

Composition in Media Facade of Narrative Subject Based on Colour Psychology

Linwei Fu, Jiani Zhou, and Tae Soo Yun

Department of Visual Contents, Dongseo University, Busan, South Korea

Email: {flw0819, mooses472530, yntaesoo}@gmail.com

Abstract—In this paper, we propose to interrelate the scene's colour composition design of media façade with colour psychology, to intuitively reach a more expressive form, richer artistic value, and enhance its narrative ability. It can also solve the problem of visual fatigue caused by the excessive colour of the media façade. With the advent of media facade technology, is getting widely used in the field of media technology as a ubiquitous technique. Due to the influence of the external environment, the content is mainly displayed to the audience through various basic colour pattern transformations. However, the case of the narrative media facade is often endowed with certain artistic value and thus is more acceptable to the public. Therefore, how to use a single colour transformation to express the narrative way as delicate as a movie is a problem worth exploring. Aiming at this situation, this paper analyzes the influence of colour psychology on the production of media façade to enhance its narrative. Through the comparison of two cases with the same attribute at different times, the common feature of colour composition is expressed in time conversion and seasonal changes.

Index Terms—colour composition, colour psychology, media facade

I. INTRODUCTION

There is variant of buildings in order to form the city's external environment space, static buildings can no longer meet people's aesthetic needs in this digital era. Yet, media facade can change the appearance of buildings in least time while maintain at lowest cost, and generate new aesthetic values. Therefore, it has been widely used in urban development [1].

With the skyrocketing development of electronic technologies, lighting and facade technology, modern architecture has begun to convert into part of media, and the facade of the building has become one of it for information dissemination [2]. Driven by the commercial purposes, electronic screen advertisement had completely covered the original facade of the building at the end of the 20th century. Electronic screens began to encroach on the facade of the building. In many commercial city squares, the area of advertising screens has even exceeded the area of traditional building facades, and media facades have been derived from such environments [3]. But based on the same background and technical

means, the media facade is difficult to separate from the electronic advertising screen.

With the development of LED technology, the colour choice of the LED media façade depends entirely on the design intent. When choosing LED for architectural exterior lighting, the owner or designer will choose the effect of discolouration. The pictures are transformed into high-purity picture graphics as the main content [4]. Although the rich colour images can quickly attract the eye, blindly pursue rich colour changes, using a large number of high-quality colour combinations will not only cause serious light pollution, but also damage audience's eyes. While the chaotic colour structure will accelerate the aesthetic fatigue of the audience and undermine the value of media façade in aesthetics [5].

The first section of this paper introduced the current development of media façade and the problems that need to be solved. In the second section, based on the literature research, the practical application of colour psychology in picture design is analyzed, and the research value of narrative media façade is explained. In the third section, the paper proposed the dialectical relationship between colour psychology, colour composition and narrative media façade, and explained the paramount methods of colour composition analyze in the paper. The fourth section demonstrated the viewpoints in this paper through the analysis of actual production cases. Based on CIE 1931 xyz diagram's theory of dynamic range of film and television colour, using the Davinci Resolve colour software to extract colour information in picture, analyzed the overall colour composition and discussed via comparing the colour brightness, intensity and other information in the picture.

II. RELATED RESEARCH

A. The Application of Colour Psychology in Picture Design

Colour psychology studies colour acceptance and application of the laws of science, and its perspective, art anatomy together forms the basis of the theory of art [6]. The study of colour psychology began in the early 20th century. Researchers found that people have different preferences for different hue, and the change of colour saturation is the key factor affecting people's preference for colour. Lightness has less influence on preferences. Hue played a minor role in this respect [7]. Through

analyzing the different feelings brought to audience with colour saturation changes, colour psychology can be applied to the design of colour composition.

Visual organ receiving external stimuli shade, while colour will automatically evoke brain-related memory traces, and the immediate past colour and visual experiences linked together, through analysis and comparison, imagination, judgment and induction activities, the formation of new physical and psychological experiences or new ideas, the creative thinking process, is so called the “colour association” [8]. Reasonable use of this colour association can achieve the purpose of expressing story content through different colour combinations.

