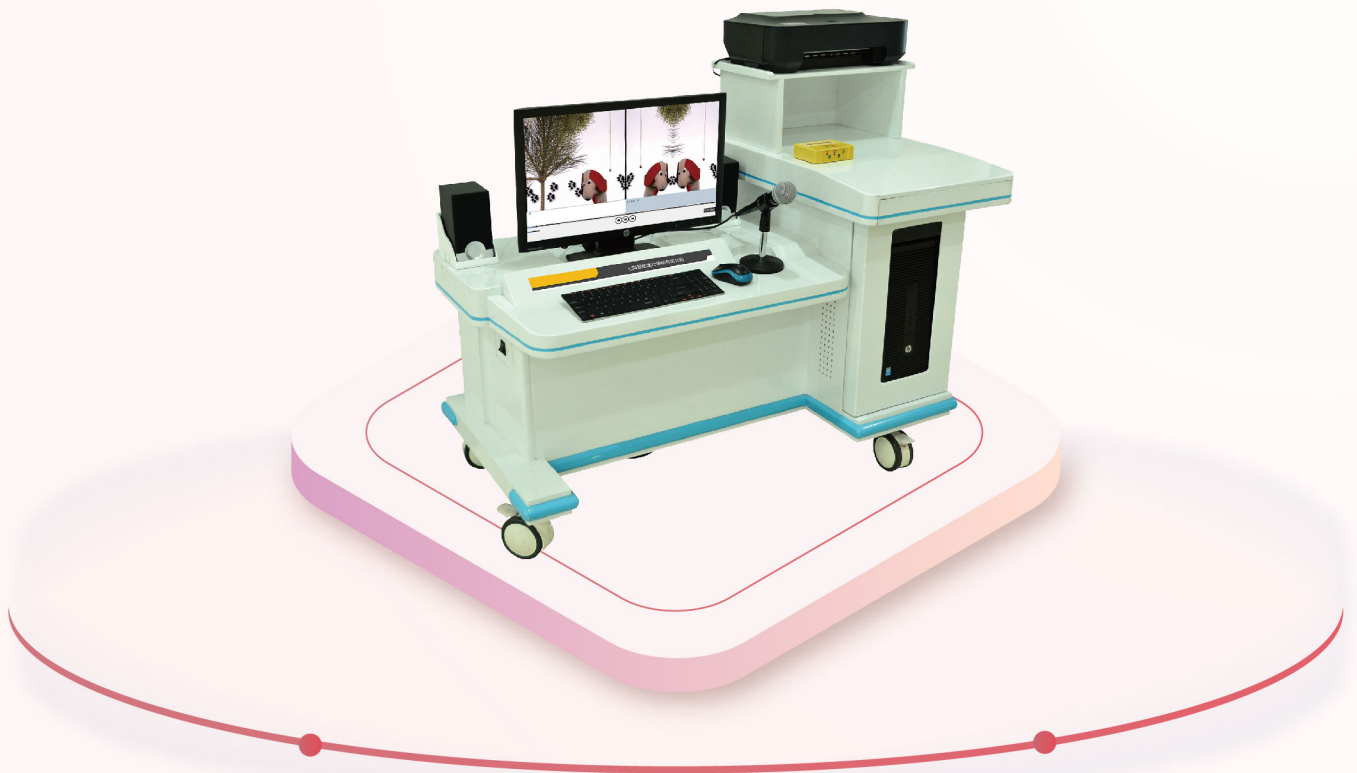


Visual Music Therapy

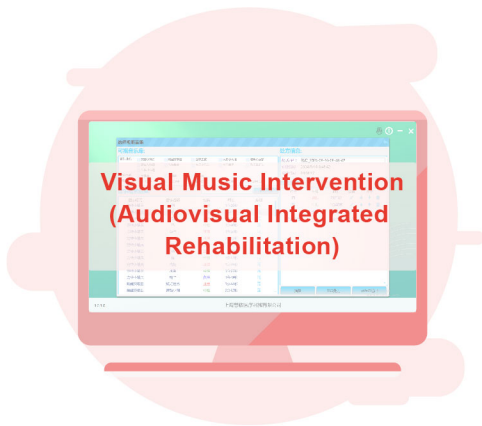


Main Functions

- ✓ Designed for the functional evaluation and rehabilitation of emotional and behavioral disorders, including autism and ADHD.

