

Repetition And Difference In Nature: An Interpretation Of Plants' Pattern Mechanism Structure Through Installation Art

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Abstract

This research project reinvestigated the aesthetics of plants patterning formation through the exploration of design element and principles based on the concept of repetition and difference (similarity and variation). This natural mechanism of plants' organic patterning system, provides constructive balancing movement and harmonious interrelationship, revolving similarity and variation, unifying the order and chaos in plants' mechanism. The key artists within the research context were Jackson Pollock, Yayoi Kusama and Giulia Ricci who dedicated their passion in portraying the beauty of repetition and difference/chaos in their visual artworks. The project established correlations between repetition (similarity) and difference (chaos) as they contribute to the unity within variety. It also contributed to the field of painting and installation art by creating visual impact through the manipulative organic images and complexity in the designed compositions, significantly once again stimulate viewer's admiration and amazement to plants' mechanism structure in nature.

Keywords: natural organism, phyllotaxis, repetition, difference, patterning system, order and chaos, installation art

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Introduction

In the plants world, pattern is everywhere. Repetition and difference are partners in this phenomenon of patterning mechanism and sustenance system, keeping the system in unity and harmony. It is the continuity of growing gesture and movement sustaining the balance and harmonies of their livelihoods and cycles, as described by Power (1999), 'Nature is not just about objects; it is also about systems and the shifting relationship between an object and its context' (p. 31). All patterns of repetition consist of characteristics of changing. They are all different because each repetition itself is a new form of the genetic generation, developing various possibilities in division and distribution of proportion, promote movement and changes of

unit pattern, forming "chaos" and variety in the order, bring forth rhythm and unity in diversity.

Repetition and difference, in another words, is order and change, regularity and chaos, their relationship and interrelationships allows groups of features in their own genetic organic organisation recur throughout space, units extended in space; it is a cyclic of repetition in motion, creating rhythm and balance to the system. The form of pattern is of regularity, but different on each individual breakout or chaos, and possess slight variation between individuals. Plant formation in the nature may overall appear same and repetitive to us; however, the chaos and changes that occur in each individual repetition is the beauty generated and integrated within the nature of regularity and repetition.

Project outline

Through the mixed medium of digital design, printing and painting on canvases, this research has explored and examined the aesthetic characteristic of plants organic patterning. The research has involved investigating the concept of repetition (similarity) and variation (changes) found in the natural plants patterning formation, portrayed how repetition of units can be in unity and harmony even though each of the unit is singularly a chaos and different, derived from their own rhythm through each relationship and interrelationships, echoing one another.

The approach of manipulation, integration, juxtaposition and intersection of unit organic image were the major aspects in making the artwork process. Through the computer-generated instrument, images were manipulated and modified, later reorganized to achieve harmonious shape combination for repetitive arrangement. Visual elements are extracted and abstracted within the work.

The aim is to create a series of art work that reflect the amazement of natural plants' dynamic living pattern through the form of repetition and difference, in which viewers will visually experience the mass-produced images' interaction and manipulative visual illusory movement of repetitive images in complex variety of juxtaposition, and also see how these art works represent the phenomena of chaos and unity. The project is concerned with the idea of the aesthetic aspect on plants' mechanism patterning, represented as follows:

- To construct and address the visual aesthetic based on the conceptual principle of difference and repetition, work within the context of natural plants' organic patterning and mass-production utilising image (unit design) derived from the plant organism pattern.
- To create a metaphor of repetitive visual experience with images in multiplying changing juxta positioning, generating illusory visual movement through complex visual installation.

Related theoretical ideas

Regularity and changes: Natural pattern characteristics

Pattern is a form of repetition, it is the reason why form and structure in nature is balanced and harmonised; it exists everywhere in nature, one echoing the other, supporting one another to repeat in each of their own inherited natural characteristic. Natural pattern allows groups of features in their own genetic organic organisation to recur throughout space and also extended in space; this extension of element units, are of regularity and similarity but not identical.

Regularity and repetition is reliant on differences and changes in its opposition and resemblance. Repetition by itself is an infinite return to itself, a fashion consisted of its comprehension that extends to infinity. However, in the repetitive formation order, each individual element unit is self-identical due to genetic organic patterning; as a whole, extending dynamic rhythm that gives lives to order. In relation to such rhythmic repetitive effects, Jackson Pollock's irregular drips of colours and spontaneous repetitive painting gesture has produced great works such as "Blue poles", strongly suggested the ultimate balancing force of repetition the 'order' with the 'chaos', their differences within its repetitive movement, defined by Ball (2007) 'compromise between forces that impose conflicting demands' (p. 180).

