Flat Research on the Design and Application of Icon Design in Mobile Phone UI Interface

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Abstracts: Flat icon design has been widely applied in web pages and mobile phone UI interface, and has been widely praised for its simplicity, clear color, and directness of information. With the rapid development of Internet e-commerce, according to the survey report of China Internet Network Information Center CNNIC (the 45th), until March 2020, the scale of China's mobile phone netizens has reached 897 million. Mobile phone has become an indispensable part of People's Daily life. It not only provides convenience for people's life and shopping, but also becomes a platform for people's work, study and education. The development of multimedia mobile phones has promoted the flat icon design to flourish. Through analysis and research in this paper, it is concluded that the UI interface flat icon has distinct visual characteristics: concise graphic design elements, strong visual impact color design, distinct order, and so on. According to the visual performance characteristics of the flat icon, a large number of cases are analyzed to obtain the style classification and specific design method of the flat icon design. Therefore, this paper hopes to provide references for relevant designers by analyzing and studying the features of flat icon and design method.

Keywords: Flat design, Phone interface, Design Features, Design method, Application

1 Introduction

With the rapid development of China's economic and technological strength, mobile Internet has also been developing rapidly. According to the 45th survey report of China Internet Network Information Center (CNNIC), until March 2020, the scale of China's Internet users has reached 904 million, among which the scale of mobile Internet users has also reached 897 million. Cell phones have become an indispensable part of our daily life; it not only facilitates our life, shopping, entertainment, friends, work and study, but also makes the whole earth become The Internet of Things (IOT), the Internet world.

Through the media characteristics of mobile phone self-media, information is constantly exchanged and transmitted. In modern times, mobile phone can be regarded as a very important form of multimedia communication, and also a window for people to understand the world. As a new media platform for release, communication, exchange and interaction, the role of mobile phone has become more and more prominent. As a result, the design of
various interfaces of self-media mobile phones has become the focus of the design industry. People have higher and higher requirements on the interface design of mobile phones that are organized in hand, looked at and remembered in mind every day. Designers are also constantly seeking more convenient, more intuitive and more effective graphic design and delivery methods to contribute to the improvement and perfection of self-media mobile phones.

In addition, to some extent, the advantages and disadvantages of the screen interface design of self-media mobile phone and its style and characteristics also directly affect the purchase rate of consumers on this brand of devices to a certain extent.

Therefore, flat icon, as a new form of visual design, is a new form of visual expression combined with scientific and technological progress with the development and popularization of Internet and self-media, as well as an important form of visual communication of modern visual media and design. The prominent personality and design style of the flat icon will lead the whole new fashion of visual communication design in the future.

2 Overview of flat icon design

2.1 Basic concepts of flat icons

The core concept of "Flat" is to get rid of the redundant and complicated decorative effect, and everything comes back to the essence of the object. The appearance of flat icon is as a kind of modern multi-media interactive interface design concept to explain. It emphasizes on the effect of icons to reduce graphical elements of the stereo feeling, texture, sense of perspective, such as three-dimensional effect, the icon to remove the complicated image detail on modelling, make icon short and concise, information directly, color pure, etc.

Flat design is generally concise and smooth in shape and eye-catching in color. In terms of information transmission, it is also more directly, enabling the audience to quickly capture its main message. This kind of clean and neat, concise and full of modern flavor rich design style is not easy to go out of style, and has concise sex, high efficiency. The design of flat icon features is determined to make it more convenient and intuitive for users to use. The simplest element symbols are used to convey the appeal content to viewers, so as to reduce people's cognitive barriers to the greatest extent and increase users' loyalty to the product.

Especially in the Internet, IOT is developing rapidly, and Self-media mobile phones have become the main front for people to shop, live and work. The icon design in the UI interface of self-media mobile phones has also become one of the important conditions affecting their sales. First of all, the flat icon can better adapt to different pixels of the mobile phone screen and self-adjust according to the size of the Phone Interface. Compared with other concrete images, it can make the page load faster. Secondly, flat uses very simple design elements, which makes the computer's web page load faster and the screen size can be easily adjusted. Even on the high resolution screen, various information elements are still eye-catching. Many electronic products are flat interface design, Especially in today's booming mobile phone users of self-media, flat icon, as a new form of visual art expression, is more and more adopted by merchants. In terms of image expression, subtle visual elements such as height, depth and length of space are adopted, and the decorative design style of plane effect is highlighted on the basis of bas-relief.

