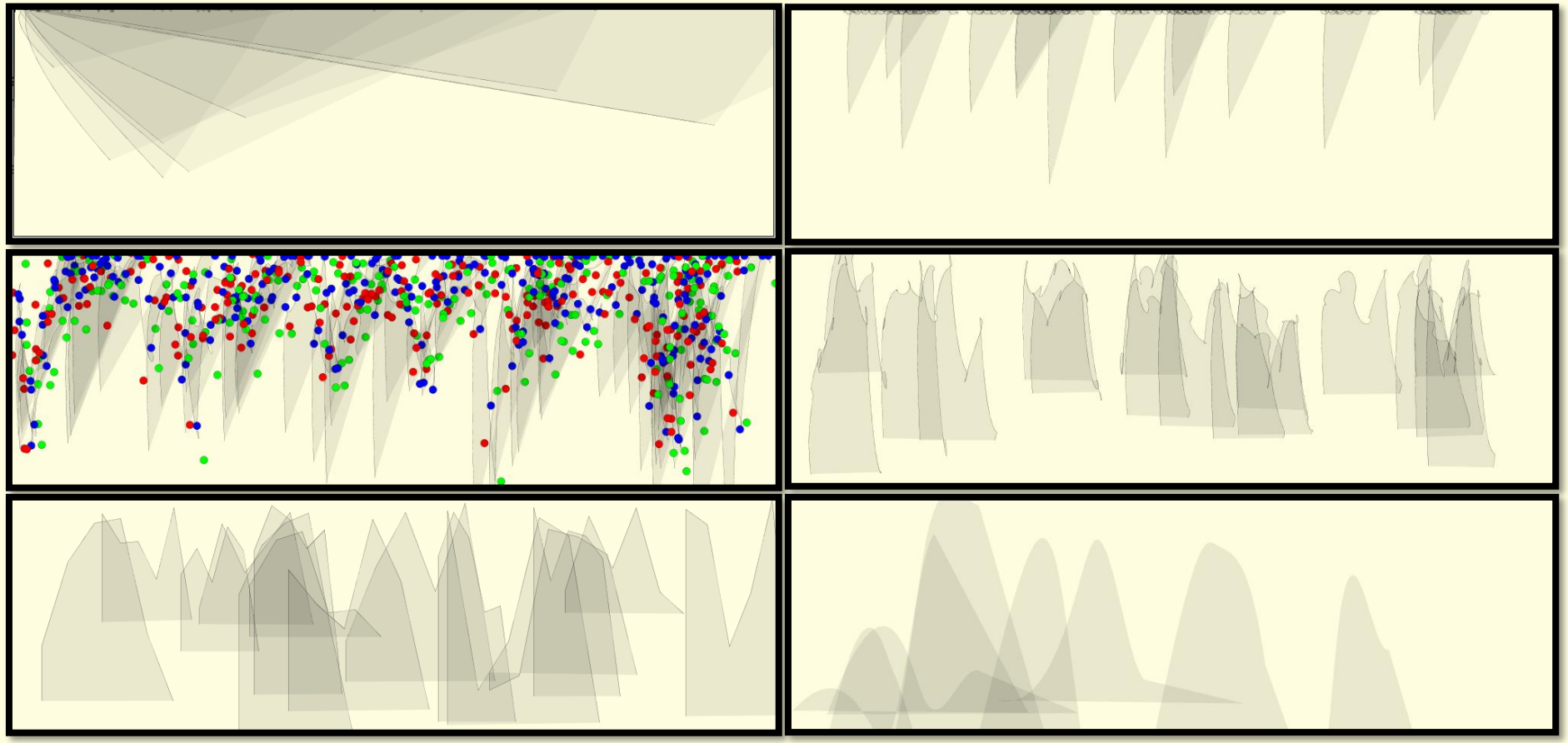
Besides, the program has a unique process for me to select generated images. The program is CPU-based, so the frame rate is around 2 frames per second. I deliberately set the frame rate to 1 fps and set the left button click of mouse as the pause and the blank space key as the save command. To shut down the program, press the “esc” key.

```
194 void mousePressed() {
195   noLoop();
196 }
197
198
199 void mouseReleased() {
200   loop();
201 }
202
203
204 void keyPressed() {
205   if (key == CODED) {
206     if (keyCode == ESC) {
207       exit();
208     }
209   }
210   if(key == ' '){
211     saveFrame("ShanshuiTape_#####.png");
212   }
213 }
```