Pattern-forming systems in nature are compromising systems that balance themselves between regularity (order) and changes (disorder). Within these systems, each living component is conflicting in growth with competing forces and symmetry breaking within their uniform, processing random engenders of size, shapes and colours within the system of patterning. In other words, repetition generated similarity, a sense of equilibrium, rhythm and balance accomplished by its unique arrangement of harmonious sequence or correlation of componse, unifying the differences in the system.

Every repetition is singular and the transgression makes every single 'repetition' different, although pattern-forming mechanisms in every natural species are structured, the pattern features have resemblance and are similar to one another. Gilles Deleuze (1994) stated how regularity and repetition is reliant on differences and changes in its opposition and resemblance:

However, these determinations are precisely only the figures of repetition: space and time themselves are repetitive milieu; and the real

opposition is not the maximum of difference but a minimum of repetition – a repetition is reduced to two, echoes and returns on itself; a repetition which has found the means to define itself. Repetition thus appears as a difference without a concept, repetition which escapes indefinitely continued conceptual difference (p. 13).

The beauty of the integrations and collaboration between difference and repetition in plants mechanism system is its routine of keeping order and generates rhythm and unity; the two are inseparable and profoundly generating their own rhythmic flow ‘from one wave and one gesture to another, and carries that difference through the repetitive space thereby constituted’ (Deleuze,

1994, p. 23).

Rhythm is generated by repetition in motion and chaos emerges in the interacting process of gradation and radiation, in a rhythmic sequence and system of order. Whether it is of mathematical notion or simultaneous inclined, each unit is consistently repeating and disguised within one another, ‘they go on being produced in a rhythmic sequence, and consequently, in the course of time, come to present a definite pattern’ (Cook, 1979, p. 81) Such illusory movement and dimension manifested the beauty of organic patterning and networking; empowered by the opposition between the positive and the negative space or plane, between sizes and habit of interrelationship.

Related art practice

Jackson Pollock



Fig. 1. Blue poles. 1952. Oil, enamel, aluminum paint, glass on canvas. 212.1x488.9cm. National Gallery of Australia, Canberra.

Jackson Pollock's visual aesthetic was always of repetition and chaos. His signature style of expressive abstraction, used simultaneous irregular colour trips creating sense of chaos within the rhythmic repetitive accidental painting effects; according to Taylor's (2006) description, 'these artists clearly noticed the recurring patterns of nature and were inspired to try to replicate them, these artworks are symbolic representations of fractals'. He argues that "Blue poles" (Fig. 1) is an example of a fractal pattern, as we look closely on the drips of colours and spontaneous repetition he created for this piece. It's obvious that there is repetition of basic form of fractal pattern of branches and leaves. According to Muir (2015), Taylor in fact claims that the aesthetic pleasure we might get from looking at Blue poles "is a result of its chaotic forms, and the way that this resonates

with a basic human preference for the chaos of nature over the order of culture."

Yayoi Kusama

The visual impact of repetitive visual elements depends on scales and mass-production to exaggerate the desired complex optical effects. Yayoi Kusama's hallucinogenic works, is obsessed with repetitive polka dots, suggesting repetition in mass form covers everywhere she can reach within boundaries, through infinite space. Kusama constantly stimulate viewers with mesmerizing visual experiences with her everlasting illusory display of one single element – dots; the beauty of all her complex visual impact came from the consistency of repetition itself, and variety of scales and colours actively move in orders

suggested with rhythm and balance within the movement.

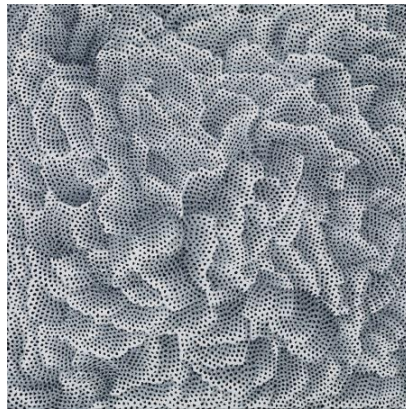


Fig. 2 Yayoi Kusama, INFINITY NETS (MAE) , 2013, Acrylic on canvas, 130.3 x 130.3 cm

Kusama's Infinity Nets (Fig. 2) series have demonstrated the inseparable equilibrium among space, points, repetition and intersection; moving and grouping of dots and marks, organized yet composed freely across the canvas, order and

chaos are together, shifting up, down, left, and /or right, repeated and different, tensioned and relaxed. Kusama's art works actually remind us of the patterning mechanism in the natural organic world.