Core Goal

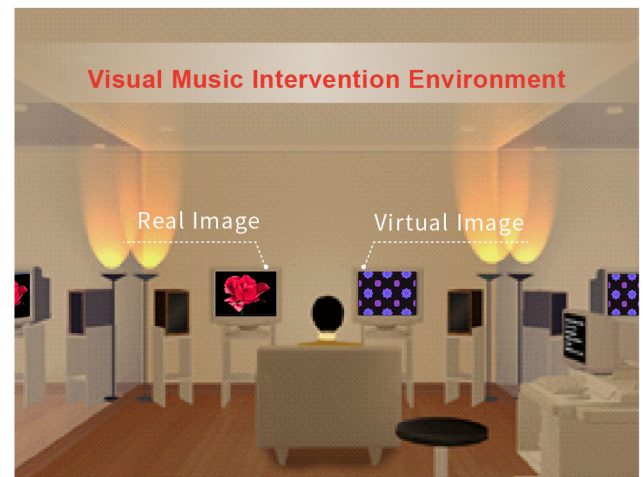
- ✓ To enhance audio-visual integration and improve auditory attention through the use of real and virtual imagery combined with brainwave light stimulation.

01**Emotional Disorder****04****Attention Deficit And
Hyperactivity Disorder (ADHD)****02****Mental Retardation****05****Autism Spectrum Disorder
(Autism)****03****Speech & Language
Retardation**

- ✓ By integrating image signal processing algorithms with music therapy principles, this system applies real-time processing of music alongside video and animation effects. Combined visual and auditory stimulation induces psychological and physiological changes, helping to stabilize emotions and effectively intervene in negative emotional states.

Adopting Visual Induction Techniques

- ✓ Positive, neutral, and negative music is embedded with brainwave frequencies (α , β , θ , and α/θ) to stimulate the brain's auditory perception and responsiveness.
- ✓ Combine real-life imagery with virtual visual effects such as sketch, mirroring, primary colors, scrolling, and relief to conduct dynamic audio-visual integration training, stimulating visual-auditory attention and interest.
- ✓ Create an immersive and distinctive artistic style that evokes positive emotions through elements of childlike wonder, animation, color spectrum, and associative audio-visual design.
- ✓ Virtual therapy incorporates art forms such as painting and sculpture to support emotional expression and processing.



Visual Music Intervention Content

- ✓ By combining real and virtual imagery, auditory and visual signals work together to influence both physiological and psychological states.

