A Management System for Visual Communication Design at Film Studio

Hong-Sheng Chen

No.1, Ling-Tung Rd., Ling Tung University, Taichung City, Taiwan
chsh@ntu.edu.tw

Abstract. This research aims to propose a design management system for helping designer to make arrangement of the furniture in a film shooting studio. The main issue is that furniture has its own characters, and it matches to other furniture in different degree. Therefore, designer need help to calculate the appropriateness. The appropriateness comes from items' color, texture and its image to audience. This management system help designer to visualize the result of combination by simulation.

Keywords: visual design, film studio.

1 Introduction

The last two decades have seen growing importance placed on research in design decision support system [8-10] and decision maker [2]. Recently there has been a shift in attention from a focus on design rules [8] to an emphasis on space layout problem [3,6]. Researchers of design decision support system (DDSS) have often suggested the application for management [1], teaching [7] and housing refurbishment [5]. However, research which has documented the application for film studio is scant. Therefore, my objective in this paper is to study a DDSS application for space layout at film studio.

2 Purposes

This research is a cooperation project for my university and Sanlih E-Television Company. They need an assistant system for environmental visual design at TV film studios. It should provide art workers to create visual environment according to the story by their equipments. We propose an academic research project for developing a design assisting and management system for film studios. Controlling visual communicating factors for story telling, the system should, at a same tine, assist designers for making visual environment at least 5 medium studios. And, it should solve the uncertainty of visual image problem.

This research presents three questions at a film studio.

1. Which furniture are better choices that can describe the characters of the roles in the drama?

M.J. Smith and G. Salvendy (Eds.): Human Interface, Part I, HCII 2009, LNCS 5617, pp. 13–21, 2009.

2. Which other items can match those chosen furniture?
3. Are all goods in this setting coherent with each other in terms of visual conception?

For answering above questions, researchers observed a real film studio and proposed a method as a solution. According to our observation, the basic elements in a film studio are sofa, table, lamp, wall, chair, door, curtain and so on. Only those elements facing to cameras need to be designed with visual collaboration. Those no need to be shown could be roughly constructed. Figure 1 is an example for explaining the construction of a living room at a film studio. It looks like a "half-completed" living room. The concepts of this study are explained as following sections.

Fig. 1. A film studio at Sanlih E-Television shows an environmental visual design plays an important part of film shooting

3 Concepts

For developing the system, I follow the concepts to make the rules.

3.1 Images Concept

Every item in a space has its image, which conveys a visual property to audiences. Images are important factors contributing to visual communication. When audiences watch an item, they associate with their daily experience and give the item a corresponding image. The image conveys properties of the users of this place in the drama or story. Even without speaking in words, an audience knows those qualities of the scene and understands the meaning of those items.

Through visual communication, a good environmental design speaks itself by conveying correct images.

3.2 Collocation Concept

The collocations among furniture are different. In some circumstances, designers probably select furniture that is not collocated. A room needs a set of coordinate furniture. In terms of material and color, they have to show a harmony perception.

Therefore, how to assist designers to build a proper image and a harmony perception of an environment? In this paper, I propose a theoretical framework to analysis it and use a computational system to implement it.

4 Images of Furniture

According to the story, two parts are divided and needed to be collaborated. Part 1, Image Attributes: Functions, Characters and Quality. Part 2, Furniture Items: Sofa, Table, Lamp, Wall, Chair, Door, Curtain.

Besides, the part 1 is noted in detail as follows:

1. Function attributes: Living room, Office, Bedroom, Kitchen, Pavilion, Hospital, Station, and Jail.
2. Character attributes: Gender, Income level, Personality.
3. Quality attributes: Color system, Texture, Luxury.

Figure 2 is an example for explaining how a chair is denoted for its characters and its proper user.

