

Analysing the Interaction Design of Motion Graphics in Mobile UI

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Abstract. This article takes the development of new media as the background, starts from the basic concept, clarifies the logical relationship between mobile UI, interaction design, and dynamic graphics, fully explores the interaction advantages and interaction forms of dynamic graphics in mobile UI, and puts forward the interaction design principles of dynamic graphics in mobile UI, so as to enhance the user's interaction experience of using mobile UI products, and provides ideas and directions for the dynamic interaction design of mobile UI.

Keywords: Motion graphics, mobile UI, interaction design

1 Introduction

With the rapid development of new media and the Internet, people's requirements for mobile devices are getting higher and higher, dynamic, interactive and interesting interaction design is more in line with the aesthetic value of people nowadays, and the interaction design of dynamic graphics in mobile UI is not only capable of enriching the visual effect and highlighting the function of the product, but also able to enhance the sense of participation and emotional experience of the user. In this paper, on the basis of dynamic graphics, we discuss the advantages and forms of expression of interaction in mobile UI, and summarize the principles of dynamic graphics in UI interaction design to create an efficient, interesting and immersive interactive world for users.

2 Basic logical concepts

From the perspective of mobile UI interaction design to study dynamic graphics, it is crucial to clarify the logical relationship between mobile UI, interaction design, and dynamic graphics. In UI design by the visual design and interaction design cross into the graphic is the interface design part of the UI, interface design in the interaction of the part of the dynamic graphic involves dynamic graphics, the specific relationship is shown in Figure 1.

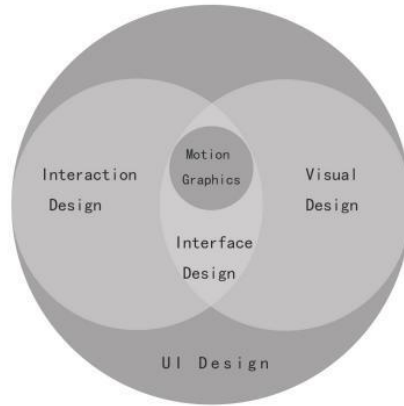


Fig. 1 Logical relationship diagram of the three, image credit: author's own.

2.1 Motion graphics concepts

Motion graphics refers to "graphics that change shape with the flow of time", in simple terms, motion graphics can be interpreted as graphic design that moves, is a kind of video art. Because motion graphics integration of graphic design, animation design and film language, involving visual, tactile, auditory multiple aspects, so the expression and application areas are rich and diverse, in the development of the Internet media play an irreplaceable role, dynamic graphic design can play the role of visual technology effectively, applied to mobile UI interaction design, enough to optimize the user experience in the process of using the user.

2.2 UI and Interaction Design Concepts

In the new media era, interaction in the mobile UI is more and more widely used, and inseparable. UI is short for User Interface, UI design refers to the human-computer interaction of the software, the operation logic, the overall design of the interface aesthetics. Broadly speaking, the interaction between the user and the interface we call it UI, UI design is the core of the "people", must follow the user-centered principle, as shown in Figure 2. Mobile UI mainly includes cell phones, tablets, navigators, smart watches and other devices.

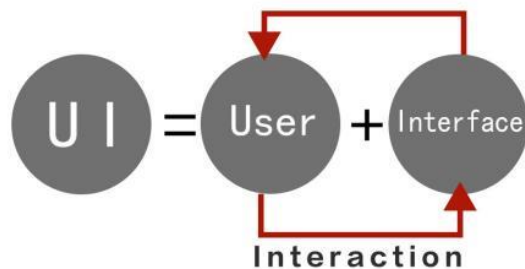


Fig. 2 Generalized UI conceptual diagram, image source: author's own work

The term "interaction design" first appeared in the mid-1980s, initially divided from the field of industrial design, originating from the user-centered thinking method in industrial design, covering two aspects of the characteristics - information transfer and user feedback. Interaction design is defined as the design of a product's mode of operation, execution procedures and content framework, so as to achieve the convenience of operation and understanding of the application and to meet the psychological needs of the user's use process, which is a bridge for the user to progress from the product's functional needs to its emotional needs.³

Interaction design contains multi-level, multi-dimensional attributes, the interaction gives "action" to give the corresponding "feedback", in order to form a closed behavior. On the one hand, interaction is the interaction between users and machines, systems, environments, etc. Users get timely feedback, which to a certain extent can enhance user participation, optimize the operation logic and improve user experience. On the other hand, interaction design includes both input and output, which need to be realized through the user's senses. At present, the user input mode is user-themed, mainly tactile and voice-based, and the output mode is machine-themed, mainly visual and auditory-based.

