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Color, Rendering Index, and Medical Sciences

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ABSTRACT

Introduction It has already been mentioned that the concept of "approximate color temperature" shows the spectral properties and color quality of light sources that produce a discontinuous spectrum. Although this concept provides good information about the intended sources, in many cases, it seems ineffective. It is important to note that what is meant is the effect of colors under the light of these sources in the eyes of the human observer, not the camera: the visual effect of colors is not meant to be their photographic effect. Two light sources of this type may have approximately the same color temperature, but the visual effect of the colors of objects under the light of these two light sources are different. As you can see, the Cool-White-Deluxe lamp produces more red light than the Cool-White lamp, which allows objects to be seen under the light of this red lamp.

Conclusion Therefore, to have information about the visual appearance of objects under the light of such light sources (light sources with discontinuous spectrum), in addition to the concept of "approximate color temperature", we use another concept called "color reconstruction index".

Keywords Color; Cool White; Lamp; Spectrum

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Introduction

The Color regeneration index of a light source indicates how natural the photographic effect of the colors under the light of this source will be. To determine the color regeneration index of a light source, compare it with a standard light source that has a high color regeneration ability. It is important to note here that the ability to recreate color is determined by the visual effect of the colors of objects [1]. Not based on the photographic effect of colors. For this reason, a light source may have a high color regeneration index but not achieve the desired color regeneration in the image [2].

The color regeneration index is denoted by the letter R, and the maximum index is 100. "Color Reconstruction Index" Several types of fluorescent lamps are presented in the table. Every photographer deals with a feature called "frame", "frame," or "frame" when taking a photo. This is a four-frame frame that covers part of the scene, and its boundaries can be seen on the camera's frosted glass or inside the viewfinder [3-7].

Frame

"Frame" is a magical feature that is quite effective in how the image looks, because it plays four important roles at the same time:

Selection

"Frame" is clearly "selective" When we see a frame in a scene, we select a number from the objects in the scene and give them a special visual validity. This feature of the frame has made it possible for the most insignificant objects and subjects in real life to be the subject of photography and even to be able to recreate meaning through their presence in the frame and in the viewer's mind. For example, a pair of old and used shoes that are completely worthless and insignificant in real life, if placed inside the frame, that is, if "selected" by the photographer and through the frame, will find special visual validity, in the field of the photo becomes the most important. Objects and subjects become because through this "choice", the photographer has pointed his finger at all the objects and phenomena in the world towards this pair of old shoes and has invited the viewer to see this seemingly insignificant object among all objects. This is why this insignificant object in the real world and important in the world of photos may help to recreate concepts such as poverty, the passage of time, etc, in the mind of the audience or be reminiscent of concepts such as old age, etc.

Deletion

"Frame" is clearly a "delete" factor, meaning that it does not accommodate a large number of objects and subjects in the scene in its heart and, in fact, removes them. The "delete" feature is as important as the "select" feature, in this new process. The frame helps to eliminate the unwanted effect of unnecessary objects and subjects on the main objects and subjects.

Breaking the proportions and real relations

The "frame" breaks the real proportions and relations between objects and subjects by selecting some objects and subjects and deleting others.

Creating New Relationships and Relationships

The "frame" accommodates objects. These objects, regardless of the type of relationships and their proportions in the real world, rediscover new relationships and proportions within the frame. In objects that are very close to each other in the scene and relative to other objects, they may appear distant by being placed inside a frame and removing other objects (which until now have been judged to be close by being far from other objects) because each is located on one side of the frame. This example shows that the frame often creates relationships and proportions that are different from the relationships and proportions in the real scene.

This process of framing some of the elements of the scene and removing other parts is called "framing," "framing," or in other words, "framing." How to "frame" in the first step in the form of "frame" means square or rectangular, along the "frame" means horizontal or vertical, and in proportion to the dimensions of the "frame" or in other words aspect ratio, i.e. the difference in the size of the horizontal side and Its verticality depends on, and in the next step, it depends on factors such as "angle of view", "location of the camera", i.e. the degree of proximity or physical distance from the scene, "height of the camera" and "focal length of the lens" [8, 9].

Arrangement

The work of creating proportions and visual relationships in the field of photography is not limited to framing but also requires other steps called "arrangement." After selecting a number of objects in the frame, how they are arranged and arranged in the frame is of particular importance. And establish relations between them. This arrangement can be done in the following ways:

Adjusting the horizontal angle of the camera

Sometimes, a small change in the horizontal angle of the camera can change the type of placement of objects inside the frame, their proportions, and the relationships between them.

Adjusting the vertical angle of the camera

The height and vertical angle of the camera determine the type of objects inside the frame, sometimes making some objects appear larger and others smaller.

