

Design of Game Style Navigation APP Interface Based on User Experience*

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Abstract—In the overall situation where artificial intelligence services is developing rapidly and the dependency of people on service type mobile software increases day by day and to meet the demands of consumers of pursuing better experience and personalized ideas, this paper takes user experience as the object of study to discuss the user experience in game style navigation APP and analyzes the factors impacting the interface design of navigation APP through the aspects including visual factor, emotion factor and interaction factor, etc and optimizes the interface design of navigation APP through the gamification mode. The paper takes the interface design of “Arbitrary Door” navigation APP as an example to accomplish the import of game style in the interface design of navigation APP and realizes the optimization of interface design of navigation APP based on user experience. This paper also finds that the interface design of navigation APP integrated with game style can adapt to the trend of the times and meet the demands of users through building of user model analysis.

Keywords—user experience; game style; navigation; interface design

I. INTRODUCTION

With the rapid development of communication network [1] and popularization of smart phones in users, the service mobile software such as navigation APP has gradually permeated into people's daily life. The improvement of consumption level and aesthetic appreciation makes the public focus more on the experience, innovation and enjoyment of software interface design when the basic demands have been met. The navigation APP of game style combines functions with aesthetic appreciation and pays attention to the innovation and beautification of interface design of navigation APP so as to improve the user experience.

II. NAVIGATION APP AND GAMIFICATION INTERFACE

As the important medium for the public to travel and get road condition information in travelling, the navigation APP

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has become one of the necessary software in smart phones. It is found in market research that although the existing navigation APP on the market has perfect functions, the interface design is too simple and lacks innovation. However, as the main activity for the entertainment of younger generation of smart phone users, games are not just the tools for spending time, but are more like outcome of social networking and trend of the times. For example, iG Gaming won the S8 championship on the 2018 World Championship of League of Legends on November 3 and game industry becomes more and more popular among the younger generation in China. As a kind of public entertainment, game is gradually penetrating our daily life. The pain spots of users are analyzed in gamification interface design and it is found that there are various kinds of navigation APP on the market, but there are still users who cannot correctly and timely arrive at the destination due to complex road conditions, incorrect positioning, unclear icon indication and too complex interface operation, etc. The interface design of navigation APP integrated with game style will enhance the interaction between users and products and guide the users to master the road condition information during navigation process in the mode of gamification first perspective so as to promote the sense of identity and sense of belonging of users on products [2].

III. ANALYSIS OF COMPETITIVE PRODUCTS OF NAVIGATION APP

There are various kinds of navigation APP on market. On the basis of solving the demands of users for travelling, tour route planning and obtaining information about destination, each APP has their different focus and interface design. Through the survey of user demands in early stage, the author selects the navigation APP: Gaode map, Baidu Map and Tencent Map which are generally known by users of smart phone and fabricates the competitive product analysis chart, as shown in “Fig. 1”. And this paper analyzes the factors impacting interface design of navigation APP through three aspects including interface style, interface color and interface layout [3].

TABLE I. COMPETITIVE PRODUCT ANALYSIS CHART

	Gaode Map	Baidu Map	Tencent Map
style	The interface is simple	Simple style but lack of innovation	Refreshing and simple
color	Based on white, complemented by blue	Based on beige, supplemented by blue, but the color is weak, resulting in poor icon pointing	Based on beige, supplemented by light green
layout	The basic layout is more reasonable, but the design is single, which is easy to cause visual fatigue	Subsidiary functions account for a large number of applications and poor practicality	Functional layout is too confusing, not concise
advantage	Better in positioning	The interface is very simple, it will provide a variety of solutions according to the search content, the distance calculation is more accurate	Better in human-computer interaction
disadvantage	Functional icon design is simple, the difference is poor	The real scene display is poor, the update is slow, and it is not conducive to using real scene view	Displaying main roads and road planning often shows unclear or unreasonable problems

A. Factor of Interface Style

The interface style is the basis of the entire APP interface design which can most intuitively convey the aspect that the interface design is going to manifest and lay the foundation of interface design. The users can understand the ideas and characters that the APP is going to convey in the fastest and the most comprehensive mode. The interface styles of most of the competitive products in this survey are mainly simple and intuitionistic. The introduction of game style into APP interface design has certain innovation and will bring the more sense of science and technology and impact on the visual experience of users and will more easily arouse the curiosity of users in the navigation interface of emotion game style. At the same time, the gamification mode can guide users to operate and use navigation APP to understand the functions of APP in a more deep and comprehensive mode so as to promote the dependency of users on navigation APP.

