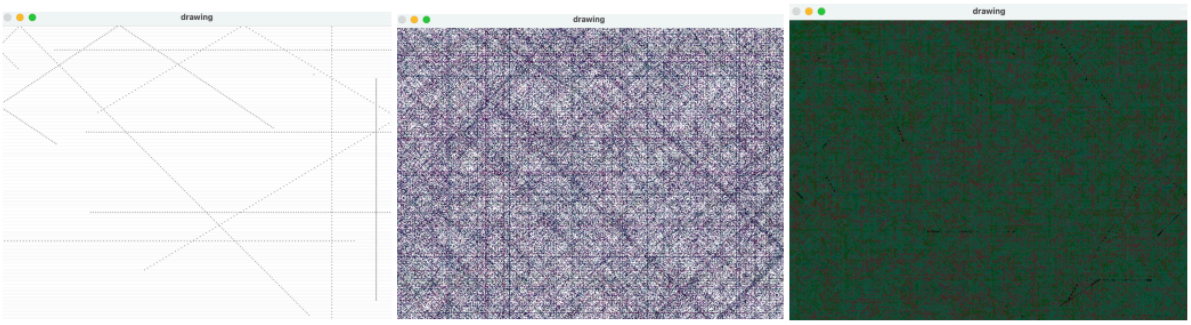
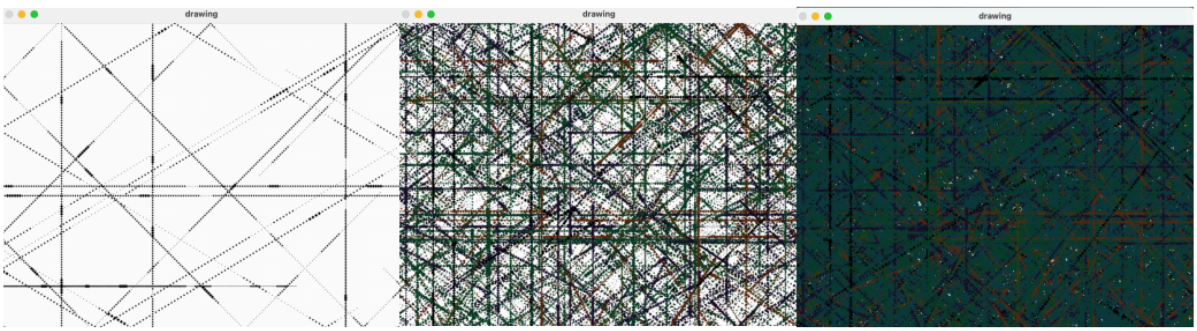
My program draws inspiration from the Chinese ink-wash painting technique. At its core, it visualizes FFT values and user mouse events. Initially, the setup() and start_loop() functions are called within the initialization function to prepare for loops and mouse events. This is followed by the creation of a list containing 10 balls. Each ball is characterized by five variables: the initial positions, speed and direction, and color. In the draw() method, the use of an. background is optional. The program utilizes a MusicAnalyser object to analyze the audio file and retrieve fft_vals. When there is data in fft_vals.size, the program scales the radius of the balls based on ten times the average value of FFT, creating an effect similar to ink splashes. The movement of the balls mimics the brush strokes on a canvas, generating unique visual patterns.
Additionally, I have defined a mouse event that changes the colors and quantity of the balls when the user clicks. The colors of the balls are randomly chosen from a range of dark hues to maintain the style of ink-wash paintings, and the number of balls increases exponentially with each click. Using OpenCV, each ball is drawn in the window, and the display is continuously updated over time. This interactive feature directly influences the visual presentation, making each click unpredictable and more creative.
Testing the program with different musical styles, I observed that the thickness of the tonality to some extent is reflected in the thickness of the drawn lines (i.e., the radius of the balls). More tranquil music tends to result in coherent and smooth thin lines, whereas music with abrupt rhythm changes tends to transition among dots, lines, and blocks, eventually forming larger block shapes, reflecting the intense and fragmented nature of the rhythm. This is because the radius of the balls is determined by the FFT values; hence, the tonality influences the frequency and affects the size of the ball's radius, determining whether the visualization will be lines or blocks. The amplitude also affects the speed of the ball radius changes, so a higher amplitude leads to rapid transitions between dots, lines, and blocks.

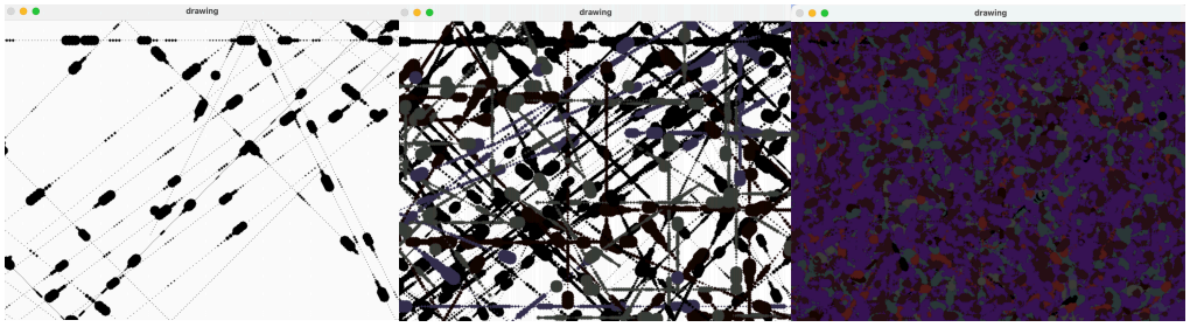
For example:
• With low-variance jazz music, the lines are mostly dense and continuous.



• Piano often characterized by full-bodied tonality, tends to produce thicker lines in the visualization, yet these lines remain smooth and continuous, reflecting the continuous flow and harmony typical of piano music.



• With hip-hop, which has larger rhythm variations, the visualization alternates between dots and lines.



• For heavy metal or EDM, the visualization transforms into block-like shapes.