In film production, colour composition is one of the crucial parts of the film story narrative. The filmmakers use colour as the constituent element of the film modeling language, reconstructed the image and made it participate in the drama. This is called the film colour language [9].

As a modern art with comprehensive vision and hearing, the film has a strong narrative ability, and the film director usually applies colour language when choosing the colour composition of the picture, and it is also the main way to promote the development of the movie story [10]. Although media façade does not have the complete picture effect of a movie and picture composition is relatively simple, but it can reach a solid narrative ability through a reasonable colour language.

B. Media Façade's Narrative

In the theory of the Japanese urban scholar Ashiara Yoshinobu, the advertisement belongs to the “second outline”. Ashiara Yoshinobu referred to the original appearance of the building as the “first contour line” of the building. The form formed by the protrusions and temporary attachments of the building exterior wall is called the “second contour line” of the building. The electronic advertising screen, as the main cover of the city’s “second outline”, occupies most of the outer surface of the city’s buildings [11]. With the advent of electronic display screen technology, the form of urban advertising has also changed from a state of separation from the past to a building, to a form that combines with the facade of the building, and the content of the screen has also transitioned from static to dynamic, which has prompted the emergence of the media façade [12].

The media façade is a comprehensive system that covers architecture, art, media content and lighting. In the whole system, media information mainly depends on lighting or optical imaging technology. The perfection of LED technology satisfies various details performance requirements of the media façade, making the media façade independent from the electronic advertisement, obtaining more forms of presentation and much rich content presentation [12].

Although media façade used screens to display media content, yet it does not have high-pixel image capabilities, people often confuse it with ordinary electronic advertising board. The independent media façade should have higher usage value than electronic advertising, and the artist’s artistic performance quality is its highlight

feature. A media with certain story can better express the designer’s intentions and have higher artistic value. It is the key point to make a media façade different from ordinary electronic advertisements [13].

III. RESEARCH METHOD

According to related research, we propose that colour psychology, colour composition and narrative media façade is a complementary relationship. As shown in Fig. 1. First and foremost, the narrative media façade requires colour psychology as the theoretical basis to obtain a much more complete storytelling ability. Next, colour psychology can determine the colour composition of the picture in the media façade. Different colour compositions are the main expressions of the media façade narrative.

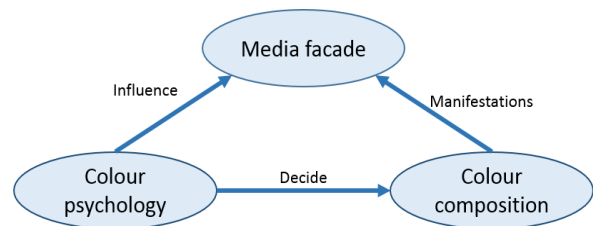


Figure 1. Case analysis diagram.

Based on the colour composition in the successful cases, this paper analysed the expressions of colour psychology with the theme set by the case. How to convey the story content that needs to be expressed to the audience through reasonable colour matching, to ensure media façade can get rid of the single colour change form in electronic advertisement and have more immerse narrative ability.

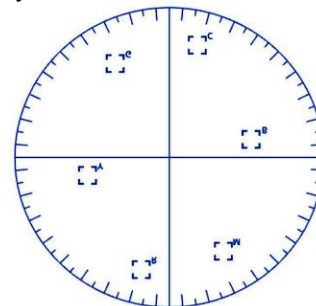


Figure 2. Davinci's colour vector diagram.

In order to extract the colour saturation information in the picture, this research used the colour vector in Davinci. Vector oscilloscopes measure the hue and saturation of an overall oscilloscope in an image. The measurement is relative to the centre scale and can be overlaid on the oscilloscope to provide a reference through the crosshairs. Davinci Resolve's vector oscilloscope simulates a drawn graph, with 75% of the colour bar target indicating the angle of each major and secondary colour around the edge of the graphic, and a skin tone reference scale (saturated colour will be displayed outward to the edge, while low saturation, the colour is closer to the centre of the vector, and the centre of the circle represents 0). As shown in Fig. 2., judging

that the vector oscilloscope protrudes at different angles, various tones can be perceived in the image, and the angles of the display indicate which colour they are.