Taking Baidu Map in the competitive products as example, we click on the initial page and the contents presented are the map indicating location of users where an icon consisting of a blue round and a blue triangle indicates users and the direction of triangle changes when the mobile phone of user turns around. The different road information in the map is distinguished by the small icons with different colors and shapes. The entire interface presents simple style and the function buttons are relatively reasonably distributed, but the interface style lacks innovation and does not possess speciality of product which lacks competitiveness. At the same time, although Baidu Map has comprehensive functions, part of the auxiliary functions has low practicability.

B. Factor of Interface Color

The colors in interface design may bring emotion insinuation to people to certain extent. For example, red

symbolizes enthusiasm, joy and excitement, etc; yellow symbolizes vivid, vitality and pleasure, etc; white symbolizes purity, cleanness and tidiness, etc. Different colors have different insinuation functions on emotion. Through arrangement of the sequence, size and scope of distribution of each color in interface design and the lightness, hue and saturability of colors, the emotions which need to be felt by users can be conveyed [4].

Considering the safety in use of navigation APP and to avoid potential safety hazards of drivers in use, the navigation APP should strive to avoid using bright-colored and dazzling colors with over high saturability and shall also strive to avoid causing the problem of unclear directive due to over mixed use of colors. Taking Gaode Map as an example, as the navigation APP which has the maximum use frequency of users in the early stage survey, Gaode Map mainly adopts simple color matching and the main colors of interface are gray and white and the complementary color is blue. However, the colors used for icon color classification have low differentiation which makes the icon directivity unclear and lack recognizability.

C. Factor of Interface Layout

As an important factor impacting user experience in the interface design and interaction design, the reasonable function layout including icon, service function buttons and search box, etc in interface layout will directly impact user experience. The navigation interface layout with logic that can meet the use purpose of users can ensure users to feel convenient in operation and use process and ensure them to obtain the information and plan that they want to know the most in the fastest and the most comfortable way. The reasonable interface layout can not only bring comfortable experience for users but also can make users be dependent on the interface operation system. When designing game style navigation APP interface layout, we should think about problems from the perspective of users and capture the use habits and mode of thinking of users, respect the operation modes of users and should also fully meet the demands of users on information acquisition, route planning, visual sense and emotion, etc. It is found through early stage survey that female will more easily get lost when travelling alone and that female may waste much time in their journey due to lack of understanding of icons, unreasonable route planning and incorrect positioning, etc even when they use navigation APP. Therefore, it appears to be particularly important to improve the rationality of function layout in interface layout, enhance the interaction between users and navigation APP and guide users to operate the navigation APP.

Taking the interface layout of Tencent Navigation APP as an example, click on the initial page of map and it is found that the users' locations manifested by icons are more detailed than those of Baidu Map and Gaode Map and the manifestation scope is smaller which will easily cause cordial feeling of users. However, it is found that the layout of icons of landmark buildings is not clear enough and the landmark buildings are too flat on navigation interface after the map is shrunk which is difficult for users to identify the road condition information.

IV. ANALYSIS OF USER EXPERIENCE IN NAVIGATION APP WITH GAME INTERFACE

As an important factor for measuring whether APP software is successful or not, the user experience is obtained from the experiences of users through visual perception, man-machine interaction and operation behavior, etc when using APP [5]. Through early stage user survey, the interface design factors impacting user experiences are extracted as follow: emotion experience which is the user's recognition of products on emotion level. The interface design shall be injected with design emotions, product spirits and brand culture except for just meeting the demands of users on functions which can meet the emotional demands of users. Build the brand loyalty and promote the feeling of dependency of users; the visual experience, color and interface layout, etc are all the basic elements constituting interface design. And such basic elements are the foundation of manifestation of interface design. Make users have a good impression on the product through visual sense so as to motivate the use behavior of users; interaction experience, a series of operations conducted by users when using navigation APP with game interface, such as sliding interface, switching interface by clicking on icons and amplification and shrink of interface, etc. The rationality of interactive experience will directly determine the favorability of users on navigation APP; therefore we should focus on and set out from the perspectives including operation habits and use behaviors of users on the aspect of interactive experience [6].