3 Interactive Benefits of Motion Graphics in Mobile UI

3.1 Enhanced forms of guidance

At the current stage in mobile UI design, the interaction design of dynamic graphics is developing in a diversified way. From the content point of view, the introduction of dynamic graphics into UI interaction improves the communication efficiency and strengthens the visual guidance effect, which not only enables the UI interface to produce a rich and interesting visual experience, but also gathers the focus of the user's vision, allowing the user to pay attention to its content and bringing more interesting visual guidance to the user. From the functional point of view, dynamic graphics can break through the single traditional text and static graphic functions, combined with audio-visual multi-sensory systems, such as visual dynamics, voice dialogues, gestures expression, etc. This natural interaction is also developing into a multi-channel, multi-sensory, multi-dimensional integrated intelligent interaction system.⁵ To a certain extent, it improves the expressiveness of the graphic, helps users to understand it quickly and find the required functions quickly, and plays a good role in guiding them.

3.2 Controlling hierarchical relationships

Hierarchy is very important in mobile UI design, and it directly affects whether information can be effectively delivered to users. Good information priority layout and reasonable hierarchy is the key to grasp the core experience and psychological behavior of users. First of all, dynamic graphics control the priority in the first level interface, and usually display the hottest and most important content to the user, so as to attract the user's attention and click. To a certain extent, it can reduce some unnecessary steps and simplify the hierarchy. Secondly, dynamic graphics in the second level of the page to achieve information visualization, guidance to help users understand the display of information, to dynamic visualization of the form displayed to the user, so that the user can understand the functional information in a short

time, to master the key points. Finally, the dynamic graphic realizes interactive and detailed in the third level page, helping users understand the detailed information and carry out interactive operation, so as to strengthen the operation details and interaction. The information between the three levels is gradually increasing, controlling the priority level of information and maximizing efficiency.

3.3 Enhancing the user experience

"Emotion" reflects a person's experience, association and memory. Experience is formed through the senses of emotion, "experience" requires the user to first mobilize the senses to feel, followed by psychological cognition, and finally in the emotional feedback.¹ Excellent dynamic interaction design directly affects the user's emotional feelings and experience, mobile UI design in the dynamic graphic interaction form of interactivity and fun, are for the user's services, standing in the user experience point of view, to solve the user's needs and pain points. Such as in the APP start page design will join part of the dynamic graphics, on the one hand, relieve the user's anxiety due to waiting, on the other hand, through the dynamic visualization of the APP brand content, to meet the user's emotional experience needs. Secondly, dynamic icons, dynamic buttons and other design contents often appear in the APP page, which are easy for users to operate and understand, and satisfy the users' instinctive needs while bringing a comfortable operation experience. The use of dynamic graphic interaction design not only improves the timeliness of the information conveyed in the mobile UI, but also highlights the artistic influence of the product, and ultimately enhances the user's emotional experience of using the products.

4 Interactive forms of motion graphics in mobile UI

Broadly speaking there are two types of interaction manifestations of motion graphics in UI, real-time and non-real-time interactions, with real-time interactions providing immediate feedback as the user manipulates UI elements on the screen. In other words, the action behavior responds immediately to user input. Non-real-time interactions occur after user input, which means that the user must briefly pause and observe the resulting dynamic interaction behavior before continuing.

Narrowly viewed dynamic graphics in the UI interaction in a variety of forms, visual, auditory, tactile, voice and other forms of interaction are common forms of interaction in the UI, the user through the operation of the mobile interface, the interaction is to participate in the process of dynamic graphics or the results, or feedback, or guidance. When the user interacts with the visual and tactile elements of the interface, such as graphics and text, positive feedback will be given to the user during the process, such as a change in the color of the icon. It is also possible to guide the user to the next step in time through the dynamic graphics on the interface. When the user operates the mobile interface through voice, the machine can interact with the user through voice interaction, so that the user is in the UI, the effective use of dynamic graphics can add interactive forms and vitality to the mobile interface, thus bringing the user a better experience.²

5 Interaction Design Principles for Motion Graphics in Mobile UI

5.1 Follow the laws of physics

Dynamic graphics should follow the basic physical laws when designing for interaction, such as fast then slow, landing rebound, and inertial rebound, as shown in Figure 3. Following the laws of physics in the design can match the user with the real content, so that the user can feel the sense of realism and immersion.