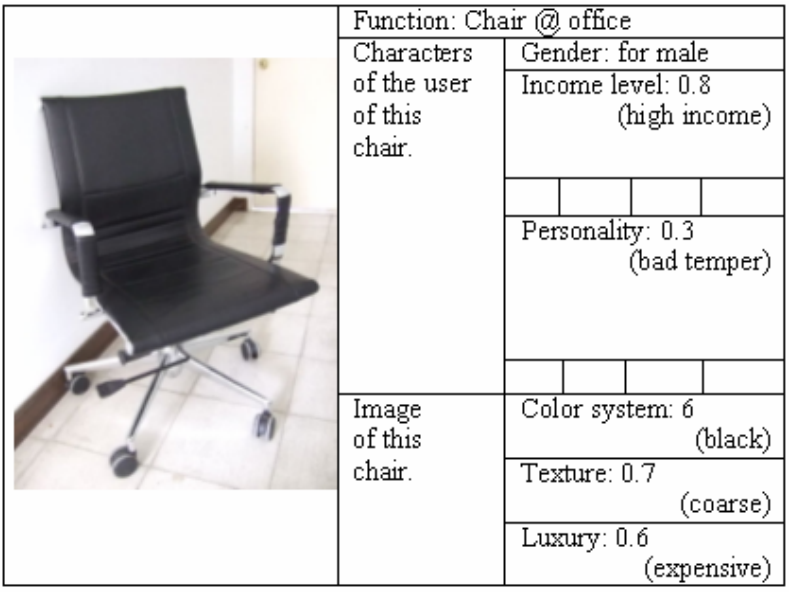

Fig. 2. Analysis for an office chair shows how the images are denoted. Any furniture can express some information of the story.

Then, this study explains its concepts in a logic form, which is interpreted as a formula for analyzing the collaboration between these two parts. The purpose of presenting in a formal logic form is to express the concepts. That is to say, according to these concepts, we have no need to use a specific computer language. Users can use other program language to make this system, if they are good at that program language.

5 Formal Language for Expressing Concepts

5.1 Declaration

F = { x | x is function attribute of the place} ⊃ { Living room, Office, Bedroom, Kitchen, Pavilion, Hospital, Station, Jail }
C = { x | x is character attribute of the owner} ⊃ { Gender, Income level, Personality }
Q = { x | x is quality attribute of the space} ⊃ { Color system, Texture, Luxury }
X = { x | x is a furniture} ⊃ { Sofa, Table, Lamp, Wall, Chair, Door, Curtain }

5.2 Predicates

Scene-A (F, C, Q): Scene A is a setting. In the story, owner of this place have characters of C. This place is used as F. This space is designed in a tone of Q.

C = { x | x is the attributes of the role} ⊃ { C_{Gender}, C_{Income} , $C_{Personality}$ }

Q = { x | x is the attributes of the place} ⊃ { $Q_{Texture}$, Q_{Luxury} , Q_{Color} }

C_{Gender} is a number, 1 for male, 0 for female.

C_{Income} is a number describing person's income. Range from 0 to 1, 1 for rich, 0 for poor.

$C_{Personality}$ is a number describing person's personality. Range from 0 to 1, 1 for bright, 0 for dark.

$Q_{Texture}$ is a number for describing the texture of the place. Range from 0 to 1, 1 for coarse, 0 for smooth.

Q_{Luxury} is a number for describing the quality of the place. Range from 0 to 1, 1 for high, 0 for low.

Q_{Color} is a number describing the color tone of the place, 0 for white, 1 for red, 2 for orange, 3 for yellow, 4 for green, 5 for blue, 6 for magenta, 7 for purple, 8 for black.

α : α is furniture. It has three attributes F, C and S, denote as α (Fi, Ci, Qi).

Examples are shown as follows.

Sofa-I (Fi, Ci, Qi): Sofa I has attributes Fi for Function, Ci for Character, and Qi for Space.

Table-J (Fj, Cj, Qj): Table J has attributes Fj for Function, Cj for Character, and Qj for Space.

Lamp-K (Fk, Ck, Qk): Lamp K has attributes Fk for Function, Ck for Character, and Qk for Space.

Wall-L (Fl, Cl, Ql): Wall L has attributes Fl for Function, Cl for Character, and Ql for Space.