A. Emotional Experience

The emotional experience is based on the user's sense of identity, feeling of dependency on products and loyalty on products after long-term use. Emotional experience requires the interface design to not only meet the demands of users on functions but also can convey the design philosophy, culture characteristic and story of products to users so as to let users to fully feel the relationship with products that is established on products. The introduction of game style will greatly improve the interaction with users and will enable users to generate sense of identity on the emotional level for products.

B. Visual Experience

The users can generate the visual experience in their minds through the color use, icon layout, image-text layout and other factors in interface design. This is also most intuitive difference between the navigation APP with game style and existing navigation APP on the market that can be felt through visual sense in interface design. The redesign of icon styles, color matching and function distribution will enable the interface of navigation APP to possess more sense of science and technology and entertainment. Meanwhile, after introducing game style in interface design, users can adopt the first perspective navigation mode in the journey to the destination. This mode mainly helps the target people who have poor sense of direction and frequently get lost due to unclear indication of navigation icons. Therefore, the advantages of game mode should be fully extracted on visual experience to attract users' attention.

C. Interactive Experience

Interactive experience is obtained based on the demands of users for obtaining the information including travelling, road conditions and merchant information. The interface design of navigation APP with game mode shall reach the effect of clear function button distribution, correct information and clear icon indication where the users can use and operate the interface in a comfortable way. The navigation APP interface with game styles and characters will set up reward and punishment mechanism. Through finishing the tasks, interaction with merchant and friends and families and other modes, the interactive experience of users in use can be enhanced which can help the users to understand product functions in a deeper level and improve the entertainment experience on the way.

V. INTERFACE DESIGN OF NAVIGATION APP WITH GAME STYLE BASED ON USER EXPERIENCE

Through analysis of the factors on three aspects impacting user experience: interactive experience, visual experience and emotional experience, it is found that the interface in game style can improve the interaction between users and products after redesign of icon styles, color matching and function distribution and can also optimize the interactive experience, visual experience and emotional experience of users [7]. "Arbitrary Door", a game style navigation APP, is independently designed as example which is as shown in "Fig. 1".

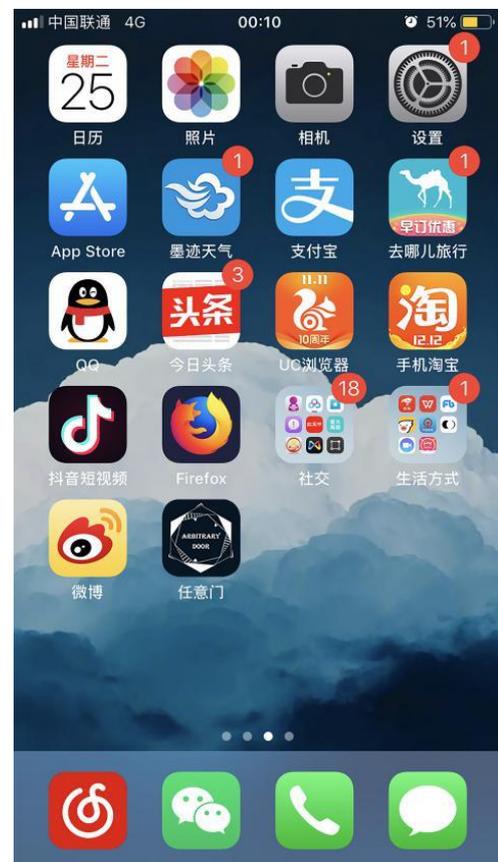


Fig. 1. Icons on desktop.

A. Study and Analysis of User Demands

Before designing the game style navigation APP interface, the steps done are as follows: determine user group first and understand the psychological behavior of target users through questionnaires and user visit, etc; then, observe and analyze the

series of mental activities, use demands and use behaviors that will be generated before making decisions and on the way and build the interactive model based on user behavioral model, as shown in "Fig. 2". User behavioral mode analysis is shown in "Table II". This way can lay a foundation for game style interface design based on user experience in later phase.