IV. CASE ANALYSIS

A. 2016 Deoksugung Seokjojeon Media Façade Introduction

In May 2016, Yonsei University professor Kim Hyung-soo, the artistic director, presenting a video piece reflecting the historical location and architectural characteristics of Seokjojeon under the theme of “Imagination of the Romance and the Romance of the Stone Age,” wearing a three-dimensional sound and “clothes of Light” on Seokjojeon as the subject of the historical and architectural characteristics of Seokjojeon. This event held at Deoksugung Palace, the symbolic space of modern Korean history, expands the base of cultural enrichment by making cultural days more abundant.

B. Theme 1: Traces

The theme takes the vicissitude history of Desheng Palace as the background, and through different scenes, respectively expresses the story line of Desheng Palace from glory to dilapidation to rebirth, and finally to create glory in rebirth. The whole theme is composed of colour transformation. Even if there is no written narration, it also brings a strong narrative experience to the audience. The theme is very successful in using colour to express the picture language. As shown in Fig. 3.



Figure 3. Main screen display in the traces theme (ABCD are the background of four different scenes).

As the beginning of the theme, red with high purity and brightness appeared, supplemented by yellow in sense A. From the colour vector diagram and CIE colour distribution diagram, the colour information in the picture is relatively single while it presents high brightness. In colour psychology, the use of warm colours such as red and yellow will bring warm and active atmosphere to people. The large-scale use of red has rendered a supreme authority of ancient imperial household and the glorious history of Desheng Palace representing imperial power at that time.

In the following scene B, all the warm colours are gradually weakened, and the picture presents a single black-and-white basic tone. According to the light-dark

purity analysis in the vector diagram, the whole picture only needs high-brightness white and widely distribution. In colour psychology, the use of black and white pictures to convey depressed and lost emotions, coupled with the effect of broken and fallen stones in the pictures, can accurately convey to the audience that Desheng Palace has a glorious and dilapidated depression history.

The third scene is based on scene C, adding a small amount of green and blue, and the picture becomes mainly cold colour tone. The CIE colour distribution map shows that green accounts for a large proportion of the picture, green represents vitality, and blue represents quietness and tranquility. This picture composition is a transition process that conveys the process of Desheng Palace waits quietly in dilapidation, till it gradually sprouts new vitality.

Scene D, the last scene of the theme, adds a small amount of red and yellow on top of scene C. By comparing CIE colour distribution maps, it is obvious that the proportion of red system is significantly increased, and according to colour vector maps, it can be seen that the purity of red and yellow is higher than that of the rest of green and blue. By means of colour purity changes, and the picture changes from cold tone to warm tone again, which indicates that Desheng Palace is reborn from broken state and will soon return to the moderns expressed in Scene 1.

TABLE I. COLOUR ANALYSIS CHART

	Vector	CIE xyz diagram
Sense A		
Sense B		
Sense C		
Sense D		

As shown in the Table I, the colour composition information extracted in Davinci. The theme is divided into four scenes. The left side is the colour vector in each scene, showing the saturation of each colour in the picture. Refer to the description in Fig. 2., the right side is the CIE xyz colour distribution diagram, which mainly

displays the colour composition in the picture. In the triangle range of YRGB, the missing part indicates that there is no corresponding colour in the picture.

The tone of the picture on this theme experienced a process from warm to cold, and invert from cold to warm gradually. This is similar to the development of its story in the article. The use of warm and cold tones in combination with light and shade differences in colour can accurately express the complete story to the audience. Moreover, in the final scene, the high purity and a small amount of warm colours, are different from the large-scale use of warm colours in scene 1, leaving the audience unlimited imagination on how brilliant Desheng Palace will be in the future. This theme subtly applies the theory that the different colour transformations in colour psychology can bring different influences to human psychology, to express the content of the story that the design wants to express to the audience, greatly enhances the narrative ability.

