INSPIRATION AND INTERPRETATION: THE EVOLUTION OF DIGITAL TEXTILE ART

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ABSTRACT

In this study texture pattern is taken as the basic unit in the digital printing project, by parametric control of operations involving wave of computer aided design software, various texture patterns are created. Discussions were made of the classification of digitalize texture patterns, and that serving as a basis for systematic analysis of variations of each parameter.

In closing, the work "Inspiration and Interpretation" is taken as an example to account for the feasibility of texture pattern as applied in the art of computer-aided system. By contrast to traditional art of hand-printed texture technique, this method proves to be more effective, accurate and versatile. The emphasis is on the interaction and dialogs between technology and culture, using computer-aided design in work creation is to use technology as a bridge between the traditional and the innovative to generate beautiful and fore-sighted interpretations in digital textiles.

1. INTRODUCTION

"*The history of every art form shows critical epochs in which a certain art form aspires to effects which could be fully obtained only with a changed technical standard, that is to say, in a new art form."* —*Walter Benjamin*

In traditional art forms such as painting, sculpture, handicrafts (metal smith, woodcraft, fiber, glass, ceramics), and even in music, an increasingly growing number of artists are using computers as tools for their creative work. The reasons can be traced back to 1984 when Apple launched its Macintosh computers, as well as the introduction of Microsoft's Windows OS for personal computers in 1990. Over the last two decades, personal computers have enjoyed rapid technological improvements in their software. Another factor was the greater accessibility of PCs as their prices became more affordable. In the academic sector, computer aided design also became popular over this period. As a consequence, computers became a seemingly active part of the creative process, and the possibilities they offer in terms of art creative concepts and methods have led to changes that can be termed revolutionary. The resulting changes in turn

altered the way viewers look at art by making possible innovative ways of experiencing art and the way they stimulated the viewing public. All these meant the emergence of new styles in visual art. In his book, Tseng Hsiao-liang said that "Art is a product of the interweaving of distinct time and space, and is limited by then prevailing humanistic and material factors…Art originates from man's way of looking at the universe and all the myriad things through the lenses of his inner soul. From the metaphysical point of view, the human soul, even after the passing of eons, and no matter how much art forms change from one to another, remains the same in substance just like the way the universe remains unchanged. Artistic creation is but a series of random reactions of man to the stimulus of living in the here and now." [1] The rise of information technology, the rapid development of optoelectronics, and the impact of ever-improving digital technology all led to more and more artists using computers as a tool for creating art. As artists in this period of time, they can best discern the humanistic and material factors relevant to their own time and space.

2. WHAT IS "DIGITAL TEXTILE"?

Digital textile art is one of the derivatives of traditional fiber art. [2] Digital textiles are textile produced with the help of computer-aided design (CAD) and computer aided manufacturing (CAM). Digital textile art developed based on mathematical formal logic, in which computers create digital signals to express abstract concepts. The creative inspiration may be a product created with the help of a digital medium, such as when traditional symbols in antique artifacts are digitally re-interpreted. The creative process used may be completed with computer assistance, such as when computer-generated graphics are made to undergo color separation prior to printing. The creative work may be printed with the use of computer-controlled machinery, such as in the case of digital weaving. These "digital textile art" done with the help of digital technology link tradition with innovation to arrive at beautiful and avant-garde interpretations that stress interaction and dialogue among technology, culture and art.

The birth of digital art is closely related to the development of digital concepts such as order, chaos, logical operation, random number, randomness, fractals, etc. In the early stages, artists employed digital technology to work on parameters such as position, shape and size in creating digital pictures. Although in the beginning, they faced much difficulties and encountered troubles while trying digital creation, patience and endless trials eventually led to better forms and methods. Gradually, the styles and forms of digital art evolved in time. The most widespread application of digital technology in

artistic creation and computerized art is in simulating traditional creative methods. In textiles, digital technology finds application in simulating analog hand-painting methods such as dabbing, dotting, line sketching, overlapping, graduated colors, blotting, moist blotting, dry brush, brush stroke, tearing, Po's-mo ink painting, spray painting, cut outs, dot pen, foam dabbing, scraping, pastel, transfer printing and other effects. Employing digital computing, other characteristics such as linearity, direction, form change, color luminosity, volume size, arrays and combinations, may be adjusted to arrive at the proper symmetry, integration, harmony, balance, proportion and gradation. The advantages offered by these digital processing translates into infinite possibilities for art creation. It allows the achievement of a highly chaotic equilibrium or an instantaneous freeze of a dialogue among diverse elements, thus differing in stark contrast from the "uniformity" and the "search for extreme simplicity" we so often see in traditional painting methods. In contrast, digital textile art is evidently much more complex, usually projecting a type of madly chaotic character that challenges visual extremes. Though its development history is short, digital art has already bore deep repercussions on the development of visual art and the culture of images. The possibility of applying another color on top of a color layer still moist to create infinite color patterns also makes digital textile products excel through a resulting kaleidoscope of colors never before imagined. Like scientists, artists employing digital techniques discover infinite worlds hitherto unheard of.

