REKA BENTUK ANTARA MUKA APLIKASI SEMBANG MUDAH ALIH BERDASARKAN TABIAT PENGGUNAAN ORANG TUA

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Abstrak

Reka bentuk didasarkan pada tabiat dan keperluan pengguna. Reka bentuk ini bertujuan untuk memperbaiki pengalaman antara muka Aplikasi Perbualan telefon pintar bagi pengguna-pengguna tua dengan menggabungkan ciri-ciri yang biasa digunakan dan menangani isu bahawa produk sedia ada tidak mengambil kira corak penggunaan golongan warga emas. Reka bentuk ini bukanlah satu eksperimen, tetapi menggunakan metodologi kajian kualitatif untuk mengkaji isu-isu berkaitan dengan produk semasa, serta permintaan dan kesukaran pengguna melalui analisis literatur, perbandingan kajian, kajian kes, dan temubual. Penemuan-penemuan ini kemudian diatur dan digunakan untuk mengarahkan praktikal reka bentuk.Penemuan-penemuan ini menunjukkan bahawa reka bentuk kajian ini memenuhi keperluan golongan warga emas dalam menggunakan Aplikasi Perbualan telefon pintar dan menawarkan kemudahan dari segi situasi fizikal dan corak pemikiran. Reka bentuk ini membolehkan golongan warga emas menggunakan fungsi Aplikasi dengan lancar dan mengalami kelajuan serta kemudahan yang disediakan oleh dunia maklumat. Reka bentuk ini juga memberi tumpuan kepada kemudahan hubungan antara manusia serta tuntutan emosi.Matlamat utama penyelidikan ini adalah untuk meningkatkan hubungan antara manusia dan mesin bagi golongan warga emas dengan membina antara muka pengguna yang lebih mesra. Ia menentang kerumitan yang biasa ditemui dalam fungsi yang terlalu kompleks dalam telefon pintar biasa, dan memberikan sokongan kepada golongan pengguna yang lebih tua dengan mengambil kira kehendak sebenar mereka dalam reka bentuk antara muka yang lebih mudah digunakan dan visual yang sesuai. Produk yang dihasilkan, terutamanya antara mukanya, menunjukkan ciri kesederhanaan, kegunaan, dan keunikan.Selain daripada unsur emosi dalam penggunaan produk, produk ini mungkin memberikan pengalaman interaktif yang dapat dipercayai, selamat, dan membanggakan. Ini akan membantu membina hubungan emosi yang lebih kuat antara golongan pengguna yang lebih tua dan teknologi telefon pintar, serta menyampaikan nilai dan makna yang sama.

Kata Kunci: Reka bentuk antara muka, sembang APP, warga tua, pengalaman pengguna, tabiat penggunaan

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INTERFACE DESIGN OF MOBILE CHAT APPLICATION BASED ON THE USAGE HABITS OF THE ELDERLY

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Abstract

The User Interface (UI) design is based on the user's habits and needs. This design intends to improve the senior user's smartphone chat interface experiences by merging the features of older users and addressing the issue that existing products do not take the elderly's usage patterns into consideration. Non-experimental design and qualitative research methodology are used in this study by utilizing the questionnaire instruments. To investigate the issues with current products, as well as the demands and pain points of consumers, employ the methods of literature analysis, comparative research, case analysis, and interviewing. Then compile findings and use them to direct design practice. The findings suggest that the study's design, to some extent, fits the demands of the elderly in terms of utilizing smartphone chat APP and offering convenience in terms of physiological situations and cognitive habits. Allow the elderly to appropriately use APP functionalities and experience the speed and convenience that the information society offers. The design responds to the elderly's interpersonal convenience and emotional demands. The primary goal of this research is to improve the man-machine connection between the elderly and smartphone by developing a more user-friendly interface. It opposes the complexity created by the mass function accumulation of ordinary smartphone, and advocates the older user group as the reference standard, based on the real demands of the reasonable interface layout distribution, and in the visual aspect, to carry out a complete study and propose particular solutions. The finished product, particularly the interface, exemplifies simplicity, usefulness, and exclusivity. In addition to the emotional connection elements of the usage process, this product may provide a trustworthy, safe, and dignified interactive experience, such that an emotional connection between the older user group and smartphone goods can be developed, and a common value and meaning may be imparted.