C. Theme 2: Memory

The theme is divided into four scenes. Different pictures show the changes of the four seasons to the audience, indicating that each person will bring different memories with the passage of time. The composition of the four scenes is basically the same. As shown in Fig. 4., spring, summer, autumn and winter are respectively interpreted through the change of warm and cold colours and different colour compositions.



Figure 4. Seasonal changes of the case.

The spring scene is mainly a large area of red, with a small amount of red, blue and purple added. Warm colours can give the audience an intuitive feeling of warm, coupled with a small amount of blue and purple cold colours, which not only expresses the signs of the recovery of everything in spring, but also a lazy feeling after winter. With the embellishment of these cold colours, the colour of the whole picture is enriched. According to the CIE colour distribution map, the distribution of red, yellow, blue and purple accounts for a large proportion except green, thus forming a colourful romantic spring atmosphere dominated by red.

The expression of summer mainly uses the blue which makes people feel quiet and cool. The vector shows the high purity of blue, which lays the cold tone of the whole picture. The addition of small areas of yellow and green evokes the audience's impression of the pictures of green plants thriving in summer and the cool memories of the

whole summer. Compared with the use of warm tones to evoke people's hot and restless memories of summer, this opposite way of expression is easier to arouse the audience's resonance for recalling beautiful pictures and has reduced aesthetic fatigue.

The expression of autumn and winter conforms to the traditional impression of most people. The large-area and high-purity golden-yellow covered picture can not only express the golden yellow everywhere when crops mature in autumn, revealing the rich joy of harvest, but also show the depression atmosphere with withered grass, trees and leaves. The whole picture is mainly yellow, and the matching of yellow with different brightness accurately shows people's memory of autumn. In addition to a large number of white colours in winter, purple is added as an auxiliary colour, which makes the whole picture colder. The CIE colour distribution map shows a large area occupied by blue and purple, with little red, yellow and green, which this single tone can intuitively express the cold atmosphere in winter.

D. 2017 G-100 Gwanghwamun Media Façade, Seoul

The Korean Ministry of Culture, Sports and Tourism and the Pyeongchang Winter Olympics Organizing Committee held a cultural event of 'Play Pyeongchang G-100' at the Gwanghwamun Central Square on the 100th day of the 2018 Pyeongchang Winter Olympics. Organized by South Korea's PK Art & Media, it performed a light show on the facade. This media facade show is named "Your Stage" and contains three themes "Your Stage", "Brilliant Passion" and "change".

The theme "Your Stage" also uses the change of colour to convey the changes of the seasons to the audience. The theme is based on athletes, through the changes in the four seasons, as shown in Fig. 5, the athletes' spirit of persisting in practice is expressed. The whole is also composed entirely of colours. Without the text, relying on graphic changes brings a strong visual experience to the audience. In the expression of spring, the picture uses a lot of purple and pink. The shape of the petals dance creates an active and romantic atmosphere, and the use of purple gives a relaxed and pleasant feeling. Through the CIE colour diagram, it can be seen that the colour of the picture is single, and the use of a large number of pinks and purples creates a lively atmosphere of spring.

The expression of summer mainly uses green, green symbolizes the vigorous vitality. Compared with the CIE map of spring and summer, it can be found that the expression of spring is almost no use of green. Through the use of this jumping colour, you can give the audience has a clear visual impact, because the previous plots are paved, but it does not cause visual aesthetic fatigue. A small amount of yellow is added to the picture to pave the way for a natural transition to the next autumn scene. The use of yellow will also give people an active feeling.

The colour of the autumn is mainly yellow, which also adds green, which conveys the information that the autumn vegetation turns from green to yellow, and the leaves are dying. Compared with the summer scene, the contrast between the CIE colour distribution maps can be

found in the yellow and green colours. The ratio is completely exchanged, which conveys the story information to the audience through the proportional conversion of colours, making full use of the perception of the yellow-green fall in colour psychology.

The expression of winter uses a lot of white. According to the CIE colour distribution map, all the red, yellow, blue and green colours are missing. This monochromatic use intuitively expresses the cold atmosphere of winter.