Selecting the focal length of the lens

The choice of different focal lengths changes the size of the view and perspective and, more completely, the proportions and relationships.

Lighting

By illuminating some objects and shading others, the relationship between them can be changed, and, in a sense, the objects placed in the frame are given different visual importance.

Filters

Especially in black-and-white photography, they change the flow of colors and light into gray tones. Sometimes, they make an object darker and sometimes lighter than it should be, changing the relationships between objects and changing their color. They also change the appearance of objects inside the frame, resulting in different proportions and relationships.

Composition

Composition or composition is obtained from the sum of two processes of "framing" and "arrangement", so "composition" can be defined as follows:

"The art of composition is the conscious selection and arrangement of image elements in order to create one or more" points of attention "or to convey an idea or concept or to create a certain emotional feeling in the viewer. In this definition, two words are significant:

Point of attention

This means the center of interest, the part of the frame where the most important object or subject is located, and the whole mechanism of composition is in the direction that the viewer, first of all, faster than all and more emphatically than all objects and see the elements of that particular subject.

Image elements

This means all possible graphic elements that may be visually present in the frame, for example, the following elements of the image:

line: Lines are present in composition in different types and shapes (horizontal, vertical, oblique, broken, curved, short, long) and with different visual weights (thick and heavy or narrow and light) and may be real and or virtual. A virtual line is a line that the eye perceives more or less the same by tracking the elements and objects of the cheek point; for example, placing a number of coins next to each other in the frame area may turn the eye from one to the other and then to the next and next. As a result, the rows of coins are perceived in a virtual linear form.

Point: Sometimes some objects in the frame are perceived as exactly or almost point.

Form: means the general form of objects inside the frame that both real and virtual forms are in the composition.

Figure: means the exact form of objects that are still diverse.

Texture: means the visual texture of objects and surfaces.

Pattern: This means the repetition of an object or element in a more or less similar way across the surface of the frame.

Depth: The amount of the third dimension (depth or dimension) reconstructed in the image is considered. Due to changes in composition, we will have deep or flat images.

Tones: Dark and light tones are effective in giving the objects inside the frame a different visual credibility and in creating a point of attention or directing the viewer to a certain part of the image.

Color

Now that we have the necessary recognition of "composition", we will refer to the role of "color" in composition [10-13]. Although the presence and role of color in the composition are complex and varied, the following are references to the most important of these:

1- With light shadow, an "attention point" can be effectively created. It is enough to reconstruct an important part of the frame in light tones and the rest of the frame in dark tones. This trick can be done even where the whole surface of the frame is with elements. A similar visual (filled with similar visual validity) is also path-breaking and creates a special "focus point" by uniformly removing it. Similar to this rule, color differences can also be used to create a point of attention. While most of the surface of the frame is covered with a single color or a more or less similar set of colors, placing some of the elements inside the frame in a different color (different in terms of color or in terms of brightness and saturation) draws the viewer's attention to this. The section will create a kind of "point of attention".

2- Just as the lack of light-opacity contrast causes the inability to represent the third dimension (Depth) in the image, the lack of color contrast has the same effect. If the entire surface of the frame is covered with more or less the same colors (similar in color, brightness, and saturation), the representation of the third dimension in the image will be accompanied by a figure, unless with other dimensional tricks such as creating a focus difference between foreground and background. Using different lenses to control perspective: Using deep convergence lines, Arrange objects of different sizes in the foreground and background of the image and increase the depth and dimension of the image.

3- One of the ways to increase the visual energy of the image and achieve more effective combinations is to use different types of contrasts. The most common of these contrasts is the dark-light contrast. Early in the advent of color photography, they avoided the use of high-contrast dark-light contrast in color photography to keep the boundaries of black-and-white photography and color photography separate and to take full advantage of the presence of color in the frame.

In later years, this idea was discarded, and a combination of color contrasts and dark-light contrast was used to achieve more complete combinations and more attractive images. Regarding color contrast, its types, and its effect, it can be said that if the image contains two dominant colors, the farther the two colors are in the light spectrum, the more effective they are. The strongest color contrast is between primary and complementary colors, such as yellow versus blue or green versus magenta. Using two very unequal levels of complementary colors can very effectively intensify this type of contrast.

Another type of contrast is heat-cold contrast. According to Johannes Etienne, the warm-cold contrast corresponds to other contrasts such as shadow-sun, far-near, light-heavy, clear, opaque, sedative-stimulating, and so on.

Contrast digester is the contrast of the quality of a single color in an image, meaning that the degree of purity of a variable of a particular color constitutes the only color element of the image.

In other words, it should be in the composition of a color photo that the whole photo is accompanied by a row of sub-buttons obtained from the same color.

Also, the visible spectrum can be obtained in the form of an attractive combination of three from the combination of colors close to each other. For example, the combination of yellow-orange and orange-red or yellow-green and yellow-orange. Of course, the harmonious combination of colors is not imposed as a sentence.