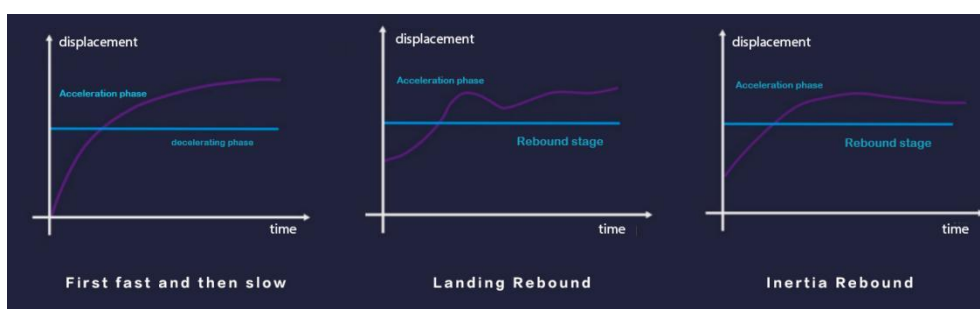


Fig. 3 Diagram of the laws of physics, image credit: author's own

First fast and then slow, there will be a dynamic effect of first fast and then slow when you slide the page content, for example, in some interfaces, when you slide some content left and right, it won't come to an abrupt end, but first fast and then slow presentation effect. Landing rebound, for example, in the APP from the top or the left and right side of the page, after landing there will be an up and down rebound action. Inertia rebound, in the APP interface pop-up window design, the pop-up window does not come out and stop immediately, but there is a constant zoom-in and zoom-out rebound action. Following the basic laws of physics can enhance the expressiveness of the product, improve the immersive experience of the user, and strengthen the user's real interaction with the product.

5.2 Conformity to realistic bionicity

People are prone to feel good about things they are familiar with, and in product design, we often use real objects around us as design elements, and associate common visual images or sounds in real life with metaphors, so as to quickly bring users closer to the relationship between them and the product. Visually speaking, UI icon design in the early days to bionic the main, reflecting the real sense of experience, in order to better adapt to the interface, the icon continues to develop, the formation of a more flat icon, and even linear icon, but still retains the basic core of the icon bionic. For example, the design of the camera icon will be based on the real form of the camera, as shown in Figure 4. Tactile, see in the WeChat chat page, double-click on the avatar to trigger a shot, the avatar will produce left and right shaking effect, visual and tactile cooperation to make the whole interactive process more vivid. Emotionally speaking, in the music APP, as shown in Figure 5, there is basically a dynamic rotation of the old-fashioned record in the playback interface, and the record is the traditional tool for playing music, so this real form of interaction makes the user immersed in the scene and establishes a sense of familiarity with the user.