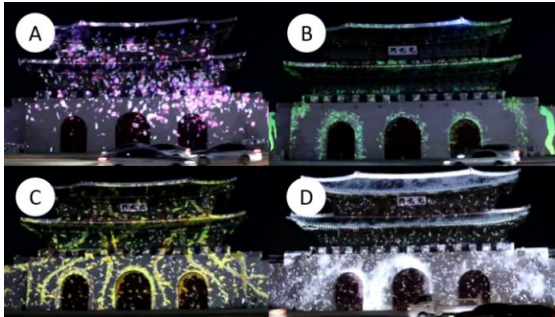


Figure 5. Seasonal changes of the case (A stands for spring, B stands for summer, C stands for autumn and D stands for winter.).

E. Case Analysis Compare Discussion

In order to intuitively compare the colour information used in seasonal changes in those two cases, Table II and Table III were produced separately. Table II shows the colour vector information, and Table III shows the CIE colour distribution information of the colour. Both tables list the corresponding four-season names, with information on case 1 and 2 listed on the left and right of each table.

TABLE II. VECTOR COMPARE

	Case 1	Case 2
Spring		
Summer		
Autumn		
Winter		

TABLE III. CIE COLOUR DISTRIBUTION DIAGRAM COMPARE

	Case 1	Case 2
Spring		
Summer		
Autumn		
Winter		

Extract the corresponding vector images in the four seasons of the case. Through comparison, three common laws can be found, which can be used as a reference for the colour composition of the media façade in the four seasons, and also in line with the basic theory of colour psychology.

- The CIE colour distribution diagram shows that the colour composition of the two cases is basically consistent when expressing different seasons. The choice of spring is mainly red and purple, and there is no green in the picture. The expression of summer mainly chooses green and blue, the autumn is mainly red and yellow, and the winter is mainly white with low saturation.
- Comparing the vector diagrams, it can be found that both cases express seasonal changes through alternating changes in warm and cold tones. The shades of spring are warmer, the summer is colder, the autumn is warmer, and the winter is colder. Through this contrast of cold and warm tones, it can give the picture a certain rhythm and bring a strong visual experience to the audience.
- The same case maintains the same colour saturation in the expression of the four seasons. According to the vertical contrast vector, it can be found that the two cases are consistent in their respective colour saturation. The saturation in case 1 is higher overall, the dominant colour occupies a larger proportion of the picture, and the dominant colour in case 2 occupies the picture. The ratio is smaller, and the colour saturation used is also lower as compare, which ensures the uniform coordination of the picture.

V. CONCLUSION

Through case studies, the research concludes that the rational use of colour psychology in the media façade can make simple colour changes convey emotions and express stories. Colour psychology provides a diverse expression and richer content for the media façade, enhancing its narrative ability, allowing it to express different content with simple colour changes and gain higher artistic value. The colour composition that conforms to the audience's psychology can also offset the aesthetic fatigue caused by the high-definition colour change to a certain extent. The detail conclusions are as follows:

The production of Media facade is not only a simple transformation of colour patterns, but also a complete story theme and background, combined with appropriate colour matching, which can quickly bring the audience into the content, creating infinite imagination space.

According to the setting of the story theme, choosing the appropriate colour matching scheme, which can not only contrast the atmosphere of the theme, but also enhance the aesthetic value of the media facade. It is clearly different from other artistic forms such as photography, painting and movies. Its picture composition is relatively simple. Influenced by the showing environment, most of them appear in the city streets at night, can only be adjusted and modified in brightness and purity of tone.

In the production of narrative media facade, there are also differences in how colours are used, depending on the timeline. Seasonal change's theme shows the audience different memory pictures in different seasons. In the use of colour, it only converts the colour tone, and the distribution proportion and purity standards of colour are unified. It is possible to express seasonal changes through alternating changes in warm and cold tones.

CONFLICT OF INTEREST

We declare that we do not have any commercial or associative interest that represents a conflict of interest in connection with the work submitted.

AUTHOR CONTRIBUTIONS

Under the guidance of Professor Tae Soo Yun, the main purpose of the paper was determined, his constant and sincere opinions had led us to completion of this paper writing. Jiani Zhou provides reference and assistance in research. The main research and writing of the paper are done by Linwei Fu. All authors had approved the final version.