4- In black-and-white photography, light and dark spots located on the surface of the image make the viewer focus on them. In color photography, light or dark spots can catch the eye, but despite the color of the spot, the effect will be much greater. It is also obvious that colored lines will be more effective.

5- At the level of the image, if several points are in a row, the eye connects those points and moves between them. Dots in color photos can be different colors. If these dots have intense colors, the eye will try to fill these separating spaces more easily.

6- Lines and dots in a color photo are also elements of composition, but with the presence of color, the effect of geometric elements (dots and lines) gives way to the play of colors. Therefore, in a color photo, the image is a function of using color and following color. He does. However, this does not mean that the abstract and geometric aspects of the image can be neglected.

7- Colored surfaces create an effect that relies more on color than shape if they do not form very specific geometric objects such as triangles, squares, or circles. In black-and-white photography, a subject composed of several separate elements forms a whole, but the same subject in a color photograph will not be a whole because the differences between each element and the other element are highlighted.

8- The color, brightness, and saturation of a surface change in contact with other surfaces. Green looks greener when viewed on a yellow, blue, or blue background. If a gray surface is surrounded by a colored surface, gray will take on the complementary color of the surrounding color. If it is red, it will be greenish gray; if it is green, it will look like magenta; if it is blue, it will be yellow. If the gray is light in color with the color around it and the second color is highly saturated, the interaction will be greater. If the color zones are separated by black or colored lines, the contrast effect will be reduced in direct proportion to the line width. If the color saturation is maximized, the result will be a more exciting contrast.

Colored surfaces also change in their dimensions. A light-colored pattern on a dark area appears larger than a dark pattern with the same dimensions on a light background; the white surface seems to expand as much as possible, and the black surface is compressed.

Yellow looks bigger than green, and blue looks smaller than green. Brightness and saturation are important factors in this reciprocal relationship change.

So, in short, we can say that the colors on each level of the image are perceived based on their dynamic interactions, that is, each of the colors is exposed to changes in relation to other color surfaces that give it relative value. Understanding how color changes alongside other colors, recognizing the active and inactive properties of colors, and understanding how one color with more force than another stops the eye. There are points that the photographer should pay attention to when combining with the color photography method.

In color photography, color is a factor that can be both structurally organized and used as a primary sensory ability to affect the viewer. In almost every place, you can find a subject that creates beautiful color images. From close-ups to landscapes and architecture, the key factor in creating interesting color images in the first stage is the ability to discover a scene's existential potential and then the method of photographing that scene to show its color quality in the best possible way.

9- Ordinary effects in the background, especially in the background Color photo, are one of the most interesting elements of composition. Blurring in the background gives a clear artistic contrast - blurring highlights and makes it possible to separate the interesting subject from its surroundings. Especially for close-up photography, it is better to use open apertures to prevent the mixing of different areas of the image. In general, any color that appears on the faded surface will have a more active effect than the same color on the clear surface. This phenomenon will have several consequences; the effect of colors is amplified and cold and warm colors are displaced.

In this regard, it is necessary to pay attention to the increasing importance of warm colors when they form spots with a fading background.

10- Scenes with a wide variety of colors are generally attractive. When all parts of the scene in front of the camera are highlighted in attractive colors, the photo taken may lack the balance, harmony, and visual quality that draws the viewer's eye to focus. One way to solve this problem is to simplify the image so that it dominates the composition of a color.

11- Images that have a limited variety of colors, especially if they are monochromatic, can have a shocking effect. This is mainly because most of the color photos we see have a lot of color variation and anything that is out of the ordinary becomes unusual.

As a general rule, it can be recommended that if you want to increase the depth and dimension of the image through color contrast, place warm colors or colors with high brightness and saturation in the background or background of the image and in the foreground of the image of colors. Use cool colors that are less bright and saturated [14-16].

Conclusion

The visual weight of the lines resulting from their diameter can be strengthened or weakened by color. Colors also have a visual weight. For example, red is the heaviest color, followed by green, blue, and orange, which are homogeneous, followed by yellow, and then the lightest, white. Therefore, lines of the same thickness can be considered that have different visual weights due to their color differences. Thus, the visual weight of a colored line will depend on two factors: its diameter and color. Symbolic effect and appearance Geometric forms can be harmonized or contrasted with the symbolic effect and appearance of colors. For example, the circle is a symbol of unity and slow movement inwards and order. Such a symbolic appearance is seen in blue among the colors. Therefore, if blue objects are placed in the composition of the object, a symbolic appearance and a similar effect between the shape of the circles and will see the blue color of this object and this similarity in symbolic appearance and effect will disappear if a circular object is seen in a color other than blue.

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