It weakens the projection, gradient and texture of figurative graphics, and forms its unique expressive form with concise elements, high-purity colors and prominent fonts, thus creating a "simple but not simple" visual effect.
2.2 Overview of the mobile UI interface

Mobile UI interface design, or phone interface design, refers to the overall design of human-computer interaction, operation of software programs and beautiful phone interface on the phone. Phone interface is a medium between the user and the hardware of the phone. It is the foremost bridge of human being and mobile phone machine communication, used for information transmission. Therefore, a good UI interface and icon design is an important selling point. However, the best state of mobile phone UI interface and icon design is not as a unique and individual independent existence, but to enable users to achieve smooth operation and use of software through the interface, so that users can be immersed in their actual operation process.

The design of mobile phone UI interface and icons will directly affect the attention and experience of users, thus affecting customer loyalty. The UI interface icon design with accurate positioning will not only bring visual enjoyment to the audience, but also make the operation of the software in the mobile phone become comfortable, convenient and free. Then the audience to generate the desire to consume, to bring profits and benefits for the business.

3 Analysis of the characteristics of The Flat icon in self-Media mobile phone interface design

Compared with other designs, mobile phone UI interface design has its own uniqueness in design form. First of all, it has a high demand for digital technology, so it is necessary to use computer digitization to realize the connection and conversion of information to ensure the timely and effective transmission of information. Secondly, it is informative graphical extraction. According to the content, performance, user groups and other factors of information transmission, it is summarized and refined and expressed in the form of graphic elements to facilitate the dissemination, interaction and promotion of information. Finally, ease of operation. In the design of mobile phone UI interface and mobile phone icon, the operability and convenience should be fully considered.

The purpose of flat icon design is to deliver the target information to the audience and consumers more vividly and intuitively. But as receiving information of each individual person, there will be individual itself in education level, culture background, cognitive habits, their own quality factors such as difference, these differences lead to their understanding, also can produce deviation but concise and practical, clear, concise flat symbol encoding expression were able to get the public consensus and understanding.

Facing the UI interface, consumers can see many icons in the UI interface and accurately read and understand the meaning of each icon. According to image psychology research, in the field of visual images, the closer it gets to the physical representation icon in the life more accord with human cognitive experience, it is easier to cause the resonance of the audience. It will be easier to identify the vision, so the representation based on profiles, refined flat design style is more suitable for mobile phone UI design. Mobile phone UI flat chip icon has the following features:

3.1 The art form of painting provides the soil for the creation of flat icons

The design of UI flat icon of mobile phone absorbs and draws on the advantages and specialties of other art categories. First of all, artistic conception, color collocation and composition form of icons have absorbed many elements from the painting art, so as to increase the artistic form and appeal of the painting. Secondly, influenced by pop art, the UI flat icon design of mobile phones will be integrated into the current social hot spot, popular
cartoon images and some popular slogans on the Internet, so that the icon will be interesting and conform to the public psychology.

The flat icon also draws nutrients from traditional Chinese culture. For example, in important festivals such as the country. The UI interface of mobile phone will be designed in the corresponding style. Taobao, Jingdong site category icons in the New Year used the characteristics of the flat Chinese red paper-cut style. Through association, imagination, exaggeration, symbolic metaphor and other techniques, the designer skillfully combines paper-cutting, UI interface design and icon. The whole interface design style not only conveys the theme message of the New Year, but also fully reflects the regional characteristics of traditional Chinese culture.

The flat icon also draws nutrients from traditional Chinese culture. For example, in important festivals, the UI interface on mobile phone will be designed in the corresponding style. Taobao, Jingdong Website's New Year classification icon adopts the paper-cut style of flat feature, which not only highlights the characteristics of traditional Chinese culture, but also conveys the theme message of the New Year. UI interface flat icon design also enriches the art form of UI interface design and flat icon through association, imagination, exaggerated humor, symbolic metaphor and other techniques, so as to improve the visual experience and aesthetic quality of consumers. To a certain extent, it has aroused the emotional resonance of the audience.