3. TECHNICAL FEASIBILITIES IN DIGITAL TEXTILE ART

The use of digital printing techniques to replace traditional screen-printing techniques can be used to illustrate how the control of high-technology stacked spectral colors makes possible an integration of pattern resolution. Here, wavelength is used as computing parameter to express color graduation from light to dark, foregoing the need to make photo negative halftone level preparation. Digital printing showcases in a futuristic way, textured space created by color patterns. In terms of rhythmic expression, methods such as those using changes in shape, color, position and quantity may be employed.

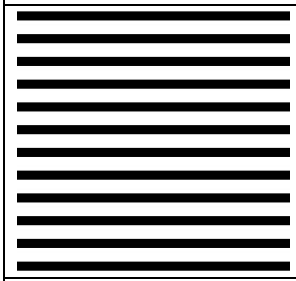
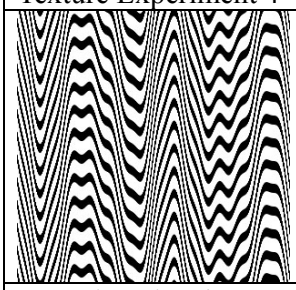
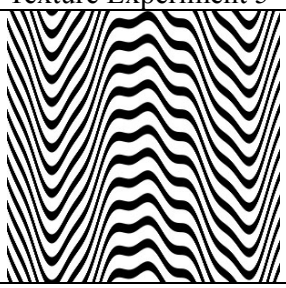
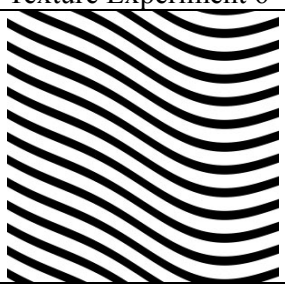
"Distortion" is a method commonly adopted in artistic expression. It makes a motif change in shape, thus giving birth to a new form. By using computer-aided systems, dimensions can be manipulated to effect a change in shape, color, position and quantity, in such a way that adds a rhythmic feel to textile art.

Contrast leads to a sense of dynamism and tension, through which they give "emphasis." With the help of computer-aided systems, "pen strokes" may be used to alter the thickness of lines and their lengths. Similarly, using color management, contrast can also be achieved in changing luminosity, color and hue, by which "accents" and "texture" are highlighted when applied to textile art.

The use of computers in art creation resembles the techniques used in traditional embroidery, which gives particular importance to "the size of the stitch, and the thread's thinness and colors," by which overlapping patches with varying densities are made. The embroiderer works to achieve "uniformity, clarity, straightness, consistency, thinness, smoothness and density." These run parallel to the digital mode, such that each stitch corresponds to a pixel. In computers, the pixels can be adjusted to the extremely small or to the extremely large. Moreover, the right color choice can be made from among 16.7 million colors available. The interpretation of texture and expression of color better illustrate the richness of the digital approach.

4. EXPERIMENT ON USING DIGITALIZATION TO EXPRESS TEXTURE

Table I. Experiment Using Wave as Media Parameter

Texture Experiment 1	Texture Experiment 2	Texture Experiment 3
		
Wave length=100 Amplitude=0	Wave length=100 Amplitude=50	Wave length=100 Amplitude=100
Texture Experiment 4	Texture Experiment 5	Texture Experiment 6
		
Wave length=1/50 Amplitude=1/50	Wave length=1/100 Amplitude=1/50	Wave length=1/500 Amplitude=1/50

From the above experiment, distortion changed the shape of the motif to end up with a new form. By using wavelength size in CAD to attain a change in form, location and quantity, it was possible to achieve accent and texture with rhythmic effects.

5. ANALYZING THE APPLICATION OF DIGITAL TECHNOLOGY ON TEXTILE ART CREATION FROM THE PERSPECTIVE OF TRADITION AND INNOVATION

Research on digital textile art includes analysis of traditional hand drawing methods, of concepts on what CAD can innovatively do in making a pattern, and of comprehensive art presentation strategies and studies of its methods. In addition, its theory of art must be integrated with concepts in artistic undertaking, in addition to putting the essence of traditional culture into good use.