5.3 Computation

$$d_c = ((C - C_{Gender})^2 + (C - C_{Income})^2 + (C - C_{Personality})^2)^{1/2} \quad (1)$$

$$d_q = ((Q - Q_{Color})^2 + (Q - Q_{Texture})^2 + (Q - Q_{Luxury})^2)^{1/2} \quad (2)$$

$$d = \triangle d_c + \triangle d_q \quad (3)$$

5.4 Decision Rules

R1: $(x \in F) \wedge F \rightarrow$ x matches F
R2: Scene-A (F, C, Q) $\wedge$ x matches F $\wedge$ mim($\triangle$d)
$\rightarrow$ Apply x in Scene-A (F, C, Q)

6 System Implementation

This study use AutoCAD and AutoLisp for representing and programming the concepts of above sections. A system can management the furniture items, attributes and decision rules. Some examples of the space layout are shown as figure3.

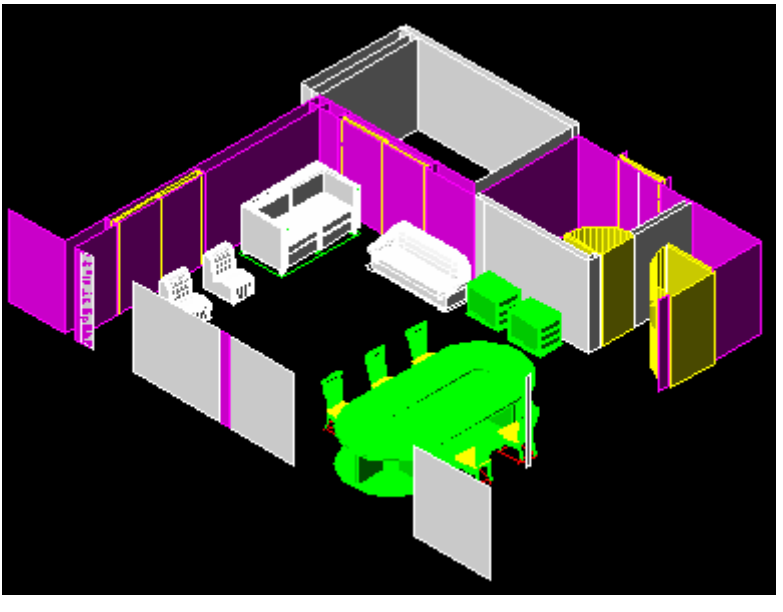

Fig. 3. A layout of furniture shows the placement in AutoCAD

Several outputs could be made by this system. For example, according the story, a director needs a layout of a living room, which owner is a female office-lady; a luxury living room and a dinning room, which owner is an old president. All articles of

furniture in these film studios have coherent relation in tune with materials and color. They also have to display the wealthy of the owner in terms of social and financial levels.

A director then can see the layout design provided by this system. If he doesn't satisfy the result, he can change other values of the attribute, make difference and improve the visual quality. After the quality is fine enough, workers bring the items to their locations in studio. Then, the setting is ready for film shooting.

7 Examples on Screen

As costume design, interior decoration shows lots of information about the characters. The actors need proper hair and costume, as well as the space need proper decoration and layout. They are both important elements in terms of visual perceptions. Figure 4 - 7 are examples of space layout by which the visual images can display the quality of the room.

Figure 4 shows a female manager's reception room in an office building. Displaying the smart female quality, film studio uses bright white and red as main colors. Red color represents the outgoing and sunny personality of the owner. The texture of the furniture is smooth flannelette.

Figure 5 shows an old rich man's living room. The tone is mature. Brown color dominates the space. Leather sofa occupies the center place. This setting displays a successful and friendly man with a big family. Figure 6 is the old rich man's dining room. The colors are perfectly tuned to each other. The seat also shows a hierarchy of those people. Figure 7 is a modern office with expensive table, chairs and decoration. The drawing on the wall is a colorful background in this setting. It is easy to perceive the color contrast between furniture and wall. Small stuffs around the wall also represent owner's hobby and personality.