***Keywords**: Interface design, chat APP, the elderly, user experience, usage habits*

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1.0 Introduction

According to the UN's World Population Prospects 2019 report, the world's population has reached 7.7 billion as of 2019, and is expected to exceed 9.7 billion by 2050. At the same time of the rapid growth of population, there is a universal phenomenon that fertility intention continues to decline worldwide. With the improvement of living conditions and the improvement of medical level, the average life expectancy of human beings has also increased significantly compared to before. The elderly population is expanding rapidly, and the degree of global aging is deepening, which has become one of the uncontrollable trends (Qin Xiao, 2021). China's previous old career development plan was to focus on the elderly population, support and expand the elderly social participation, and encourage them to actively explore new forms of participating in social activities. Aging is both a challenge and an opportunity with economic and social development, and they are not a social burden. However, in terms of encouraging their social participation, the industrial revolution has resulted in significant changes to the social system and technological advancement, which have had a significant impact on the authority and advantages of the elderly in society and cause them to face numerous practical issues and barriers in their social participation activities. Then, how to tackle these challenges and hurdles is also the focus of contemporary design, that is, to develop products that are in line with the actual demands of the senior user group. Furthermore, the advancement of science and technology, as well as the rise of living standards, diversify demand for older products, nevertheless, existing market products are mostly oriented at the group of young people in the professional stage, with relatively few products for the elderly. Hence, the growth of the senior market has enormous potential.

According to a current social environment analysis, smart phone items for the elderly have a strong market demand. With the rapid development of information technology and multimedia technology, the mobile phone, a representative of modern high-tech products, has increasingly become an indispensable necessity in people's lives, under the influence of environment and others, contemporary elderly people increasingly use and even rely on smartphone, which have gradually become an important way for them to communicate with the outside world (Li Biao et al, 2019). But at the moment, most companies tend to ignore the elderly market, the old mobile phone products on the market account for the relatively small, mainly from traditional button type style, with a simple phone message function will not be able to meet the demand. In today's social life, which is mostly made of information technology and multimedia technology, a varied smartphone is excellent for the old man's life, On the other hand, it may make their life more rich, such as WeChat, etc. The introduction of social software makes it easier for them to interact with their children; nevertheless, the smartphone may also bring convenience for their life, such as security. It may be stated that smartphoneAPPs made specifically for the elderly have a high market demand.

This design study's target market is 60-80 year olds who have a tendency of utilizing smartphoneapplications and can take care of oneself. The primary issue for the elderly while using the APP, according to the search data, is that the interface is difficult and the semantic expression of the interface cannot be determined. Memory loss and weak reasoning skills are the primary culprits. There are relatively few applications on the market that are developed with elders in mind, which leads to seniors not knowing where

to click or what to anticipate with a sophisticated and elegant interface. They stop using the APP interface on the senior people's mobile phones as a result of not being able to find the features they require, allowing the elderly to use the APP features properly and enjoy the speed and convenience that the information age has to offer. Elderly people should be able to interact easily and have their emotional needs met by the design.

Stephen P. Andereon (2012) stated that when technology meets basic needs, user experience begins to dominate. How essential is user experience in current design? Mobile phones are the medium via which the senior user group develops modern life feelings. The elderly are increasingly ready to satisfy the emotional needs between themselves and their friends and family using smartphone, and user experience emphasizes on touch with those around them. The ideas and practices of emotional design are utilized to modify the experience of geriatric smartphone interface design when combined with the characteristics of older users. The goal of this study design was to improve the existing problems in the operating interface of the existing smartphone chat APP for the elderly, improve user interface experience and the ultimate goal of this design is to enable elderly users to have a convenient and applicable smartphone chat APP suitable for their age group. Based on the above background issues, the following research contents are summarized:

1. What is the current state of aging social structure and its problems?

2. Does the previous literature reviews support the theories on interface design among elderly?

3. Which types of groups are affected among smartphone users?

4. What is the influential contributions made by interface design and how its effected design practicality and efficacy?

2.0 Problem Statement

At the present time, the mobile phone design for the elderly in the market is very insufficient. Although the feature phone is simple, it cannot meet the demand, and the research on the design of smartphone specifically for the elderly is even lacking (Peng Liping, 2016). Due to the rapid economic development in foreign countries, the popularity of smartphone was earlier, and the high penetration rate and usage rate of smartphone in the elderly group, there are relatively more foreign research theories on mobile phones for the elderly, and the scope is more extensive. Karen Renaud and Judy Van Biljon proposed that the current mobile phone design for the elderly is not easy for them to understand, and the corresponding relationship between shortcut keys and functions is not clear and intuitive (Judy van Biljon et al, 2017).