It has enriched the art form of UI interface design and flat icon, and enhanced the visual experience and aesthetic quality of consumers. To a certain extent, it has aroused the emotional resonance of the audience.

3.2 Concise graphic design elements

The extraction of main image elements is the primary content of flat icon design. We know that when designing for a subject, it is necessary to fully reflect the main information conveyed by the subject and carry out icon design according to the subject, so as to get twice the result with half the effort, make the final design graphics have strong directivity, and let the audience understand the true meaning of the icon and its implication when they see it. Especially in the IOT information environment, users can quickly access information, which has become the primary work of the Internet, so the flat icon design should be clearly directed to better meet the needs of the audience.

The simple and clear design style of the Flat icon captures the audience's attention. We know that figurative images touch the hearts of consumers with their vivid and delicate details, causing resonance. However, excessive attention to detail makes the image too complicated. Especially, the icons on the UI interface diagram similar to the mobile phone are designed to fit the use of the mobile phone terminal, which is too complicated and affects the understanding of the audience. Therefore, the simplification and abstraction of the figurative graphics become the focus of the flat icon design. Concise but not simple, icons contain rich information, which can be expressed through concise images, so that the information can be clearer and easier for the audience to recognize and remember. Therefore, the abstraction and generalization of the image can deliver simpler and more accurate information to the user and meet the user's higher use requirements.

3.3 Color designs with strong visual impact

If small and full of design icons want to form a visual impact, it goes without saying that the importance of color! In the UI interface of mobile phones, color matching style of flat icon generally adopts complementary colors or contrasting colors with strong color contrast
to stimulate the audience's eye to the maximum extent and attract the attention of consumers.

However, in order to avoid too bright colors and interference with the line of sight, the overall tone will appropriately reduce the color purity, so that the overall icon color presents the color collocation feeling of "harmony in contrast". For tie-in on chromatology similar color and similar color of absolute harmony are also often used in mobile phone UI icon design, but with similar color and similar use of color in order to increase visual appeal in the icon tend to join a small amount of contrast, formation of that "comparison" in harmony in scope, in order to control the overall graphic picture color, forming a harmonious unification and change color vision feeling.

### 3.4 The order of the picture

As a special icon form for network, The flat icon's core concept in design is to simplify the complex, that is, to summarize and abstract the image of specific things, so as to present the most concise and essential form. The simple and clear feature of the design determines the order of its images. The icons on the small UI interface of mobile phones are only about 1cm in size, and most of the icon graphic designs are simple and orderly.

When multiple graphic elements appear on an icon, they are generally arranged in simple geometric forms such as circles, rectangles and parallelograms, which are mainly composed of symmetrical and repetitive bones. Through the repeated arrangement of simple graphics, the audience's impression on the icon is deepened, so as to pay attention to the information behind the icon.

### 4 Research on the design method of icon flat style in mobile phone UI interface

#### 4.1 Modeling of subtraction

The feature of the flat style is to use a minimalist shape to show graphic elements, and simplify all complex elements to make the picture more intuitive and more design sense. What need our attention is that the most basic geometry is the model of extracting elements. The single geometric graphic element is representative, simple and intuitive, easy for the audience to understand and convey information, and the visual effect presented is relatively vivid and interesting. In particular, the collocation and combination of geometric graphics are used in the picture to form a sense of rhythm and rhythm, so that the audience can understand the information behind the icon in a relaxed and pleasant way.

![Figure 3-1. Subtractive modeling icon Design (Pictures from Baidu Pictures).](287)
4.2 Enhance the personalization of icons, highlight sparkle

4.2.1 Origami style

Drawing on the artistic features of origami, it forms a picture with abundant light and shade levels and obvious structure. Origami style is easy to create a three-dimensional sense of space. The complex light and dark levels combined with the simple shape and color challenge the stereoscopic nature of flat.

