Image Processing in Industrial Design

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Abstract. Image processing is the core of visual culture. Visual culture is formed and developed around image processing, which is analyzed from the essence of visual design. It can be understood that visualization constitutes the external form of image processing, the visual regime constitutes the internal mechanism of image processing, among which the industrial design should grasp the image processing. Shape constitutes visual cognition, color arouses visual emotion, texture can obtain visual extension. Industrial design is the rational integration of product practicability, beauty and environment. The research on the aesthetic form and visual characteristics of industrial design is the main content of industrial design research [1]. Using computer vision expression method to evaluate the rationality of industrial design has application prospects. Using computer vision expression method, combined with graphics and image processing, the optimization design of the structure, structure, shape and color of workpiece products can be realized.

Keywords: Industrial Design, Image Processing, Visual Culture

Image processing is derived from visual culture. The image processing of industrial design refers to the industrial design completed by means of design and design technology. Finally, the image or visibility is embodied. The image processing of industrial design determines the level, quality and grade of product design, which is an important basis for evaluating design works. Image processing is an important part of visual culture, in which the relationship between image processing and visual culture has been studied. At the same time, it can grasp the form and mechanism of image processing. The basic role of image processing in industrial design has been analyzed, which is conducive to better use of image processing factors to improve the level of industrial design. The progress and development of industrial design are promoted. Using digital scanning technology to evaluate the rationality of color, shape and component of industrial design workpiece, combining with image processing technology to realize the reasonable expression of visual characteristics of industrial design workpiece, the evaluation of the rationality of structure, structure, shape and color of industrial design workpiece is based on the three-dimensional digital scanning imaging of industrial design product workpiece [2].

1. Relationship between Image Processing and Visual Culture
1.1. Visualization Constitutes the External Form of Image Processing

After the rise of visual culture, images with their prominent visual features have become the core elements that control the world. Visualizations represent images, shapes, textures, and other elements that make things easy for people to capture. The connotation, implication, spirit and other elements of the thing itself can also be reflected [3]. In the modern society, almost all things have image processing, and image processing is constituted as an external form through visualization. As more and more visual forms are created, people's experience of image processing becomes more and more abundant. At the same time, people's ability to absorb and interpret visual information and experience will be gradually enhanced. However, the negative effect is that people will be controlled by the dazzling visual composition. People's design inspiration will disappear. Industrial design, as far as mass-produced industrial products are concerned, endows materials, structure, shape, color, surface processing and decoration with new quality and qualification by virtue of training, experience and visual experience. Secondly, it makes visual evaluation on product packaging, publicity, display and other issues by using technical knowledge and experience. In a fundamental sense, industrial design is not an end in itself, it is a means and way of information interaction used by people to achieve their own purposes. This is often represented as a process. Industrial design is for people rather than things. People are the foundation and starting point of design. In the early days, people's information interaction on industrial design mainly focused on the visualization of objects and the semantics of objects. This also makes it very important to take the visualization of industrial design research object as the measurement standard.

1.2. Visual Polity Constitutes the Intrinsic Mechanism of Image Processing

The first feature of image processing is "visibility", which is fundamentally different from the "visibility" of text. Compared with textual visual mode, visual visual mode is more systematic and has certain rules of formation. Analysed from the viewer's point of view, all its elements form a visual regime. Visual polity refers to "a set of cognitive system or even value order based on image processing and a practice and production system based on image processing". Image processing is understood from the perspective of visual culture, and people in modern society will be understood in the position of being concerned. No matter walking on the road or sitting at a desk, they will become the "scenery" in the eyes of others anytime and anywhere. The formation of this "landscape" will not be subject to laws, rules and order. At the same time, this is based on the human visual imaging system, which can be maintained entirely by physiological mechanisms [4]. The visual power will be owned by everyone, and the visual power will be played more freely and flexibly. Industrial design can make up the gap between technology and people. Design can combine emotion (novelty, independence, security, sensibility, confidence, strength), ergonomics (ease of use, security, comfort) and aesthetics (vision, hearing, smell, touch). "Technology" refers to the use of advanced technology or traditional technology with high processing quality to give the product sufficient functions to enable the product to continue to work normally and maintain good technical ability.