WeChat is a social APP popular among the elderly in China. According to the findings of the poll, the elderly mostly use WeChat to communicate with friends or family members they know. The primary functional needs are audio and video chat, as well as the occasional sharing of photographs. Webchat's current interface design is extremely difficult for the elderly to use, with excessive information presented on the interface, sophisticated content, and awkward capabilities. Some even hand-painted a WeChat

instruction manual to teach the elderly how to use WeChat. Personal information for the elderly can be established by others, all functional areas must meet the logical thinking of young people because they are the target users, while the elderly find it difficult to use these functions. The elderly cannot easily use smartphone, so they will have psychological resistance, which will lead to their inability to communicate with the outside world through mobile phones, which is not conducive to the elderly's adaptation to life in today's society, and even have adverse effects on their physical and mental health (Yu Hong, 2006).

Humanized design begins with the user experience. It is vital to consider in the product design process that consumers would function according to their own habits, that is, the body's conditioned response is developed for the aged (Bai Yuying, 2019). The APP interface is intended for the elderly, with a focus on behavioral design and product complexity. The elderly, in particular, use social applications primarily for voice and video chat with family members, photo sharing, and other activities to alleviate their loneliness. The interface primarily reflects the operation function and conveys the operation behavior to the user interface, producing a sense of convenience in the process of usage and relieving the elderly's pressure. Based on the research of users, the following design principles are derived:

1. Function partition: Put similar functions in one area for the elderly to identify easily.

2. Simplify the content of the interface, reduce the content presented on the interface, simplify the content of the interface, reduce the time of eyes on the interface, and reduce the trouble of selection.

3. The functions expressed on the interface are more intuitive. Reduce key semantics, quickly and effectively identify the metaphorical function of each key.

The solution is to enlarge the keys of voice chat function and video chat function in the interface design of mobile chat APP for the elderly, and eliminate the original functionalities that are not widely used or even never used by the elderly, in order to make the function single and the interface simple, in accordance with the cognition and operation of the elderly. The Discovery menu is removed from the main interface, leaving only the message and Me menus. The operations are more apparent, and the interface is more compact, which saves the elderly time judging when using the contact menu bar and simplifies the original friend list. Friends in the list can be redirected to the chat screen after tapping at the top of the Settings family members.

The main functions of the elderly using WeChat are to share photos, voice chat video chat, in the chat interface, function differentiation and induction: delete all the original options, this photo class function to view photos, reduce the voice chat video chat function, increase the positioning function, when the elderly are in an unfamiliar environment, they can put the location of their family members click send, so the family members can easily find the location. The elderly are hesitant to enter text into the chat interface since, on the one hand, typing is difficult and, on the other side, it is simple to make mistakes. As a result, the interface's voice input capability is boosted. When you click the chat button, you'll be prompted to pick between voice and video chat. Text

reminders are used to remind users during voice conversation to guarantee clear semantics. The conversion to video chat switch is designed on the interface, and relevant text cues are supplied for operation, avoiding the need to return to the chat interface after the voice conversation.

3.0 Design Process

3.1 Define the Problem

The target market for this design study is 60-80 year olds who use smartphone applications and can care for themselves. According to the search data, the biggest concern for the elderly while using the APP is that the interface is difficult to use and the semantic expression of the interface cannot be identified (Li Yongfeng, Jiang Chen & Zhu Liping (2016). The key factors are memory loss and poor thinking abilities. Because there are few programs on the market designed specifically for seniors, seniors may not know where to click or what to expect from a complex and visually appealing UI. They cease using the APP interface on senior people's mobile phones because they can not locate the functions they need, allowing the elderly to properly use the APP features and enjoy the speed and convenience that the information age has to offer. The design should allow elderly people to engage comfortably and meet their emotional requirements.