01 Sketch Images

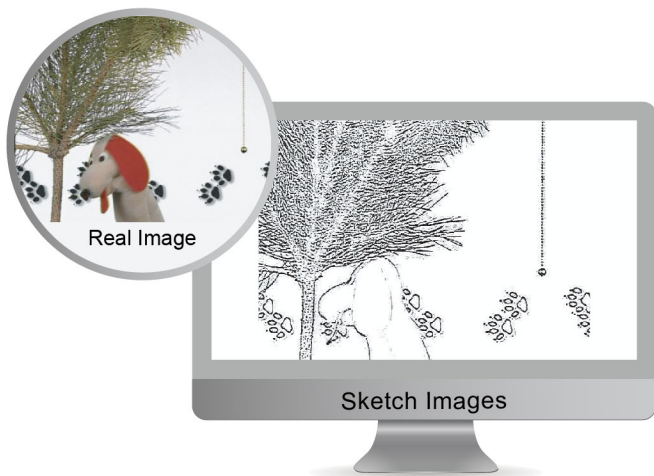
02 Mirror Images

03 Cartoon Images

04 Abstract Images

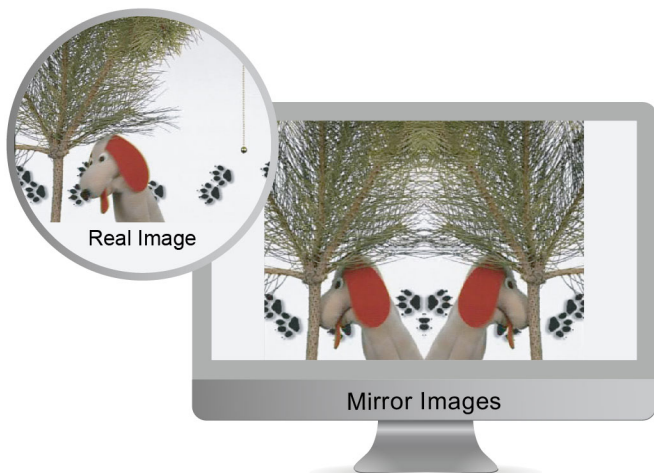
05 Primary Colors Images

06 Scroll Images



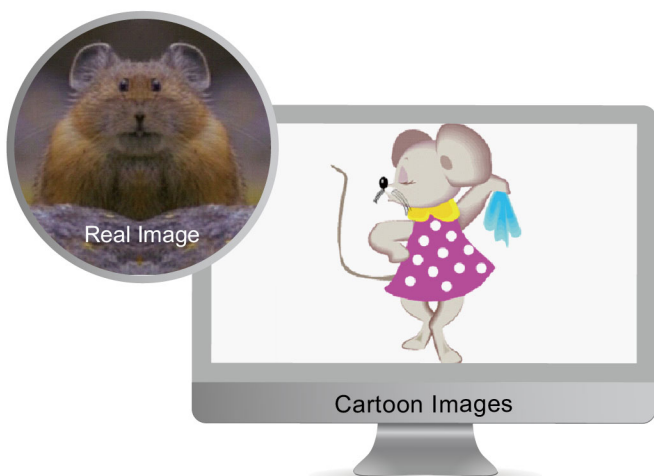
Sketch:

- ✓ Painting is one of the most effective and direct forms of emotional expression, allowing individuals to communicate feelings visually. Through the use of lines and imagery, it can stimulate self-awareness, foster insight and epiphany, and inspire free association.
Example: Individuals with autism may perceive the world as simplified black-and-white line patterns (line perception). Presenting sketches alongside real objects can help enhance accurate recognition and cognitive reconstruction of the real world.



Mirror:

- ✓ The mirror image effect allows patients to continuously reconstruct external reality in their minds, activating or alleviating emotions through shifting visual stimuli.
Example: Individuals with autism may perceive objects as mirror images (mirror image perception). Presenting both the mirror image and the real object simultaneously can help stimulate accurate understanding and reconstruction of the real world.



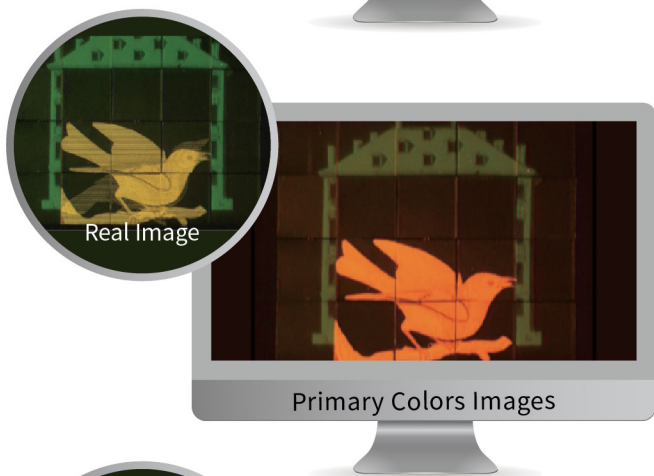
Cartoon:

- ✓ Through humorous, ironic, subtle, and unique character portrayals, patients' emotions are engaged and influenced within the dynamic and engaging animation.
Example: Individuals with amnesia may perceive objects as flat, with simplified lines and rough colors. Presenting cartoons alongside real objects can help stimulate accurate perception and reconstruction of the reality.