# Complications
# 曲折

徐誠開

1. Originally I planned to use Bezier curve to draw the contour. At last, after 3 days of testing, I change to use normal curve vertex instead.
2. Originally I planned to form the mountains based on the spectrum of the audio clip. At last, after 2 days of struggling, I use only the amplitude.
3. Originally I planned to leave the images in black-and-white. At last, after 3 hours searching for suitable solutions, I figure out how to use the peasy gradients library.



Snapshots on progress

1. Spectrum-based
2. Weight scale unadjusted
3. Debug mode (dots to indicate the anchor points)
4. Bezier curves
5. Straight lines
6. Curve vertex

# Complications
# 曲折

徐誠開

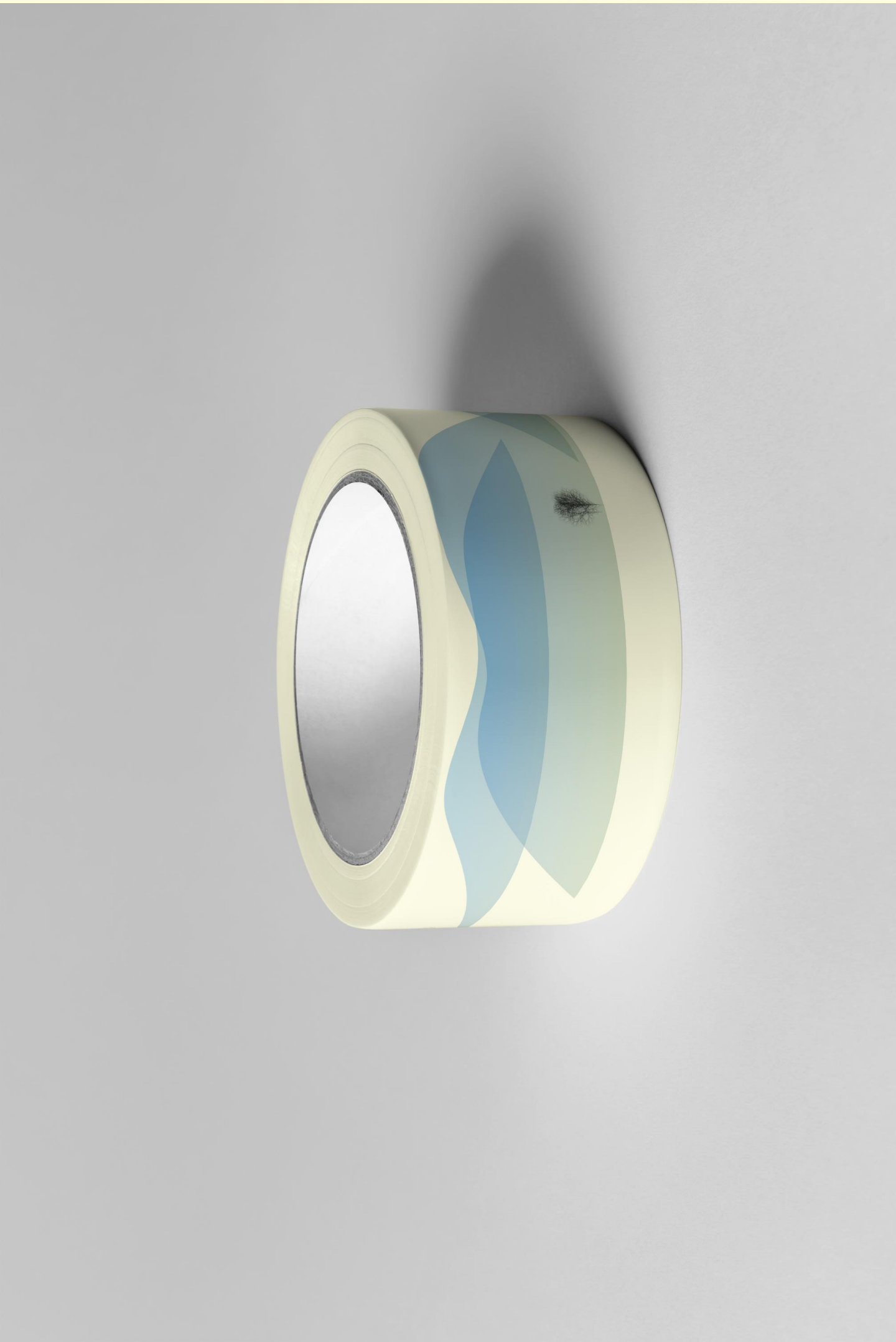
## Snapshots on progress

1. Debug mode (dots to indicate the anchor points)

2. Perfect curve generation with color
3. Trees are added

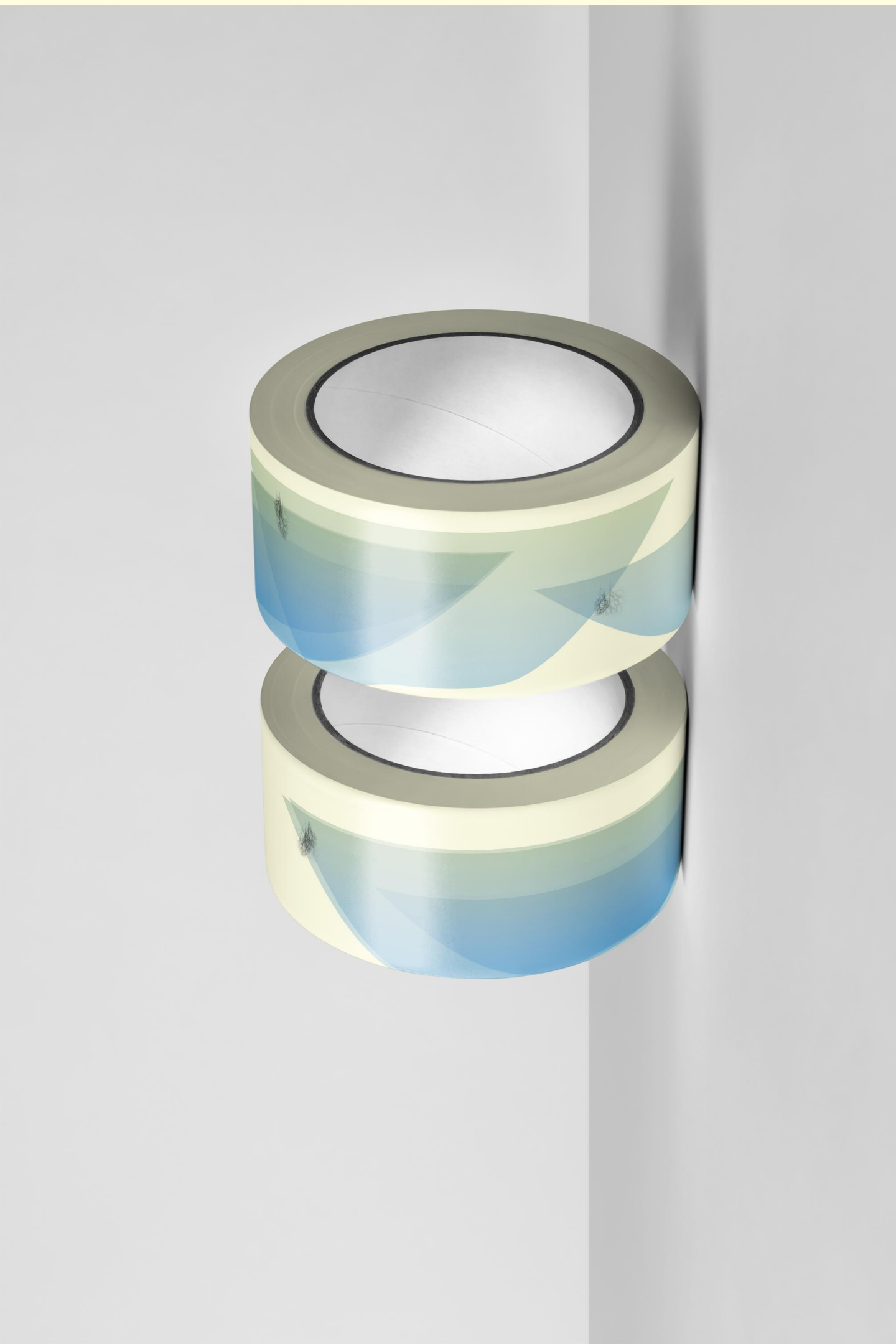
# Finished Product
# 成品

徐誠開



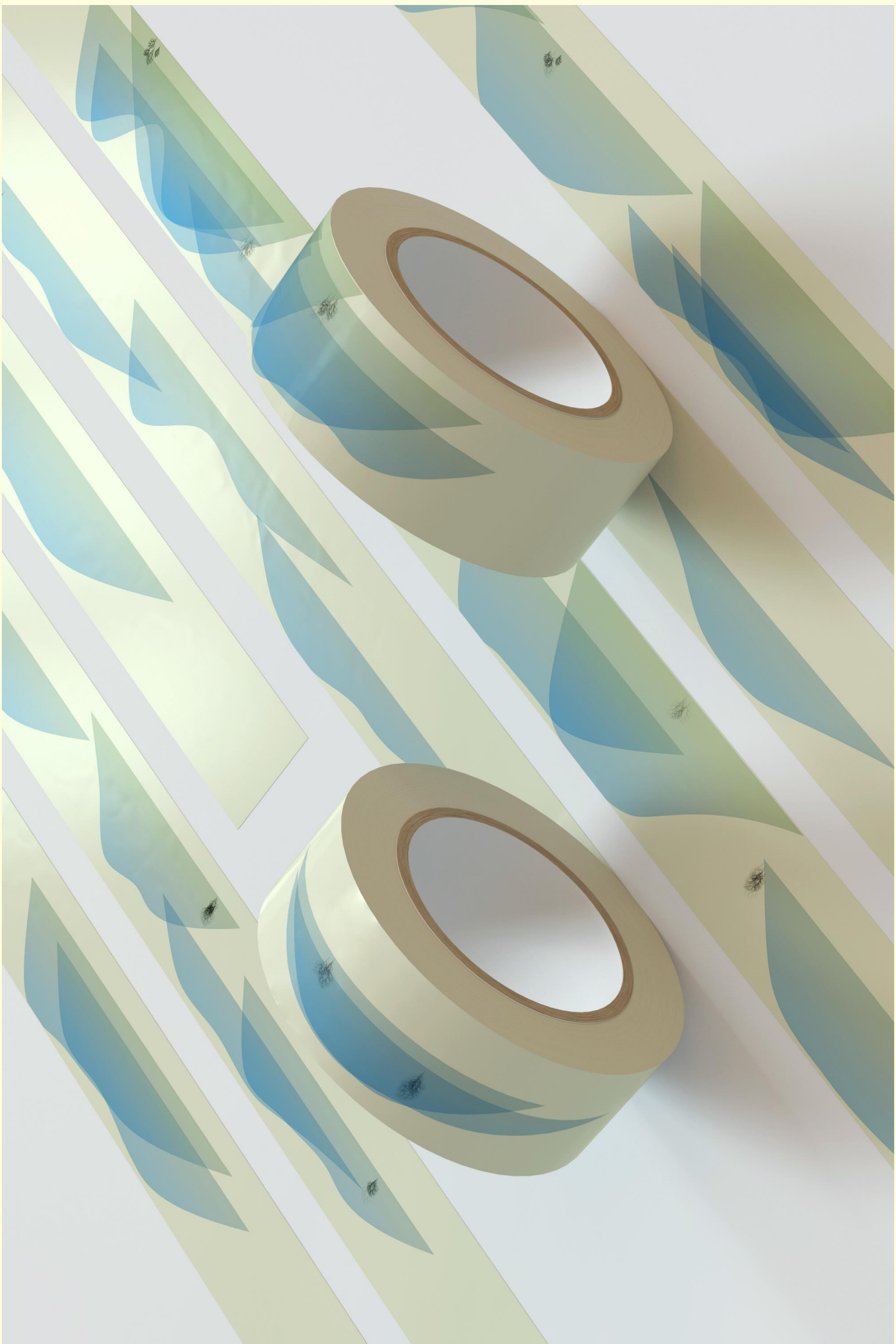
# Finished Product
# 成品

徐誠開



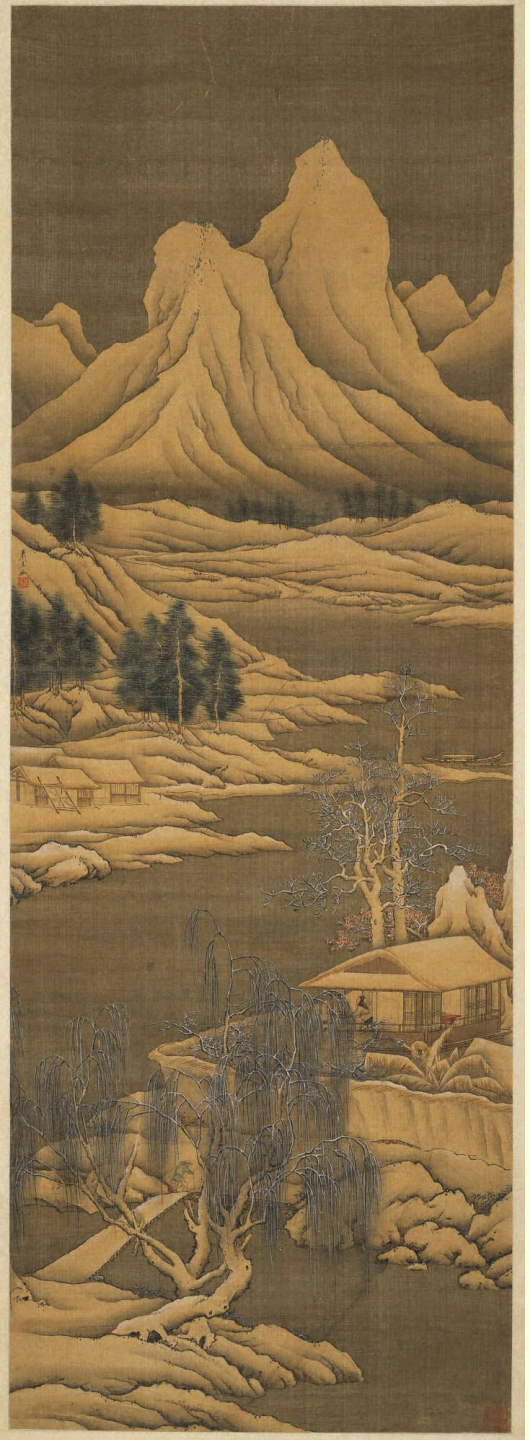
# Finished Product
# 成品

徐誠開



# Finished Product
# 成品

徐誠開



# Credits & Reference
# 致謝與參考


Shiffman, D. (2012) *The nature of code.* Available at: https://natureofcode.com (Accessed: 23 October 2021).

Shi, W. (2017) 'A Generative Approach to Chinese Shanshui Painting', *IEEE Computer Graphics & Applications*, 37(1), pp. 15–19. doi: 10.1109/MCG.2017.13


徐誠開