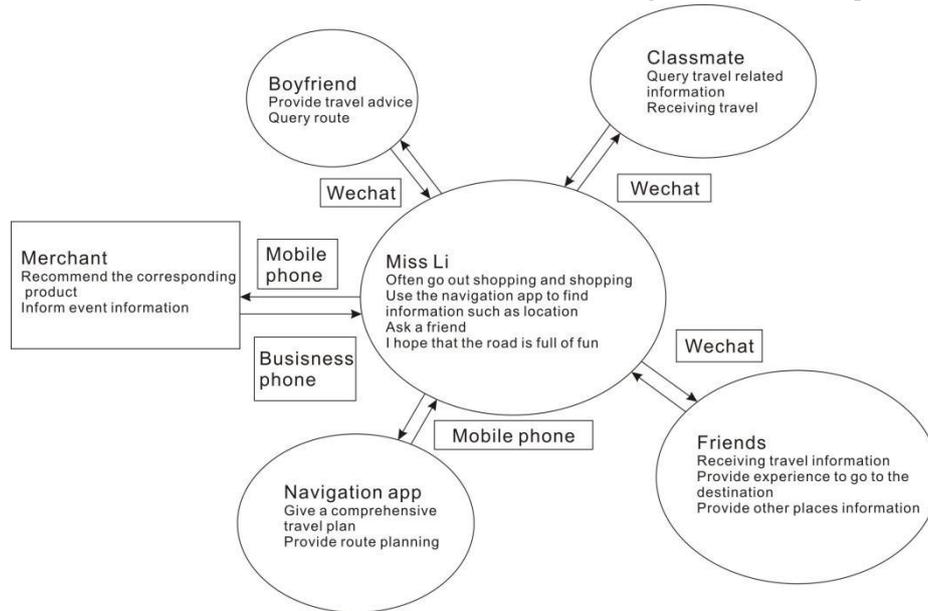


Fig. 2. Interactive model.

We can see from the building of interactive model that users mainly obtain the travel information through two kinds of modes when coming up with the idea of travelling: first, communicate with the people with close relationship to obtain travel experience and information; second, use navigation APP. It is found from analysis that the first kind of mode for obtaining information needs longer time where the information is also relatively scattered and needs the organization of users; and the information collected has individual subjectivity which is not objective and comprehensive enough and cannot guarantee the serviceability and applicability of information. However, when choosing navigation APP to obtain travel information, users can directly obtain the overall route planning and can voluntarily choose the optimal route where the time for information acquisition is relatively shorter. It can increase the travel efficiency. According to the interactive model, further determine the target prototype and conduct study and analysis to the behavior mode, as shown in "Table II".

TABLE II. ANALYSIS CHART FOR USER BEHAVIOR MODE

User prototype	Problem found	Solutions
	During the travel process, the route plan will change, and occasionally the positioning will be inaccurate, which will lead to errors in the destination.	GPS+Mobile Artificial Intelligence
Mr. Wang	As a young man, Mr. Wang feels monotonous and not fresh enough for the navigation app interface and navigation mode he is using now.	Try new apps, compare them, choose your favorite and distinctive.
Be good at using the network to plan your itinerary and follow the traveler who planned the route	The navigation APP has a weak sense of substitution and is not attractive enough to use, which reduces the use of the app.	Update and download the APP navigation mode, evaluate it after use, and give feedback to customer service.
	I don't know enough about the activities of many merchants, which caused me to "pay for money" at the time of purchase.	Pay attention to the APP and other corresponding public numbers, get the latest news, browse other users' comments.

Through above survey and analysis, it is found that the users who frequently use network and are good at planning route can solve these problems with the help of GPS and artificial intelligence even they may occasionally change route planning and encounter the condition of incorrect positioning when traveling alone. At the same time, in the process of using navigation, they hope that the interaction with navigation APP can be enhanced to add some fun to the boring journey and they also look forward to obtain more merchant information and the feedback of other users so that they can learn the information about destination and achieve better travel experience.