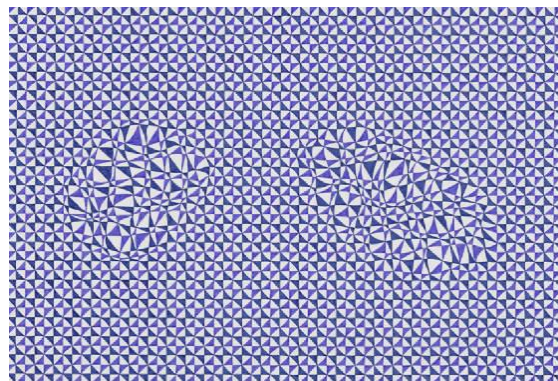


Fig. 3 Giulia Ricci, Order / Disruption 31, 2011

Giulia Ricci

Giulia Ricci (2011) explained her works and how she managed her working process to achieve her aesthetic in the idea of repetition in pattern and chaos, 'The basic structure of my work consists of grids of isosceles right triangles. I arrange, modify and distort their configuration using repetition, rotation, mirroring and other compositional methods.' Giulia further described, 'I create multiple focal points through the repetition of triangles within the grid structure and through the ambiguity between figure and ground.' She is determined to 'achieve a balance between systematic rigour and the accident that can interfere to modify the sense of order', which she expressed her concerns that 'geometry, order, disruption, repetition and how the individual unity fits into the pattern' (Valli & Ibarra, 2013, p. 224).

Giulia Ricci expressed her obsession with patterns and constantly used geometrical shapes and rules in her paintings, dealing with order and disorder. She emphasized, 'I have been influenced by things like the Pattern and Decoration movement. I guess these diverse influences somehow reflect the two opposites that I am trying to explore: order and disorder. Order being a controlled and distanced approach, and disorder being the more unpredictable side of experience' (Jaray, 2012, para. 8).

The studio investigation

The research was undertaken in the form of the focus on investigating the concept of repetition and difference in the system of plants' patterning order and disorder. The studio experimentation began

with an initial plan of developing design ideas through a selective organic image. An image of internal organic pattern of a cabbage was chosen to be my design pattern unit to be developed into a series of changes within repetitive composition.

The project began with the idea to create a painting with images designed from a selective organic

image and the natural repetitive structure to manipulate the design composition. It was not an easy process to choose from various plants from photo images and from internet research; after much searching, I found the closest organic form to represent my ideas of repetitive and genetic phyllotaxis formation in plant, and that is the Cabbage (Fig. 4 a, b, c).

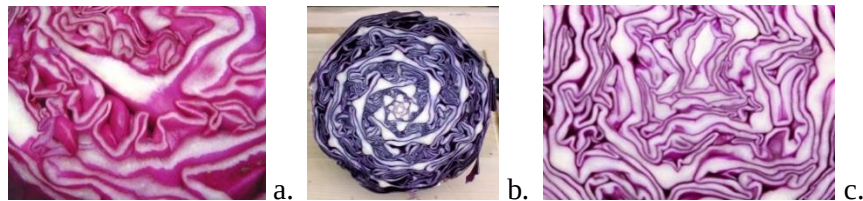


Fig. 4 a, b & c Picture references of cabbage

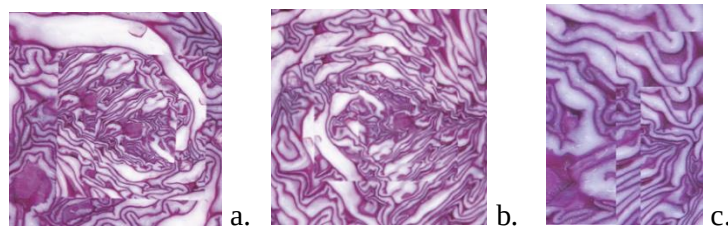


Fig. 5 a, b & c Examples of different design compositions through photoshop manipulations.

Through exploring ways of manipulating and reconstructing the selected images through Photoshop practice, I learned to develop integration and juxtaposition of composing the patches of selective cropping, reconstruct and reorganize forms and combination of forms (Fig. 5a, b, c). However, they were not chosen due to the lack of creative potential in further visual

development that would lead to possible visual impact on the concept of Repetition and Difference/variety. After much trial and attempts to secure my ideas, my final decision was to select 6 divided portions from the selected picture of the cabbage (Fig. 4c), as unit designs for further development (Fig. 6) to generate further composing and reorganizing.