5.1 Taking A Qing Dynasty Silver Bracelet as Source of Three-Dimensional Pattern

Using CAD, a three-dimensional silver bracelet's design is applied to textile art, developed and studied. With the use of a scanner, the design is first abstracted, then transformed, analyzed and integrated to obtain a planar Eight Immortals pattern good for textile printing. The analysis of this transformation from a 3D image to a planar design can be applied to generate a contiguous pattern derived from "ancient artifacts." Continuous picture-taking of the item can be done without harming the artifact's surface, aided by computer-assisted connecting function. This is a departure from the tracing method traditionally used for lifting continuous patterns from artifacts. Furthermore, it also allows reading and analysis of contiguous patterns on artifacts with very small dimensions.

In this experiment, a Nikon-FE2 SLR camera equipped with a micro-lens capable of close-distance picture-taking is used. The 3D bracelet is marked all around with 1-cm. rainbow-colored strips that could serve as connecting references once the pictures have been taken.

Then the obtained pictographic data are further analyzed by first directly scanning them into the computer, before being presented in nearly-planar rectangular forms. Results of the analysis are later expressed as black-and-white patterns showing the relief design on

the silver bracelet. By thus using the processes of transformation, analysis, and integration, the 3D Eight Immortals design is expressed as a planar textile printing element.

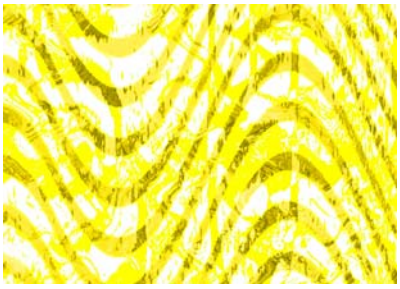
5.2 Experiment on Creation and Design Transformation

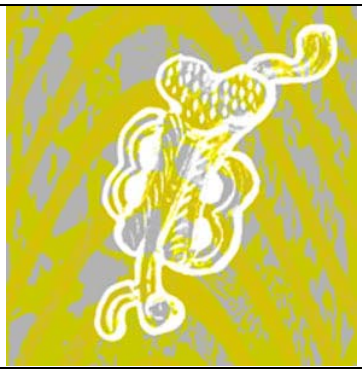
Table II. Design Flowchart for "Inspiration and Interpretation"

Finding the bracelet's central axis	→	Calculating a symmetrical reference diagram	→	Deciding position and dimensions of the expressed pattern	→
Integration of the 14 pictures	→	Connecting and refining of the pictures, and its planar expression	→	Calculation & documentation of the error of the planar expression	→
Analysis and drawing of the planar expression	→	Texture Experiment using Wave as medium parameter	→	Integrating texture experiment 3 and drawing	

Table III. Design Transformation Flowchart for "Inspiration and Interpretation"

The simplification and integration processing		
1		Taking a Qing Dynasty silver bracelet as reference
2		Realistic photography method, with the 3D bracelet being marked with 1-cm. rainbow color patches. This was done for easier post-photography connection of the pictures.

3		The planar expressed “hidden” Eight Immortals pattern.
4		The Eight Immortals were represented by symbolic elements, such as a fan representing the immortal Han Chung-li, a sword representing Lu Tung-pin, a fish symbolizing Chang Kuo-lao, castanets for Chao Kuo-chiu, a gourd for Li Tieh-kuai, a flute for Han Hsiang-tzu, a flower basket for Lan Chai-ho, and a lotus flower for Ho Hsien-ku.
5		The inspirations derived from these auspicious symbols, the “hidden” Eight Immortals, are expressed as abstract concepts and emotions, in away resembling the Fulushou (Good Fortune, Honor, and Longevity) deities often depicted through auspicious language and symbols in Chinese art.
6		Using Wave as medium parameter, the pattern is made to attain graduated texture.
7		Finally, in Experiment 3 (using a wavelength of 100 and an amplitude of 100), a definite textural effect was derived for “Inspiration and Interpretation.”