B. APP Framework Design

The framework design is also known as interface process design which can determine the basic functions, preference setting and key features of navigation APP through building framework model. After analysis of use habits and operation behaviors of users, sort the functions used and the interface contacted when users operate navigation APP in sequential orders [8], as shown in “Fig. 3”.

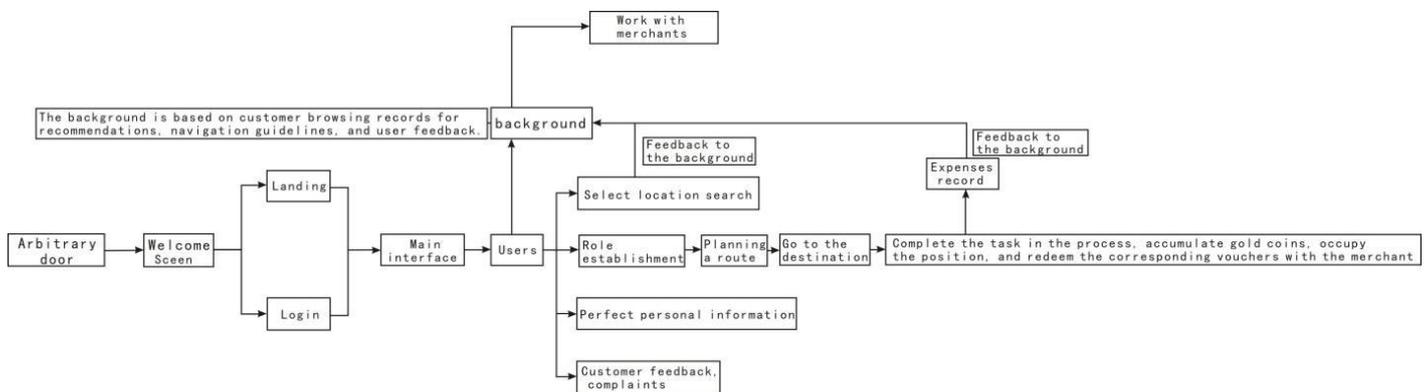


Fig. 3. Interface process design drawing.

The interface process design simulates the sequence of information acquisition of user by using navigation APP in the direction indicated by arrows according to logic and discloses the relations among different interfaces. The interface design flow chart can intuitively show the switching relation among interfaces and provide the users with correct and concise guidance, help users to understand the design philosophy of game style navigation APP and smoothly use the game style navigation APP. The principle of interface design usability is introduced throughout the series of interface switching from welcome interface to the independent completion of tasks of users which can guarantee the users to easily learn to use game style navigation APP and have keen interests in such APP. Based on user experience, the interface process design always takes the simplification of APP use steps as objective and only the functional steps which are the most practical and can manifest the characteristics of game style navigation APP are reserved to meet the basic demands of users.

C. Prototype Design

Preliminarily build the prototype of game style navigation APP after combing the functions through the use process of users in interface process design model. On the login or registration interfaces, place the useful information and key function buttons at the most conspicuous position for convenient user operation; the design of icons always takes the design philosophy of concise and easy to understand to avoid the icons with unclear indication; the navigation interface adopts the first perspective mode of game characters to intensify the feeling of immersion of users, as shown in “Fig.4”. The prototype design shall always be oriented by user

experience to enhance the interaction between user and gamification navigation APP interface and increase the interaction efficiency. For example, guide users to choose character through novice tasks and interact with merchant to draw cash coupons and motivate users to travel and interact with friends who also use the APP through reward and punishment mechanism so as to enable users to preliminarily understand the use mode of gamification navigation APP and convey the idea of game mode to users with the clear function layout. There shall better not be too much complex information on the same information. The directive of icons shall be strong and clear and the function layout in each zone shall not only be mutually connected but also have independence so as to guarantee that users can learn the function layout of each interface fast when using the APP. Integrate the factors impacting user experience including interface style and interface layout, etc., optimize the interaction between interface design and users and improve the interaction performance.