Fig. 6 Combination of 6 unit designs from chosen cropped components of the cabbage image

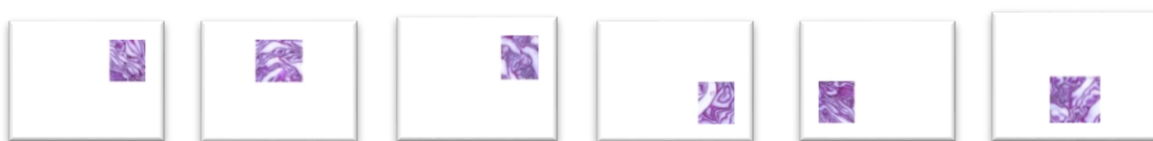


Fig. 7 6 unit design components in various juxtapositioning



Fig. 8 Examples of compositions and juxtaposition of the 6 unit design

To generate these 6 design components to form various design composition demands time and careful records of every change and movement of each change, and the development of changes must be in sequence. Each time one unit move to its right, the others will move together; this routine will continue for each unit to move and replace each other's position till each takes up every new placement (Fig. 7). Then I continued to manipulate the juxtaposition of the 6 design components

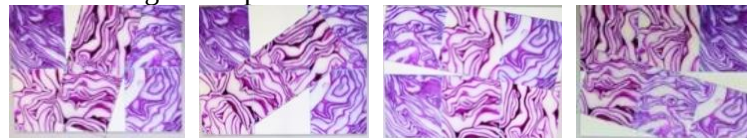


Fig. 9 Example of new composition created by flipping rows of design up-side-down, left-to-right, and various directions, through Photoshop manipulation.

Inspired by Yayoi Kusama who is constantly obsessed in creating illusory facts of continuity and ideas of infinity with her famous repetitive dots and her well-constructed or random and spontaneous distribution of design composition (Fig. 2), I decided to develop my ideas in creating

created for the earlier phase (Fig. 8), through Photoshop to form multiplying changing composition, switching placement and position in various directions, rotating or flipping, moving to left and to right, top to bottom column, reverse composition and so on to observe various possibilities (Fig. 9). More than 100 different arrangements and juxtaposition were explored and created through Photoshop application.

an impactful visual outcome of Repetition and Variety, to the extent of huge space occupation and multiply scale of repetitive works that can evoke mesmerising visual impact: an illusion in movement and in depth.



Fig. 10 Sample of digital print on canvas

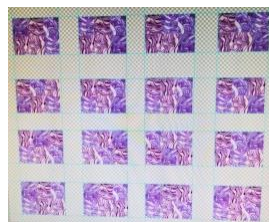


Fig. 11 Computer-generated design panels positioning for digital printing onto canvas

I began to consider how my 100 pieces of panel design can be materialised in a massive manner; I first started with hand painting the designs on small canvases. It wasn't successful due to inconsistency and accuracy of images and design repetitions. Later I decided to appoint digital printing service to assist in transferring each

design images on canvas (Fig. 10), in grey tones; each digital print is 16 panel designs on one 5 x 4 feet canvas (Fig. 11), 7 printings on canvases in total for the whole project. Each and every print-out panel were to be stretched on wooden stretchers, sized 10 x 7.5 inches for each panel.



Fig. 12 Examples of experimentation on black-and-white unit design



Fig. 13 Final decision and selection for black-and-white panel design unit

After settling on each panel's composition, I had to select the right shapes within each panel so that as a whole, there is some sort of focusing repetitive design unit to lead the overall visual optical

illusion effects of movement and rhythm. I was finally satisfied with one set of shapes selection for the unit composition (Fig. 13) after several dissatisfied attempts and trials (Fig. 12).



Fig. 14 Sample of experimentation in exploring colour combination using neon colours



Fig. 15 Sample of experimentation in exploring colour combination using gold, black and white colours

Due to the consideration of displaying massive amount of small panel canvases on wall with complex colour combination may visually distract, two of the experimental colour combinations using neon / fluorescent colours (Fig. 14) and gold, black and white (Fig. 15) were used. Both of the combinations were not acceptable because the visual effects were not harmonious and were overall rather confusing. To avoid complication of possible messy visual outcome, I chose to apply only black and white for the selected printed designs on each panel canvas (Fig. 13), so that they stay simple with the repetitions and effectively generate visual movement and rhythm as a whole.