3.2 Collect Information

User information collection

This design compiled the ordinary mobile phone APP interface and the elderly mobile phone APP interface demand degree questionnaire. The questionnaire is divided into two parts. The first part is the basic information statistics of the respondents, including gender, age and education level. The second part is to design the corresponding problems according to each index in the hierarchy model of mobile phone interface design. After the actual experience, respondents were asked to rate the commonly used mobile phone interface and the elderly interface respectively. The rating ranges from 5 to 1, with 5 being "very satisfied," 3 being "moderately satisfied," and 1 being "very poor." The rest of the scores fall somewhere in between. Due to the experience involved in the operation process, this survey adopts offline survey. Several communities, shopping malls, parks and other places in the city were randomly selected to issue questionnaires, and the survey results were collected for analysis. The questionnaire is detailed in Appendix 1.

A total of 100 questionnaires were collected in this survey. The gender, age and education level of the respondents are as follows (Figure 1).

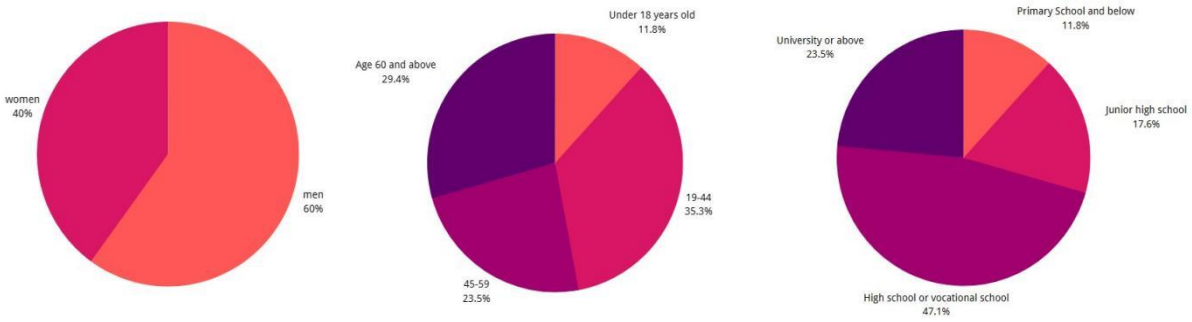

Figure 1: Graph of Demogrgraphy Profiles

The following points of the elderly when using mobile APPs have been summarised based on market research:

1. All widely used apps in the market are not targeted at the elderly, and there is no app suitable for the elderly with wide popularity.

2. Many of the various apps are downloaded under the banner of the middle-aged and the elderly, and at the same time, numerous spam advertisements and fraudulent advertisements are released.

3. The interface is complicated to operate and the process is complicated, which makes it difficult for the elderly to operate smoothly.

4. Nowadays, apps have different functions, such as scanning code, shopping and taking a taxi. There are too many kinds of apps, and the elderly simply cannot open appropriate apps according to their own needs.

3.3 Interface design element collection

A complete software interface design mainly includes software startup interface design, software main interface design, software framework design, menu bar design, interface button design, interface icon design.

Design of APP startup interface

Software startup cover design is another term for APP startup interface design. The program starting cover should be a high-resolution image throughout the design process. If the program startup cover must be used on many platforms and operating systems, alternative formats will be considered, and the colors picked should not exceed 256, ideally 216. Software boot covers are typically 1/6 the resolution of standard screens (Hou Sen, 2022).

If it is a series of software, the overall design will be examined for unity and continuity. The company logo, product trademark, software name, version number, website address, copyright notice, serial number, and other information made or supported should be prominently displayed at the top to establish the image of the software and allow users or buyers to receive hints when the software is launched. For illustrations, it is appropriate to employ graphics with independent copyright, strong symbolism, high identification, and a good visual

communication impact. If the picture is utilized, digital processing should also be done to develop the software's specific qualities.

Figure 2: APP startup interface (Image source: Internet)

APP main interface design

The design of the APP's main panel, the design of the APP panel should have the scaling function, the panel should be clearly separated into the function area, should be matched with the style of dialog box, pop-up box, and so on, as far as possible to conserve space, and simple to switch.