Fig. 4. A completed layout – a layout shows the quality of the office. The right-hand side lady is the user of this office. How we can know the information of the lady by this picture? We can get some clues of the sofa, table, china and so on. (http://www.sanlih.com.tw)

Fig. 5. A completed layout – a living room. (http://www.sanlih.com.tw)

Fig. 6. A completed layout – a dinning room. (http://www.sanlih.com.tw)

Fig. 7. A completed layout – a modern office. (http://www.sanlih.com.tw)

8 Conclusion

This research proposed computational concepts for constructing a design decision supporting system. With the concept that every item in the film studio has its collations to other goods, this system aims to help design to choose a better collocation for visual effects.

I followed the concepts and construct a DDSS by using AutoCAD and AutoLISP. It displays the layout of environment items by visualizing effects, and lists the decision results for working sheet. The visual designers input the system the qualities of figures and places. Through the rules in professional design database, searching the fine attributes in storages. Finally, the system suggests resolutions. Designers modify these simulations, then give it to workers and make the scenery.

The findings of this study highlight the need for research to investigate DDSS for film studio, and in particular, methods for improving coordinating design, as well as in providing appropriate layout for film shooting with a better understanding on visual communication.

Acknowledgements. I thank the assistant come from the members of Sanlih E-Television for their abundant assistance.

References

1. Barton, J., Parolin, B., Weiley, V.: A Spatial Decision Support System for the Management of Public Housing. In: Van Leeuwen, J.P., Timmermans, H.J.P. (eds.) Recent Advances in Design & Decision Support Systems in Architecture and Urban Planning, pp. 69–84. Kluwer Academic Publishers, Dordrecht (2004)
2. Chitchian, D., Henco, B.: A Decision Support Tool for Decision Makers, Digital Design: The Quest for New Paradigms. In: 23nd eCAADe Conference Proceedings, Lisbon, Portugal, September 21-24, pp. 715–721 (2005)
3. Gero, J.S., Kazakov, V.: Learning and reusing information in space layout problems using genetic engineering. Artificial Intelligence in Engineering 11(3), 329–334 (1997)
4. Hu, Y., Ding, W., Yuan, G.: The Adjacency Topological Model for Housing Layout and Its Generating Algorithm, Based on the Case Study of Chinese Apartment Layouts Since 90s. In: CAADRIA 2007, Proceedings of the 12th International Conference on Computer Aided Architectural Design Research in Asia, Nanjing, China, pp. 19–21 (2007)
5. Huang, D., Shih, S.: A Case-Based Decision Support System for Housing Refurbishment. In: CAADRIA 2005, Proceedings of the 10th International Conference on Computer Aided Architectural Design Research in Asia, New Delhi, India, April 28-30, vol. 2, pp. 288–299 (2005)
6. Jagielski, R., Gero, J.S.: A Genetic Programming Approach to the Space Layout Planning Problem. In: CAAD Futures 1997 Conference Proceedings, München, Germany, August 4-6, pp. 875–884 (1997)
7. Lin, C.-J.: Space layout game: An Interactive Game of Space Layout for Teaching and Representing Design Knowledge. In: CAADRIA 2005, Proceedings of the 10th International Conference on Computer Aided Architectural Design Research in Asia, New Delhi, India, April 28-30, vol. 1, pp. 130–141 (2005)

8. Rosenman, M.A., Gero, J.S., Oxman, R.E.: An Expert System For Design Codes and Design Rules, pp. 745–758. Springer, Berlin (1986a)
9. Rosenman, M.A., Gero, J.S., Hutchinson, P.J.: Expert Systems Applications in Computer-aided Design, pp. 218–225. Butterworth, Guildford (1986); reprinted in Computer Aided Design 18(10), 546–551 (1986b)
10. Rosenman, M.A., Gero, J.S.: Design Codes as Expert Systems. Computer Aided Design 17, 399–409 (1985)