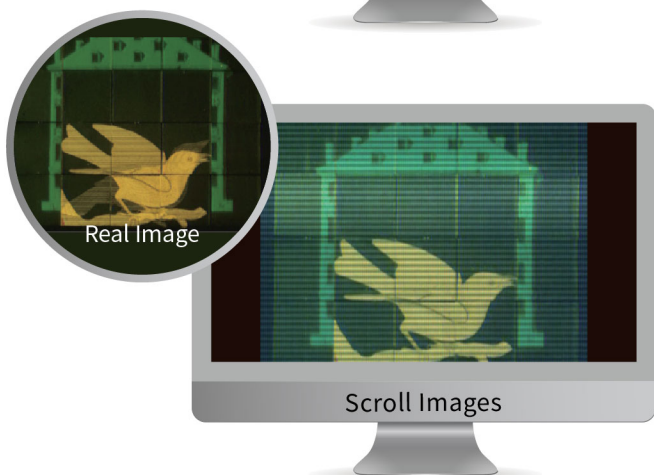
Abstract:

- ✓ The brain's left and right hemispheres serve different functions. Comparing real objects with illusory effects enhances logical and abstract thinking, improves cognition, and supports emotional release in a dreamlike visual context.



Primary Colors:

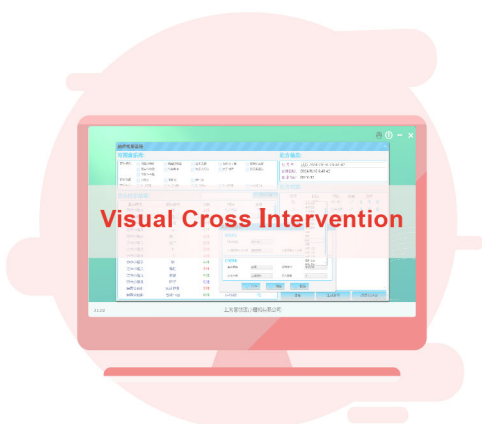
- ✓ Based on the three musical tones—positive, neutral, and negative—image colors are assigned red, green, and blue to correspond with light wavelengths, effectively stimulating patients' emotional responses.
- ✓ Positive music paired with red imagery evokes excitement; negative music with blue imagery evokes calmness; and neutral music with green imagery creates a balanced state of both alertness and relaxation.



Scroll:

- ✓ Simulating TV flash frequencies creates a strong visual impact, especially for individuals with autism. A vertically flashing scroll bar effectively captures attention and stimulates internal associations.

Example: Individuals with autism may perceive things in a mechanical and rigid way (repetitive phenomenon). Presenting scrolling images alongside real objects can help focus attention, stimulate imagination, and enhance accurate understanding and reconstruction of the real world.



Visual Cross Principle & Computer Graphics Processing Technology

Audiovisual Arousal

- ✓ Enhances intentional attention through combined visual and auditory stimulation.