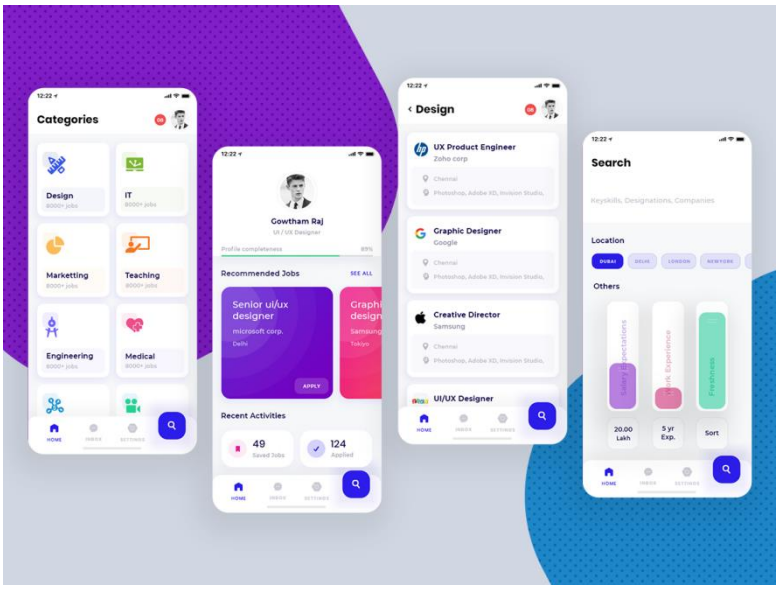

Figure 3: APP main interface (Image source: Internet)

APP framework design

The APP framework design should be simple and straightforward, with no needless adornment. It should address preserving screen space, different resolution sizes, state and principles while zooming, and reserving room for future design elements like buttons, menus, tabs, scrollbars, and status bars (Yang Rui, 2022). In order to comply with the visual process and user psychology, the overall color combination should be suitably matched, the program trademark should be put prominently, the main menu should be positioned on the left or top, the scroll bar on the right, and the status bar on the bottom.

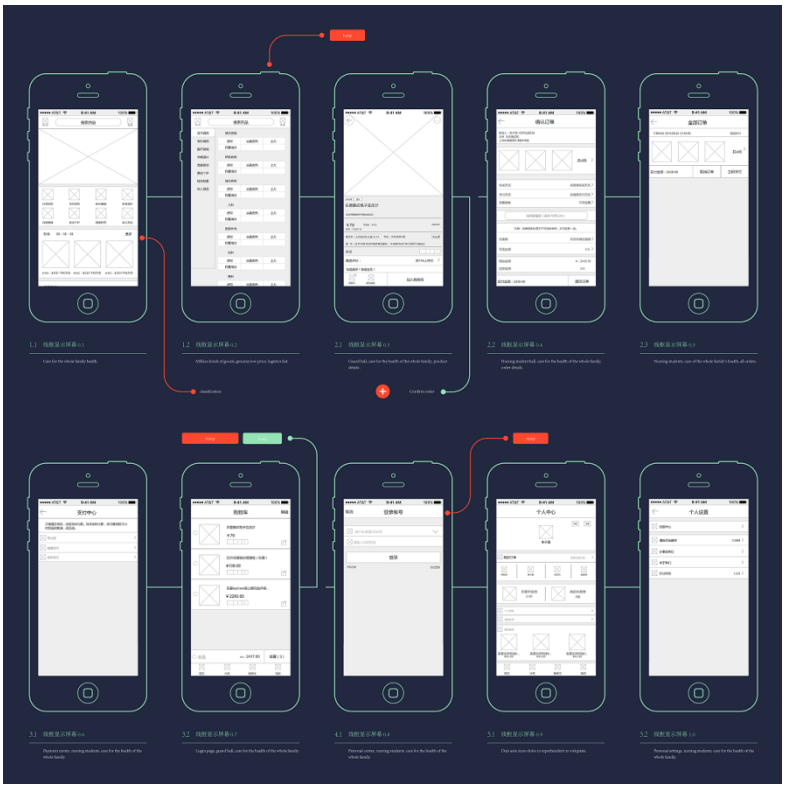

Figure 4: APP framework (Image source: Internet)

Menu bar design

It mostly consists of menu, scroll bar, and status bar design. Menu design normally contains a selected state and an unselected state, the name on the left, the shortcut key on the right, if there is a lower-level menu, lower-level arrow symbols, and distinct functional regions separated by lines. The scroll bar is primarily intended for transforming internal capacity in the fixed size of the regional space. There should be up and down arrows, scroll indicators, and page-turning marks, among other things. The status bar shows and prompts the software's current state.