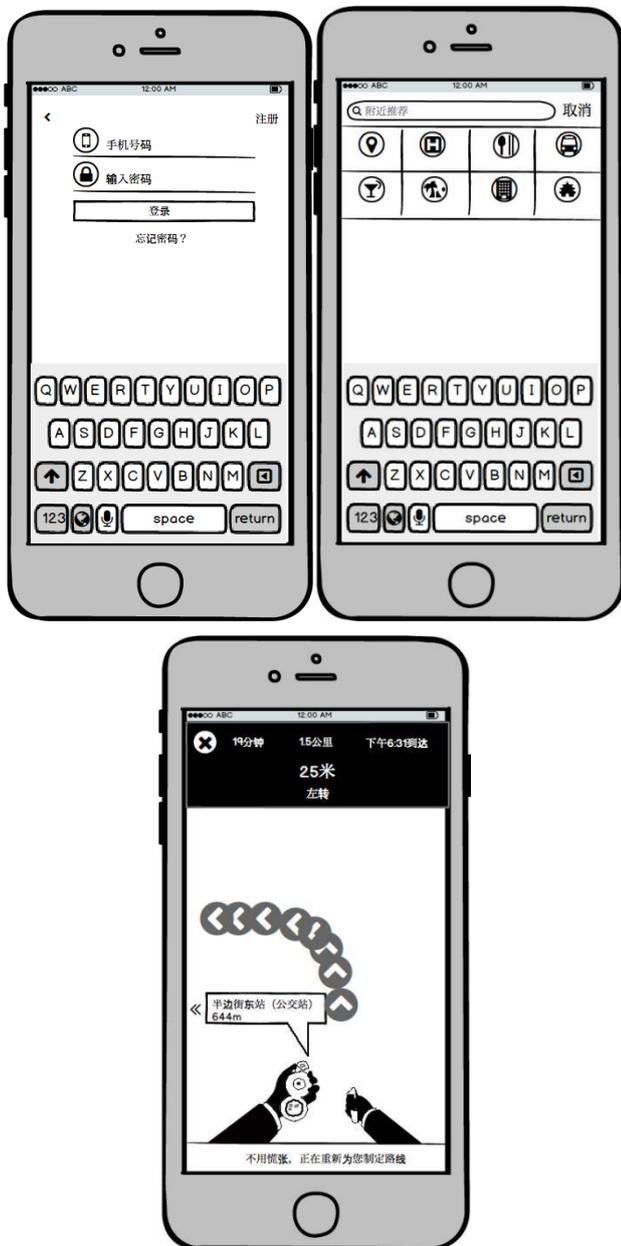


Fig. 4. Lo-fi figure.

D. Visual Design

The visual sense has the most direct sense of use of colors, icon layout, image-text arrangement and other factors in interface design. Under the situation where the interface design of navigation APP is generally the same and lacks innovation and individuation, the interface design of game style navigation APP will possess strong identifiability. In visual design, the game style will convey the main design philosophy of building sense of science and technology, sense of the future and entertainment. Considering the features of navigation, the icons and information shall be distributed according to the sequence of their degree of importance during interface layout so that the users can get correct information in short period and improve the operation efficiency of users. In term of interface

design, focus on the beautification of icons and bring enjoyable visual experience and enjoyment in use for the users. The design of function icons shall conform to the functional properties of such icons, otherwise it will cause obstacle to the identification of users.

E. Application Examples

The interface design of game style navigation APP based on user experience sets out from visual factor, emotion factor and interaction factor to discuss the application of words, images, colors, layout and animation and other contents on system interface in navigation APP. In the interface design of game style navigation APP, focus on enhancing the sense of science and technology and entertainment of interface style and promoting the identifiability and practicability of icons; guide users to use navigation APP by introducing the mode of tasks in navigation and make users be dependent on the products through long-term use.

1) *Diversification of emotional experience*: Although the varieties of APP on the market become more and more and the scope involved also becomes more and more broad, the interface design of most of navigation APP has not made any innovation. The interface design is still monotonous and lacks individuality which would easily cause aesthetic fatigue of users. And such interface cannot interact with users during travel process which lacks entertainment[9]. Through introducing the first perspective game mode to bring the game characters into interface design of navigation APP, users can choose the characters they like when using the navigation APP. And the emotional connection is established through such mode which will make users be dependent on the products through long-term use.