8		A definite textural effect was derived for "Inspiration and Interpretation."

The simplification and integration proceeded through the following steps: (1) Realistic photography method, with the 3D bracelet being marked with 1-cm. rainbow color patches. This was done for easier post-photography connection of the pictures. (2) The 14 pictures were joined, guided by the rainbow markers, before planar expression. (3) The planar expressed "hidden" Eight Immortals pattern. (4) The Eight Immortals were represented by symbolic elements, such as a fan representing the immortal Han Chung-li, a sword representing Lu Tung-pin, a fish symbolizing Chang Kuo-lao, castanets for Chao Kuo-chiu, a gourd for Li Tieh-kuai, a flute for Han Hsiang-tzu, a flower basket for Lan Chai-ho, and a lotus flower for Ho Hsien-ku. (5) The inspirations derived from these auspicious symbols, the "hidden" Eight Immortals, are expressed as abstract concepts and emotions, in away resembling the Fulushou (Good Fortune, Honor, and Longevity) deities often depicted through auspicious language and symbols in Chinese art. (6) Using Wave as medium parameter, the pattern is made to attain graduated texture. Finally, in Experiment 3 (using a wavelength of 100 and an amplitude of 100), a definite textural effect was derived for "Inspiration and Interpretation."

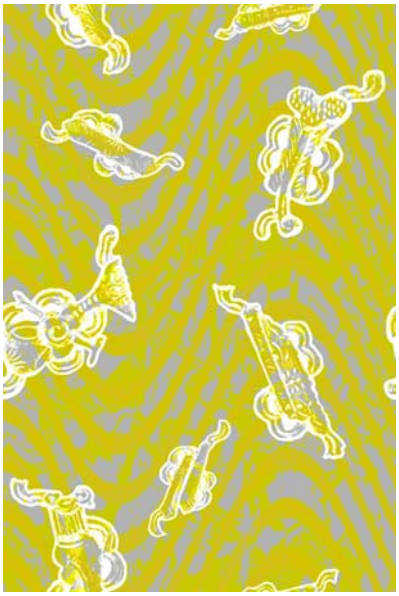


Figure 2: Art Work of Inspiration and Interpretation

Figure 3: The installation of Inspiration and Interpretation

This attempt to obtain a pattern from an object using high-precision computer methods to a certain extent runs parallel to a scientist's search for truth and an artist's pursuit of beauty. Through digital technology, textile art is enabled to fully preserve essences embedded in tradition. It represents a respect for tradition, and shows humility in the face of traditional culture, while pursuing artistic creation. Such digital works of art

achieved through digital technology enjoy their place as a novel art within textile art itself.

6. CONCLUSIONS

In these times of continued scientific progress, notably in the information industry and digital image technology, we must re-examine the future development of culture. In these times, the communication of concepts and ideas, as well as their expression, are carried out through digital media (such as digital image, electronic mail, websites, etc.). In the future, we expect to see how the digitalization of all information will usher in the arrival of the full digital age.

Aesthetic experience may either be external or internal. An external aesthetic experience mainly involves cognition and knowledge structure, method of expression and symbolic form. In contrast, internal aesthetic experience is mainly based on form, that is, such elements as lines, shapes, colors, symmetry, rhythm, balance and repetition. Art and technology share identical expressions of internal forms, most especially in mathematical expression. From the perspective of form, mathematics seeks for the commonality between experience and cognition, and is mainly involved in creating laws on compositional principles. Mathematics' random system creates the unpredictability well utilized in digital technology. Many computer art creations utilize this unpredictability in achieving surprise elements.[3]

Digital textile art is a novel form in the art of textiles. No longer emphasizing a purely handmade characteristic, digital textile art instead pays attention to the common value of viewing art from the angle of interpersonal communication. The artistic value, or lack thereof, in any new art is decided upon by how much viewers identify with its styles. Visual taste is subjective and is often dictated by feelings, for which it is difficult to calculate. However, it is largely dominated by certain cultures. Within such cultures, information culture and digital image technology constantly undergo renewal. Digital art possesses three cognitive structures or modes of expression: ability to seek order amidst chaos, feasibility of creative continuity, and resource-sharing. In fact, even the experience of interior beauty is what digital art wishes to probe and present. The resulting new artistic forms are expressions of tastes that should best reflect common values.

7. REFERENCES

1. Tseng, Hsiao-liang. “Tradition and Innovation: The Myths of Modern Art”. Taipei: Sanyi Cultural Publications, pp. 23-25, 2002

2. Huang, Li-chuan. “A Probe into Contemporary Fiber Art”. Taipei: The Artist, p.6, 1997.

3. The Development History of Computer Art and Its Significance in Our Times, p. 16. http://www.arts.nhctc.edu.tw/ARCR/Ch1.html

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