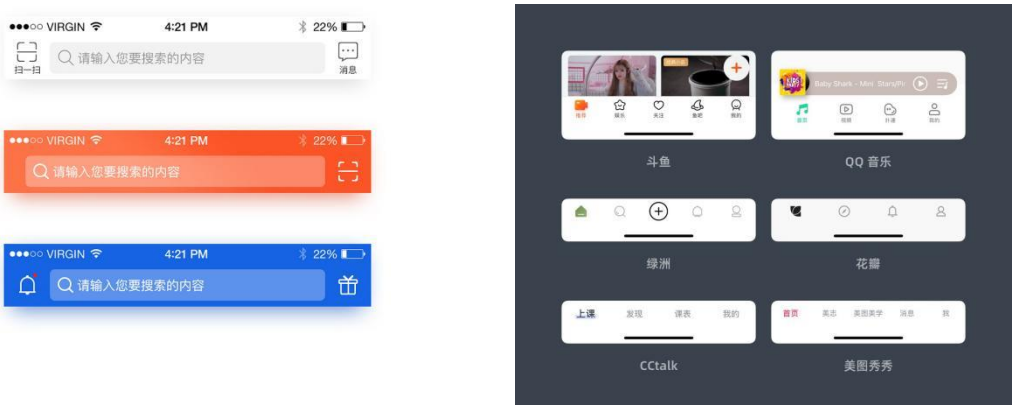

Figure 5: Menu bar (Image source: Internet)

APP button design

The design of the APP button should be interactive, with 3 to 6 state effects: The condition in which the mouse is placed but not clicked. The condition in which the mouse is not on it before clicking; When the mouse is not positioned on it after clicking; The time state cannot be selected; A condition that changes on its own and autonomously. Buttons should have a succinct graphical impact, be able to elicit a functional correlation reaction from users, have a consistent design throughout the group and be distinguishable from buttons with major functional variations.

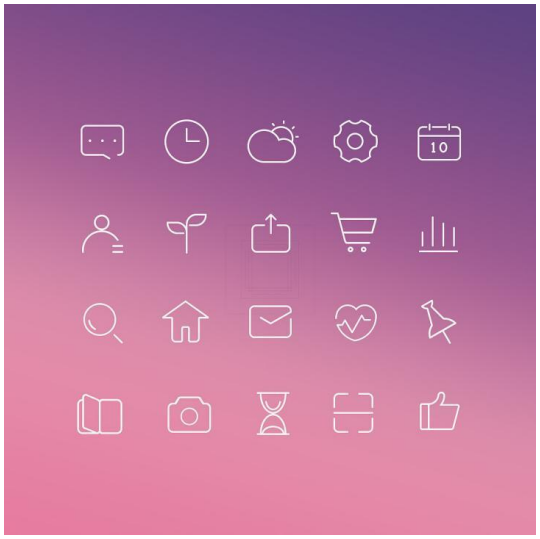

Figure 6: APP button (Image source: Internet)

APP logo design

Logo design color should not exceed 64 colors, size of 16x16, 32x32, icon design is a square inch art, should pay attention to the visual impact, it needs to show the connotation of the software in a small range, so many icon designers use

simple colors in the design of the icon, the use of eyes to color and dot space mixing effect. Made a lot of wonderful logos. The label design should pay attention to the changes in the corner part (Wu Haixiang, 2019).