Figure 3-2. Origami style Icon Design (Pictures from Baidu Pictures).

4.2.2 Use projection to increase the sense of picture level

Icons in this style are those in which graphic elements are clearly projected. The addition of projection can create a sense of picture and space with distinct layers. The number of colors used for the projection style icon is relatively small, and 3 kinds of colors are generally adopted. The color purity is relatively high, which forms a concise picture style, and the picture is prominent, eye-catching and has strong impact.

Figure 3-3. Projection Style Icon Design (Pictures from Baidu Pictures).

4.2.3 Pure planarization style

In the pure planarization style, the flat icon completely adopts the visual manifestation form of planarization. The overall picture is flat in color, clear in color, simple in shape and strong in design. The visual recognition of the entire icon is high, which is also a form of manifestation adopted more frequently in the UI interface of mobile phones.
4.2.4 Light and three-dimensional sense

This type of icon can be seen from the surface of the obvious thickness, the thickness of the details to increase the three-dimensional image, increase the thickness of the icon. As a result of the richness of details, so that the overall visual effect of unity, simplicity is not as eye-catching as the pure planarization style. But it also has its uniqueness as a form of expression.

4.3 Bright and high purity colors

Flat icon compared to other forms of visual art, have more bold eye-catching color scheme. The main reason is that flat icon is suitable for mobile phone UI interface, the size is too small to make the picture can't depiction of graphic elements to do too much detail, so I need increase the rate of icon attention through the compact model and high purity to colorful images. So no matter the color is lightness, hue or saturation are relatively high. Most of the flat icon color blocks are basically controlled between 2-6 colors, which can be represented by using the technique of flat painting with pure color blocks, so as to make the icon easy to recognize and strong integrity.

If the color scheme is too complicated, the intention of the icon will be weakened and the information of the icon will not be clear enough. Therefore, UI interface icon design is featured by small size and flat shape, and color scheme is usually matched with high-saturation and strong contrast colors, so as to create visual tension and make up for the thinness in modeling.
4.4 The primary and secondary of multi-element combination is distinct

The design concept of flat icon is to subtract from the image shape. In the face of multiple elements of the screen, permutation and combination becomes particularly important. For the permutation and combination of multiple elements, the primary and secondary relationship should be selected first and arranged orderly according to the primary and secondary relationship. Secondly, flat is not to restore the authenticity of things, but to extract the main characteristics of things, and simplify the complex forms with concise and general methods. Therefore, simple forms can be extracted for better information transmission. With people's brains receiving more and more picture information every day, the most direct graphics with bright and straightforward colors are the best choice to convey information, which is why Flat is so popular all over the world.

![Figure 3-6. Multi-element Icon Design (Pictures from Baidu Pictures).](image)

5 The future development trend of flat icon in the UI interface of Self-Media mobile phones

Due to the rapid development of commodity economy and electronic technology, the communication media has also undergone earth-changing changes, with the traditional media gradually declining, while the new types of Multimedia, Micro video, mobile phone self-media, etc. have undergone tremendous changes from the form of communication to the content of communication.

From the initial text description to the image display, from the single communication to the interaction of diversified communication, from the play of imagination to visual representation of the epoch-making revolution. In the face of multi-level and diverse needs of customers, in the face of diversity, popularity of electronic media, the design of the multimedia mobile phone flat icon is to adapt to the epochal changes at breakneck speed, it has a clear, lively and concise color, composition form because of its vividness, interesting and timeliness of information transmission meet the multi-level and multi-dimensional audience's psychological demand. It is also consistent with the characteristics of the rapid spread of the Internet, determining the flat icon design will become important forms of mobile UI interface design.

The development of self-media mobile phone calls for the emergence of diversified design styles of icons. After using flat style for a period of time, designers began to explore more possibilities. New definitions of flat style kept appearing, including more "paper-cut style", "black and white style", "nearly flat", "semi-flat" and other new icon design styles.
The new design style is flat on the whole, but adds other treatments and styling elements, or uses subtle shadows, or adds highlights to create new shapes for UI icons. I believe there will be more forms and styles of icons in the future to enrich our mobile terminal UI interface design.

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