2. Basic Analysis of Image Processing in Industrial Design

2.1. Shape Constitutes Visual Cognition

Shape is one of the characteristics of products, which is the primary element in industrial design. It is an important basis for people to distinguish and recognize products. With the development of industrial design, there are many types of shapes [5]. However, no matter what shape the product is, its shape design will follow the basic shape rules. You can watch the things around you, such as the shape of computer, pen and mobile phone. Although there are some differences in appearance, this can reflect the basic shape characteristics of industrial design products. Geometry is the main feature, which is the combination of various points, lines, surfaces and bodies in space. The formation of this combination is based on the formation law of formal beauty and the structural composition of the product itself. Designers want to use the cultural connotation and spiritual essence of design. Body
modeling is the essence of product shape, and the visual feeling given by body modeling is not only size, but also weight. Therefore, size and weight can bring different visual cognitive feelings to products. Shape can form visual cognition. Therefore, when designing products, designers will consider the combination of points, lines, surfaces and bodies. They also consider factors such as size and weight. Industrial design is to present things directly in front of the audience in the form of three-dimensional visualization. Therefore, the analysis of things can not be as accurate as language communication. It is necessary to convey all kinds of information to users through the semantics and form of objects as a special language (or symbol, non-verbal means). The communication between objects and users is not only reflected in human physiology, but also to meet the needs of human emotional communication. The traditional concept of "form follows function" is gradually changing, and to some extent, it is influenced by fashion, personalization, culture and economic situation. Just like the square tripod of Shang Dynasty, it is not only a sacrificial object, but also shows the social labor productivity at that time. The relief pattern on the tripod reveals the social culture at that time. The tripod standing on three feet contains the value of "balance" and also has the symbol of "power".

2.2. Color Evokes Visual Emotion
Color is the most common form of visual elements, which is expressive and full of strong emotions. People will have different psychological feelings. In addition to pursuing novelty in modeling, industrial design will also pursue the aesthetic feeling which is extremely demanding on color. Designers will make use of the technical sense of color and artistic creation, so that color can give products a special expression and enrich the information of products, so as to successfully stand out from the dazzling array of products. At the same time, color is used, which can also reflect the characteristics and functions of products. It will make viewers understand the characteristics and functions of products by observing the colors of products. In industrial design, there are various forms of color expression, among which different combinations of colors bring different visual experiences to people. For example, the colors of mobile phones are rose gold and moonlight silver. Rose gold gives people the feeling of being noble, gorgeous and flamboyant, while moonlight silver gives people the feeling of being cold, elegant and unique. In industrial design, rich patterns are decorated on the surface of products, which will show another ornamental effect. Color can arouse visual emotion. However, when color is used, the functional requirements of products should also be considered. If the functional requirements are strict, then designers can't use color to express their emotional demands. Color is a special language full of emotion. Throughout all the affairs in nature, we can find that they all belong to their own color. The use of a variety of different chroma, purity, lightness and its harmony, contrast, color presents a very outstanding variability. Color has endless space of change, gorgeous and beautiful, can bring people the psychological and visual impact that can not be ignored. Similarly, in industrial design, products with different colors can also create different visual feelings, guide and meet people's diversified consumption and living needs [6].

2.3. Texture for Visual Extension
Texture is the feeling of the surface texture caused by the quality of goods and the materials that make up them, which will not only impact people's vision. At the same time, it will bring different feelings to people's sense of touch. Under the dual effects of vision and touch, profound perceptual experience is formed. The texture and texture of products will also stimulate people's visual system, which is smooth or rough, heavy or thin. People have different feelings. Texture shows the physical feeling of the material itself through "texture" and "texture", and also reflects the special properties of the material and the novel effect given to the product surface by the designer through technological means, which belongs to the category of vision and touch. Material and texture are the exterior and interior of each other. All kinds of materials reveal their appearance with the help of texture, and express the characteristics of materials through texture. In other words, "texture" is the comprehensive expression of the external characteristics of product material, such as color, luster, texture, thickness, thickness, transparency and so on. In industrial design, designers will make full use of different materials to
reflect different textures of products. Compared with shape and color, texture is highly dependent on materials. In modern industry, more kinds of materials are produced, and the types of texture are richer. After the shapes and colors are superimposed, the more diversified the visual effects that can be displayed to people. Because the products have specific uses and functions. Therefore, when designing the texture of products, the applicability of the materials used will be considered, and its applicable features will be integrated with the visual sense. A unified "overall texture" can be formed.

3. Conclusion
When the image processing of industrial design is studied, it is necessary to study visual culture. The inextricable relationship between visual culture and image processing is understood. Image processing is the core of visual culture. In industrial design, the comprehensive application of shape, color and texture will be utilized, which can reflect the differentiated visual experience, thus providing space for product design. Designers use shape, color and texture synthetically in industrial design, and the designed products have emotion, characteristics and connotation. Therefore, designers should deeply study the image processing of product design, so that the visual laws can be grasped and the visual elements can be combined well. Therefore, good works are designed.

References
[1] XIA K, WU Y, REN X, et al. Research in clustering algorithm for diseases analysis [J]. Journal of networks, 2013, 8(7):1632-1639.
[2] MERNIK M, LIU S H, KARABODA M D, et al. On clarifying misconceptions when comparing variants of the artificial bee colony algorithm by offering a new implementation [J]. Information sciences, 2015, 291(10):937-945.
[3] Bao Yixi. Deep structure of product vision-a visual cultural perspective of industrial design [J]. Literature and Art Research. 2014 (06)
[4] Hao Ting. Industrial Design from the Perspective of Product Image Processing and Cultural Practice [J]. Electronic Testing. 2015 (07)
[5] Xu Man. Image Processing and Visual Culture-Research on Visual Culture of Industrial Design [J]. Economic and Trade Practice. 2015 (06)
[6] Xian Zhou. The realization of color tools for digital industrial design.2008(04)