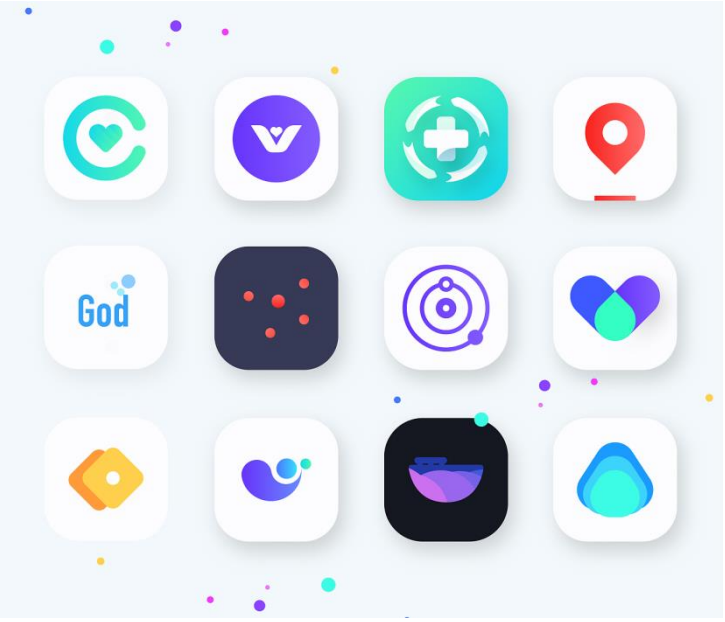

Figure 7: APP logo (Image source: Internet)

3.4 Basic Ideas Development

The design of an app for the old, with a simple and clean interface, font enlargement, voice control, and all services for the senior group, not only to make their lives easier, but also to contact with family. As a result, not only the elderly, but also their children, can download this program. They wish to contact their offspring, who are unable to care for the elderly without living together, to locate and utilize this software, in this way, it may be expanded to the old group, attracting people's attention to the senior group via the young people's market. Understand the difficulties in the lives of the elderly and assist them in resolving their concerns.

Name of the APP is Ti Ti. Ti Ti is short for Time and Tide. The meaning of the name is that the APP can accompany users for many years.

Following the determination of the APP's product positioning, its information and functions will be thoroughly sorted out in order to construct a sensible and transparent information architecture. Due to the physical and psychological peculiarities of the elderly users, functions and tasks at all levels are simplified as far as possible in the design process to enable the elderly users to quickly familiarize themselves with various functions and interaction modes of the software, and the main information architecture mode of the design scheme is to ensure the operation within the three levels as far as possible.

In the information architecture, as shown in Figure 8, on the main page, customers may access official customer service for phone assistance, tutorials, contacts, calendar, magnifying glass, flashlight, real-time bus, and health code capabilities. You can make text, phone, and video calls to your message list pals. The take-out service can help the elderly who find it difficult to travel to acquire medicine and veggies. The ME page may be used to customize the elderly's health page and emergency contact information.