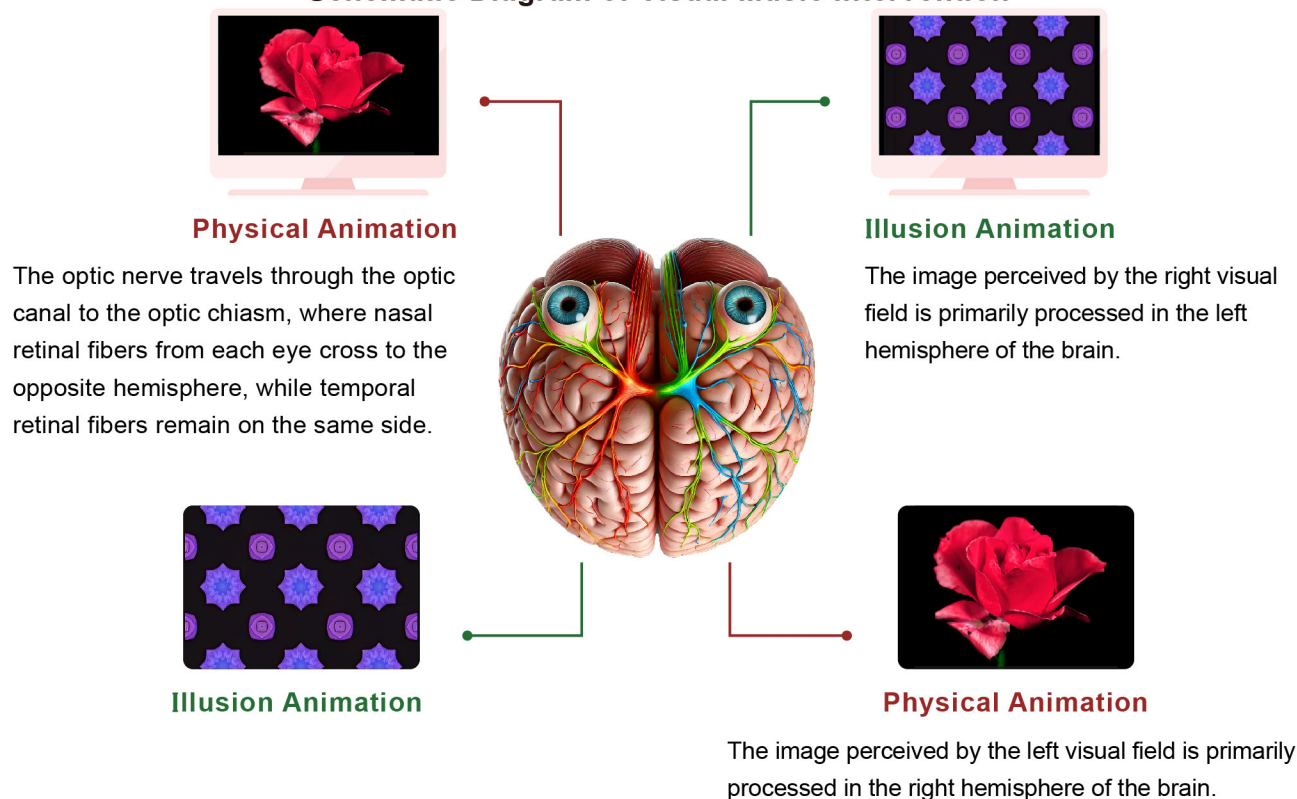
Emotional Stability

Emotion Regulation

- ✓ Emotion induction
- ✓ Emotion Cognition

Visual Cross Principle and Computer Graphics Processing Technology

Schematic Diagram of Visual Music Intervention



- ✓ Based on this principle and combined with computer graphics algorithms, the images displayed on the screen are processed in real time, generating physical animations and special illusion effects on the left and right sides of the screen.
- ✓ Physical animation reflects the real world, while illusion animation represents a hallucinatory world. During treatment, individuals are exposed to dual stimulation from both the real and imagined worlds.

Emotional Stability

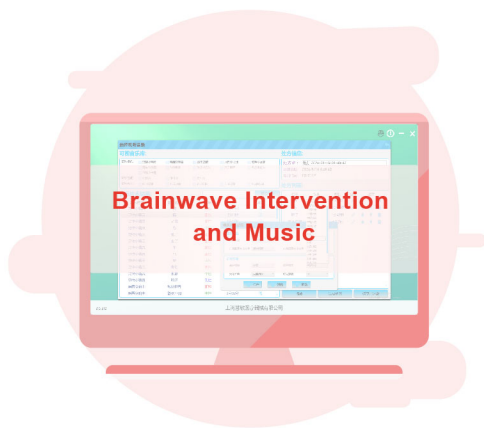
- ✓ Positive, neutral, and negative music embedded with δ waves is paired with visual effects—such as mirroring, sketching, scrolling, relief, primary colors, cartoons, and paintings—to support emotional regulation.

Emotion Regulation

Emotion regulation consists of the following two components:



- ✓ **Emotion Induction:** Utilizes three-screen dynamic display technology, combining animation and music with dual imagery (real and illusory). Under the optic chiasm mechanism, visual cross-intervention is achieved through brainwave-embedded music, imagery, and lighting to stimulate emotional responses.



○..... Behavior Modification

- ✓ Behavior modification through music and brainwave intervention

○..... Homogeneity Principle & Brainwave Induction Technique:

- ✓ In music therapy, the selected music should align with the individual's emotional state to enhance therapeutic effectiveness.
- ✓ Uses brain wave induction technique

Behavior Modification

- ✓ Behavior modification is achieved through music and brainwave intervention, using multi-sensory stimulation—such as music, lights, images, childlike animations, and associative audio-visual content—to induce desired brainwave states.
- ✓ Childlike animations and themed 3D images, combined with common everyday scenarios, use multi-sensory stimulation to induce targeted brainwave states for behavior modification.