The next challenge then was when I needed to consider the right colour materials that are suitable and best support the desired visual outcome. As I have decided to use digital print for the panel design on canvas, I realised normal acrylic paint is rather difficult to apply on the printed surface on canvas. I later experimented on various paint materials and found out that rubber dye is thick and assessable on printed canvas, so I painted all selected white shape patches with white rubber dye. Besides painting black rubber dye on black shapes, I used Japanese Sakura marker that comes with a very black oil-based ink which served very well on drawing fine lines, outlines and edges for black colour shape patches on canvas.

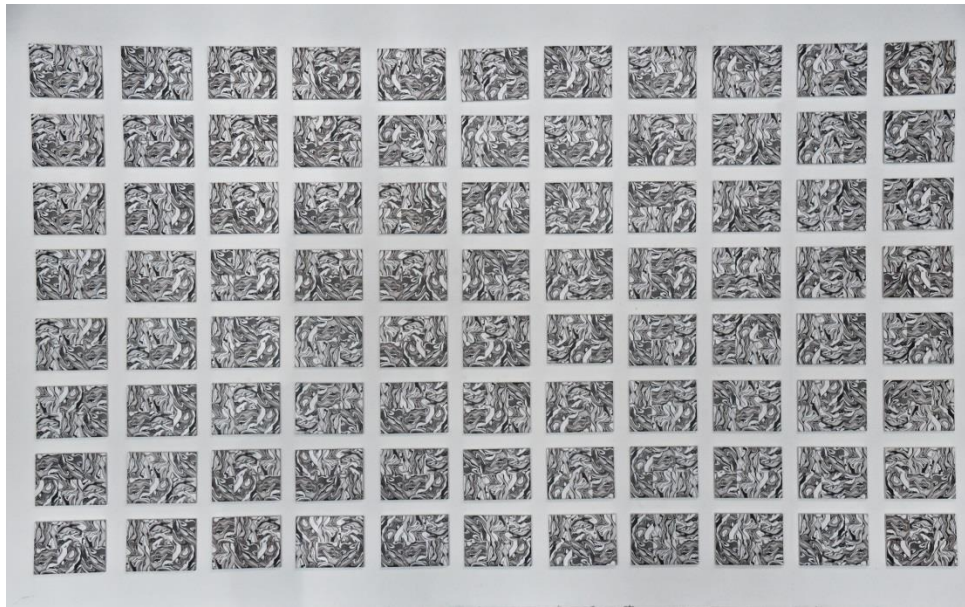


Fig. 16 88 Dancing Echoes

The final part is to complete my painting on all panels for installation (Fig. 16). Overall, it required a wall of approximately 8 x 11 feet or wider with a space approximately 4 - 5 cm between each panel. The visual outcome of the work is to create a dynamic visual impact to the viewers in experiencing the optical illusion of rhythmic movement; experiencing the sense of infinite changes or chaos within the massive repetition of organic genetic formation while enjoying the fascinating internal changes of each design unit's repetitive configurations changing position within the whole body of works, forming a large repetitive formation of massive interaction.

The visual interpretation of the installation piece is the completeness of pattern moving on its own intrinsic formula of repetition and difference, scaling in sequenced proportion, and expanding to form planes and negative space, and at the same time generating infinite changing forms within a repetitive formation. All of these characteristics of repetition and differences ruling in plants' patterning resulted in obtaining visual illusion of dimension, depth and movement, which manifested the rhythm of order and chaos in the whole livelihood of nature. This order and chaos, in transgression, formed depth in movement, determined never ending changes within the interrelationship of the repetition itself; simultaneously, the installation pieces elaborating the possibilities of visual concept of infinity and endlessness.

Conclusion

The work has explored strategies for the representation of the use of magnified pattern images extracted from natural plant. The repetitive mechanism in large and complex composition aimed to evoke illusory visual impact to the viewers; It has been employed as an art practice that reveals how repetition and variations generate a sense of balance and harmonies within patterning formation of the natural plant world. The work also established correlations between the principle of repetition, similarity and variation, applied on the idea of representing plants' organism pattern and its various constructive mechanisms. This mechanism kept the order and chaos in a rhythmic harmony and in unity. Through representation and exploration of repetition and variation, this project provides a visual account of why we celebrate and enjoy the ideas of the plants' self-govern balancing pattern in a rhythmic sequence, manifesting the infinite harmonies in nature.

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