REFERENCES

- [1] Y. Lv, "Research on the development of the media architecture," M.S. thesis, Dept. Arts., Henan Univ., China, 2016.
- [2] P. Dalsgaard and H. Kim, "Designing urban media façades: Cases and challenges," in *Proc. the SIGCHI Conference on Human Factors in Computing Systems*, 2010, pp. 2277-2286.
- [3] W. He, "Media façades, the show stage of city lights," *Art & Design*, vol. 3, pp. 20-26, 2015.
- [4] Y. Lin and L. X. Hao, "Design of media facade based on the LED lighting technology," *Zhaoming Gongcheng Xuebao*, vol. 21, no. 5, pp. 95-100, Oct. 2010.
- [5] J. H. Jung and J. T. Kim, "A study on the characteristics of the media facade buildings," *The Korean Institute of Illuminating and Electrical Installation Engineers*, vol. 24, pp. 44-45, 2010.
- [6] J. E. Andrew and M. A. Maier, "colour psychology: Effects of perceiving colour on psychological functioning in humans," *Annual Review of Psychology*, vol. 65, pp. 95-120, 2014.
- [7] J. Hogg, "Principal components analysis of semantic differential judgements of single colours and colour pairs," *The Journal of General Psychology*, vol. 80, pp. 129-140, 1969.
- [8] X. L. Wang, "The related research on colour psychology and art design," in *Proc. 5th International Conference on Social Science, Education and Humanities Research*, 2016, pp. 72-75.
- [9] Y. Liu, "Research on art consciousness by movie colour," M.S. thesis, Dept. Arts., Chongqing Univ., China, 2011.
- [10] Y. Ashihara, translated by Lynne E. Riggs, *The Aesthetic Townscape*, The MIT Press, 1983, pp. 72-73.
- [11] E. Aydogan, "From 'advertising architecture' to 'media façade': Communication through digital display skin," M.S. thesis, Dept. Architecture, Middle East Technical Univ., Turkey, 2009.
- [12] W. Carla, "Media façades in the urban context, planning criteria for media facades," *Professional Lighting Design*, no. 60, pp. 52-56, 2008.
- [13] Y. Lee, C. Y. Jung, and H. Kim, "Analysing the narrative structure in the contents of media facade," *Journal of Digital Contents Society*, vol. 14, no. 3, pp. 367-379, 2013.

Copyright © 2021 by the authors. This is an open access article distributed under the Creative Commons Attribution License ([CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)), which permits use, distribution and reproduction in any medium, provided that the article is properly cited, the use is non-commercial and no modifications or adaptations are made.



Linwei Fu was born in August 1993, in Hubei, China. He is studying his doctoral course in Visual Contents at the Dongseo University, Korea. He received the B.S. in Visual Communication Design from Zhongnan University of Economics and Law in 2016, China. He received the M.Sc. in Department of Visual Contents from Dongseo University of South Korea in 2019. His current research direction is the Media facade.



Jiani Zhou was born on July 30, 1994, in Jiangsu, China. She is a doctoral student in Visual Contents at the Dongseo University of Korea. She received the B.S. in Animation department from Zhongnan University of Economics and Law, China. Since 2015, she has been studying in Dongseo University of Korea. She received the M.S. in Department of Visual Contents from Dongseo University of Korea in 2017. Her current research interests include VFX, image processing, game ethics and visual communication.



Prof. Tae Soo Yun was born in Pohang City, Korea, in 1968. He received the B.S., M.S., and Ph.D. degree in Computer Engineering from Kyungpook National University, Korea, in 1991, 1993 and 2001, respectively. He is currently working as professor in the Department of Digital Contents, Dongseo University of Korea from 2001. Dr. Tae Soo is a chief vice president of IACST (International Association for Convergence, Science and Technology) and in charge of center for AGRIC (Arcade Game Regional Innovation Center) of Dongseo University. His current research interest includes game technology, artificial intelligence, virtual reality, and interactive media.