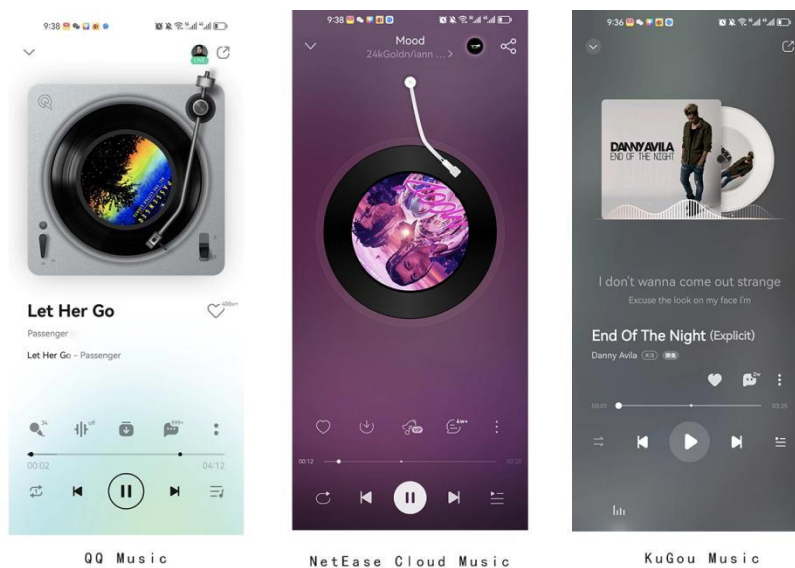


bionic icon

Flat icon

Linear icon

Fig. 4 Camera labeled image, image credit: author's own



QQ Music

NetEase Cloud Music

KuGou Music

Fig. 5 Music APP playback interface, image source APP screenshot

5.3 Control of dynamic time

Dynamic graphics is "graphics that change shape with the flow of time", time plays an important role in the design of dynamic graphics, so the dynamic graphics with reasonable time can provide users with a smooth experience in the process of using interaction. In UI dynamic interaction, the interaction feedback should be fast and direct, such as the user clicks on the lag or too long time will affect the user's sense of use. In APP design, dynamic graphics are involved in page switching, start page and page design. The dynamic loading of the page switch is to overload the page, so the loading of dynamic effects should not be too long, generally no more than one second. Dynamic graphics in the start page, on the one hand, in order to ease the user's emotions, on the other hand, to deepen the brand impression, enhance the fun, the length of time is generally controlled within 3 seconds. Page design has a lot of dynamic graphics, this kind of graphics cycle, the purpose is to attract the attention of users, the cycle length is generally controlled in 2-3 seconds, control the length of dynamic graphics to enhance the quality of the product and user experience.

5.4 Focus on emotional design

Donald Norman wrote in *Design Psychology 3*: "The success of a product, the emotional elements of the design may be more critical than the practical elements."⁶ He believes that the emotional system contains three levels, first of all, the first impression of the product according to the visual, auditory for the instinctive level, followed by the use of the product's function, interactive experience for the behavioral level, and finally in the use of the product after the emotional, personal feelings for the reflective level.

Instinctive level: people will be attracted by the beautiful appearance, the instinctive level is the most basic content of the design, the visual graphic elements in the design of the dynamic graphics of the main position, the sensory experience can attract people to interact with the experience, such as in the APP in the interesting dynamic graphics, beautiful colors, pleasing to the ear of the sound can be enhanced the user's first impression of the product, to the user to establish a good emotional experience.

Behavioral level: At the behavioral level, the focus is on interactive operation and functional satisfaction, and intuitive instincts are not so important at this stage. Excellent visual effects are indeed more effective in catching people's eyes, but after satisfying the visual feeling, the functionality based on user experience is the purpose of use. Good dynamic interaction at this level will enhance the frequency of use, reduce the cognitive burden, and improve the fun, for example, in the Tencent QQ friend dynamics, the like function will produce interesting dynamic interaction, on the one hand, the user's interactive operation experience is strong and participatory; on the other hand, it will satisfy the user's use of the like function.

Reflective level: reflective level comes from the visual and interactive feelings and other aspects, as a bridge carrying emotions, not only connects the visual information of the dynamic graphics, interactive feedback, but also connects the multi-sensory experience, emotional feelings, to meet people's emotional needs.⁴ Dynamic graphics firstly, through excellent visual experience, bring good impression and feeling for users, secondly, through more reasonable interactive behavior, bring convenience, efficiency, fun and other aspects of the advantages for users, and finally finally reach the brain for thinking and reflecting, the brain can make the final judgment and thinking based on the experience information obtained before, and make comprehensive evaluation of the product.

6 Conclusions

The continuous development of mobile terminals in the new media era has given rise to the innovation of dynamic graphic design, which brings a brand-new development space for mobile UI interaction design, and transforms the interaction form and design principles. Based on the complementary relationship between mobile UI, interaction design and dynamic graphics, this paper analyzes the interaction advantages of dynamic graphics in mobile UI, clarifies the interaction form of dynamic graphics in mobile UI, and proposes the design principles of dynamic graphics in mobile UI. Eventually, mobile UI products can better serve users and provide more references and lessons for the development of dynamic graphics in mobile UI interaction.

Scientific research projects: (1)2021 Youth Project of Humanities and Social Sciences at School Level, Research on Interaction Design of Dynamic Graphics in Digital Media Era (Project No. GKY-2021KYQNW-53). (2)2020 School-level "Innovation and Strengthening Project" Digital Creative Design Innovation Research Team (No. GKY-2020CQTD-6). (3)2022 Guangdong Undergraduate Colleges and Universities Teaching Quality and Teaching Reform Project Construction of Experimental Teaching Demonstration Center Project<Virtual Reality Experimental Teaching Demonstration Center for Digital Arts>

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