

由像素概念強化全像點矩陣系統之視認性研究

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摘 要

點矩陣式全像片相較於傳統全像片而言，主要訴求著重於圖案的美工設計與視覺產生的效果，並由於繞射效率高，因此在一般的光源中就可以輕易的被看見，很適合被運用在視覺設計的領域中。

不過在拍攝點矩陣式全像片時，其電腦反鋸齒效果會使得點矩陣式全像片在範圍較小的圖像中，容易產生雜點與變形，進而影響了圖像視認度的呈現，而透過本研究發現，當運用像素的概念製作前製圖形時，能夠強化點矩陣式全像片圖像的視認度，因此藉由像素的概念強化全像點矩陣系統之視認性成為本論文的主軸。

在本論文中，首先針對像素概念與特徵的資料分析彙整，找出有助於圖像視認度呈現的手法，再將其運用在全像點矩陣系統中，並透過實驗得到以下結果：

1. 在黑底與白底對於點矩陣式全像片圖像視認度的影響上，無論是在基本圖形或立方體圖像線條的表現上，黑底點矩陣式全像片皆比白底點矩陣式全像片清晰。
2. 在黑底與白底的點矩陣式全像片圖像上，36 像素*36 像素範圍與 12 像素*12 像素範圍的兩組圖形中，範圍較大的圖形視認度均優於範圍較小的圖形。
3. 在直線、基本形狀、立體圖像中，運用像素概念後的圖像與原圖相似程度>未使用像素概念的圖像與原圖相似程度。
4. 在水平投影與一點透視表現立方體的圖像中，較多人選擇 8 像素*8 像素的範

圍 (34.1% , 37.8%) ; 在兩點透視與三點透視表現立方體的圖像中，較多人選擇 12 像素*12 像素的範圍 (35.4% , 48.8%)。

5. 不同投影圖法和選擇圖像的最小值之間關連達顯著水準 ($p=.000<.05$)，在立方體圖像辨識最小範圍的視認度上，其強度由強到弱分別為水平透視、一點透視、兩點透視、三點透視。

關鍵字：像素風格、點矩陣式全像、視認性

Strengthen the Legibility of Dot-Matrix Holographic Images by Using Pixel Concept

Abstract

Compared with traditional holography, the dot-matrix holography mainly emphasizes on the art design of patterns and its visual effect. Due to the high efficiency of diffraction, dot-matrix holograms could be easily seen at normal light source, and it is suitable to apply in the field of visual design.

However, while shooting dot-matrix holograms, the function of anti-aliasing in computer would cause mess and deformed in the smaller range of patterns, and influence the representation of legibility. This research explores that it could strengthen the legibility of dot-matrix holographic image if applying pixel concept to design the patterns in the beginning. Therefore, it becomes the main topic of the thesis to strengthen the legibility of dot-matrix holograms by using pixel concept.

At first, it aims at the concept and feature of pixel to analyze and categorize all related data, and find out some helpful methods to represent better legibility. Then apply them in making the dot-matrix holograms. Through some experiments, five conclusions are drawn below:

1. In the experiment of black and white background for dot-matrix holographic images, black background always shows clearer images than white background in any case, including basic patterns or cubes.
2. In the black and white background of dot-matrix holograms, the experiment takes the patterns in the range of 36 x36pixel and 12 x12pixel as example, and finds that the legibility of images in large range is better than images in small range.

3. In the case of straight line, basic form, and stereo image, the similar degree of the original images and the images using pixel concept is higher than the images without using pixel concept.
4. When representing cubic images, there are more people choose the range of 8 x 8pixel (34.1%, 37.8%) for horizontal projection and one-point perspective, and more people choose the range of 12 x 12pixel (35.4%, 48.8%) for two-point perspective and three-point perspective.
5. When the relation of projective images and the minimal value of chosen images achieves marked level ($p=.000<.05$), the order of the legibility intensity of the smallest cubic images is horizontal projection, one-point perspective, two-point perspective, and three-point perspective.

Keyword : Pixel Style 、 Dot-Matrix Holography 、 Legibility