2) *Rationalization of visual experience*: The reasonable visual experience can enable reasonable layout of colors, words and images on the interface through understanding of characteristics and demands of target groups. The interface design of game style navigation APP "Arbitrary Door" shall attach full importance to the coordination between colors and product functions when choosing colors which is also one of most important standards for measuring the quality and function of color in interface design, which will use blue cast. Through the matching of white and blue of different lightness and purity will bring users the calm, stable and comfortable visual experiences. At the same time, add the science and technology elements with more game style and blur out the background to certain extent through large quantity of connection like data points; the matrix in the middle formed by large rounds spreads all around from the center and the lightness and saturability of all colors are also weakened, as shown in "Fig. 5" so as to cause the changes of overall sense of space and grasp the eyes of users and enable the interface design to have innovation and characteristics.

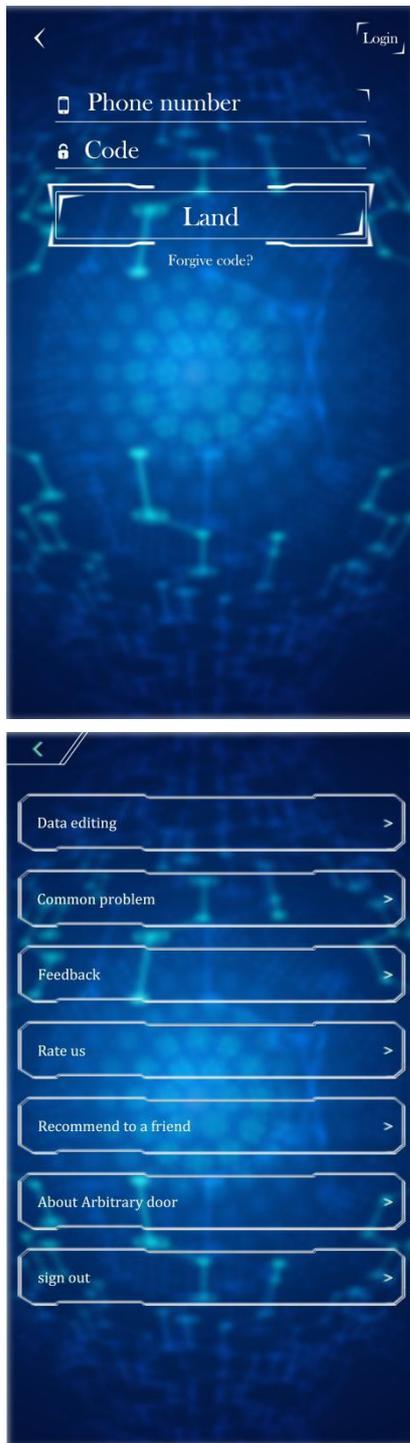


Fig. 5. Hi-Fi figure.

3) *Humanization of interactive experience*: For the convenience of users' operation, the layout of interface design adopts the mode of more blank and the most important function buttons are placed at the center of users' sight [10], simplify auxiliary and other assistant functions and place in the subdirectory of corresponding functions as the secondary navigation in case of causing users to fail in rapidly and correct acquisition of the information that they want. Design the

corresponding and complete work flow and the concise operation can reduce the click of users and increase use efficiency. On the aspect of man-machine interaction, focus on the game reward mechanism in the game style navigation APP. Users can obtain cash coupons and gold through completion of a series of little tasks, cooperation with friends, interaction with merchant and other modes upon login of navigation APP or during traveling process. And it will attract the users to continuously login and use the APP through introduction of the mode of signing in for gold and enable the users to cultivate the use habit and conventional thinking so as to intensify the dependency of users on products, as shown in "Fig. 6".



Fig. 6. Function interface.

VI. CONCLUSION

As the important consideration factor for verifying whether the man-machine interaction and interface design are reasonable, the user experience is gradually intensifying the application in APP. In the future, the design philosophy of people first will be integrated into the interface design of navigation APP and other APP more deeply. As the outcome by conforming to the trend and the times, the interface design of game style navigation APP shall have innovation, rationality and individuality which brings the interactive experience of entertainment for the traveling process of users and can deepen the emotional interaction between products and users. The interface design of navigation APP in the future will study the users' mentality and thoughts more deeply and will gradually promote the user experience during the process of man-machine interaction and it shall take the continuous optimization of user experience in interface design as design objective.

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