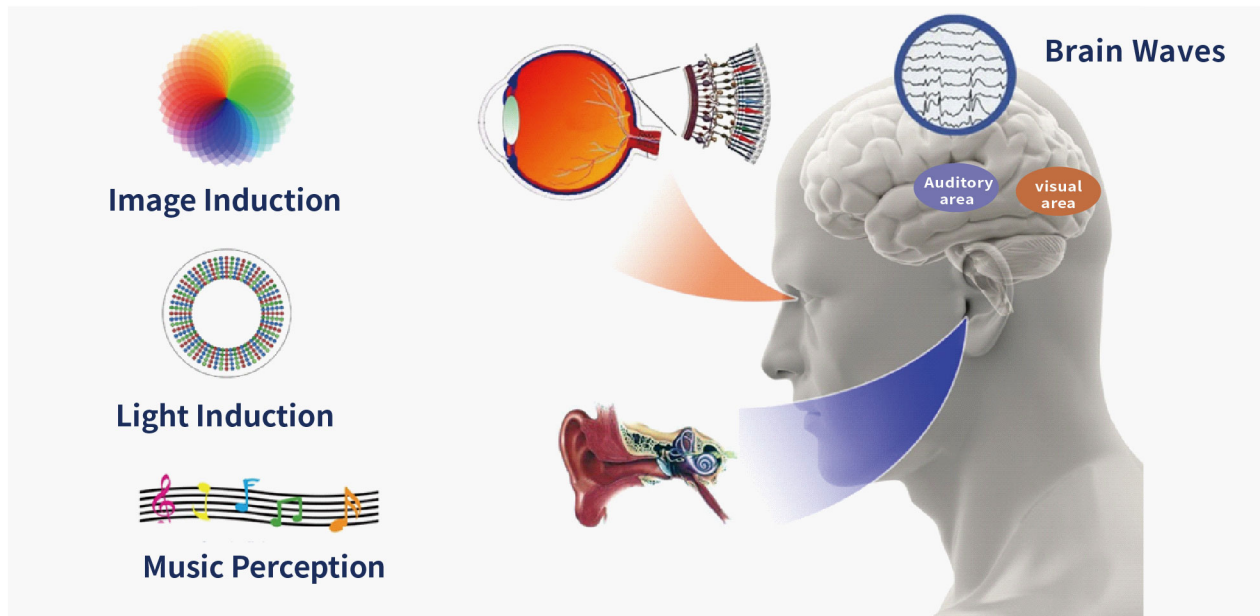
- ✓ Uses bright, contrasting colors to enhance image visibility and draw visual attention.
- ✓ Enhances the impact of psychedelic visuals using gradient, neon, and fluorescent colors

Homogeneity Principle and Brainwave Induction Technique

- ✓ The homogeneity principle states that, in music therapy, the selected music should match the emotional state of the individual. Research shows that homogeneous music produces better therapeutic outcomes than heterogeneous music. When individuals hear music that aligns with their emotions, it creates psychological resonance, enhancing the effectiveness of the intervention.
- ✓ Emotional responses to music can be broadly categorized as happy, calm, or sad. For therapeutic purposes, these are classified as positive, neutral, and negative music types.

Type	Symbol	Emotional Reaction	Effect	Character
Positive Music	+	Excitement, nervousness, energy, stimulation, alertness	Emotional relief	Fast tempo, clear rhythm, and frequent staccato elements
Neutral Music	0	Calm, elegant, relaxed, desirable, leisurely	Emotional transformation and clarity	Smooth melody, moderate pace, and balanced rhythm
Negative Music	-	Melancholy, homesickness, bitterness, heaviness, unease	Reminiscence and emotional reflection	Slow tempo, subtle rhythm, and prolonged, sustained sounds

- ☑ Brainwave induction technology is used alongside psychological resonance, employing physical stimuli such as sound and imagery to elicit physiological brainwave responses.
- ☑ Brainwave frequencies are introduced through auditory (music) and visual (animation, lighting) stimulation, guiding the brain to gradually synchronize with the frequency.



- ☑ **Example:** To help reduce anxiety, two-channel music and stereoscopic video are used simultaneously for dual-sensory stimulation. An 8 Hz frequency difference is embedded between the left and right audio channels, as well as in the depth perception of the video. These differential frequency pulses guide the brain to generate 8 Hz alpha waves, which are associated with relaxation and a sense of well-being. This approach initiates both physiological and psychological induction simultaneously, enhancing therapeutic effectiveness with greater efficiency.