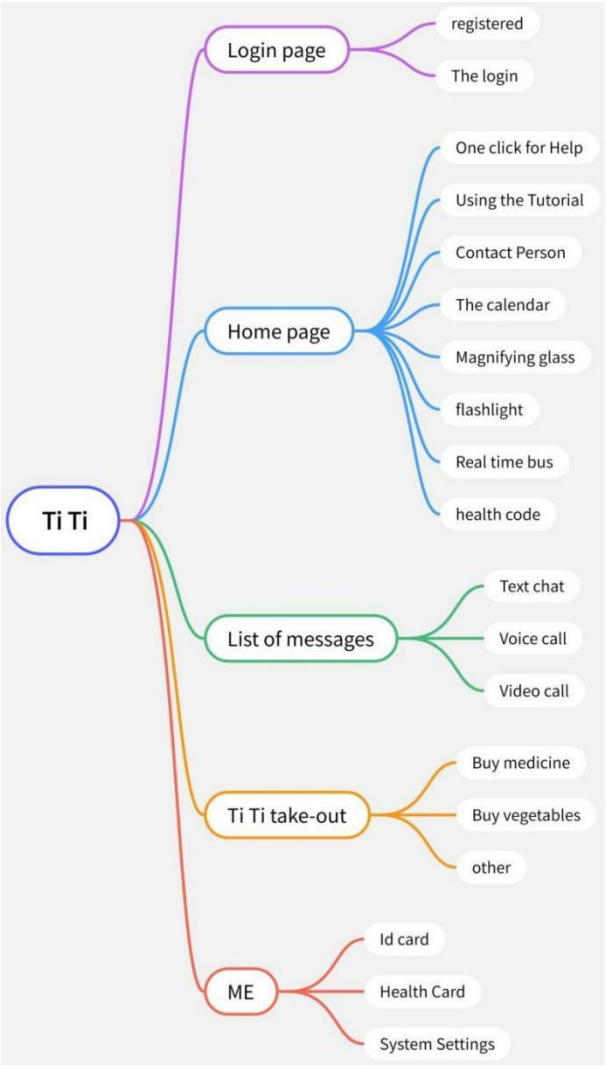

Figure 8: Information architecture of Ti Ti APP

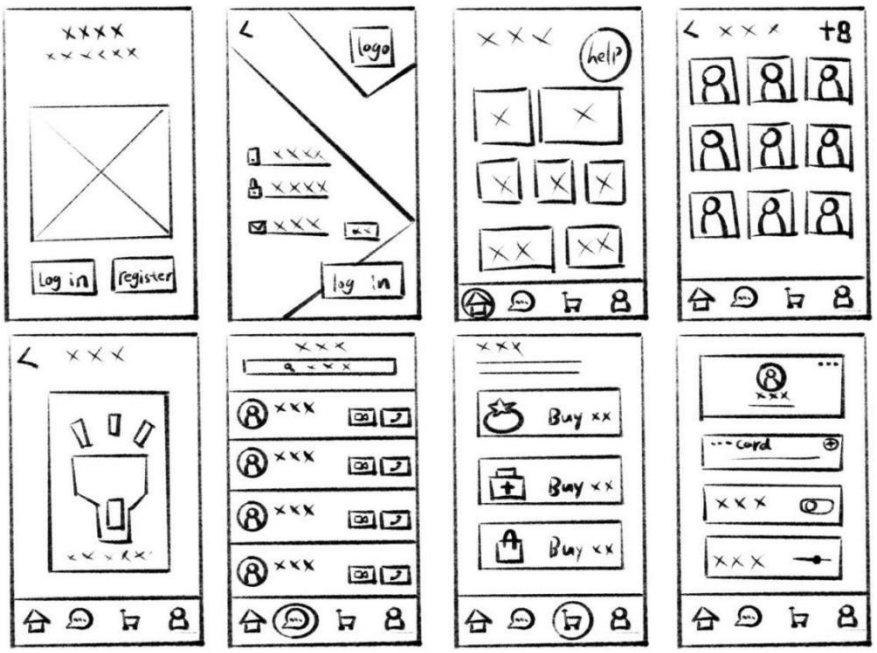

Figure 9: Preliminary interface concept sketch

3.5 Develop Solutions: Visual element Design

Color matching

High-saturation color collocation is not ideal for the elderly, according to physiological research and surveys on their eyesight. As a result, the main color of this interface design is low saturation soft green (C2D7CD), which may relieve visual pressure and tiredness to some extent and also has a certain affinity.

194F40		C2D7CD	
R:25	C:88%	R:194	C:28%
G:79	M:59%	G:215	M:8%
B:64	Y:77%	B:205	Y:21%
	K:27%		K:0%

Figure 10: Color matching of Ti Ti APP

Logo design

The Ti Ti APP logo is made up of color blocks and typefaces. The logo color is compatible with the main color of the interface, as is the style. The straightforward design makes it simple for older users to locate this icon on the mobile desktop of numerous programs.

Figure 11: Logo of Ti Ti APP

Illustration Design

The login and registration interface uses hand-drawn illustration for interface visual design. Hand-drawn cartoon characters fit the APP style and increase affinity.

Figure 12: Illustration Design of Ti Ti APP

Icon Design

The use of larger module component style, simple and clear, easy to discover and comprehend the function in this interface design for the icon design. Color employ monochromatic to increase text contrast, make it simpler to read, and preserve colour homogeneity.

Figure 13: Icon Design of Ti Ti APP

Interface design

The login page is designed with a hand-drawn illustration to increase affinity. Interface design is simple and clear, The buttons on the enlarged interface make it easier to view, reduce the difficulty of use.

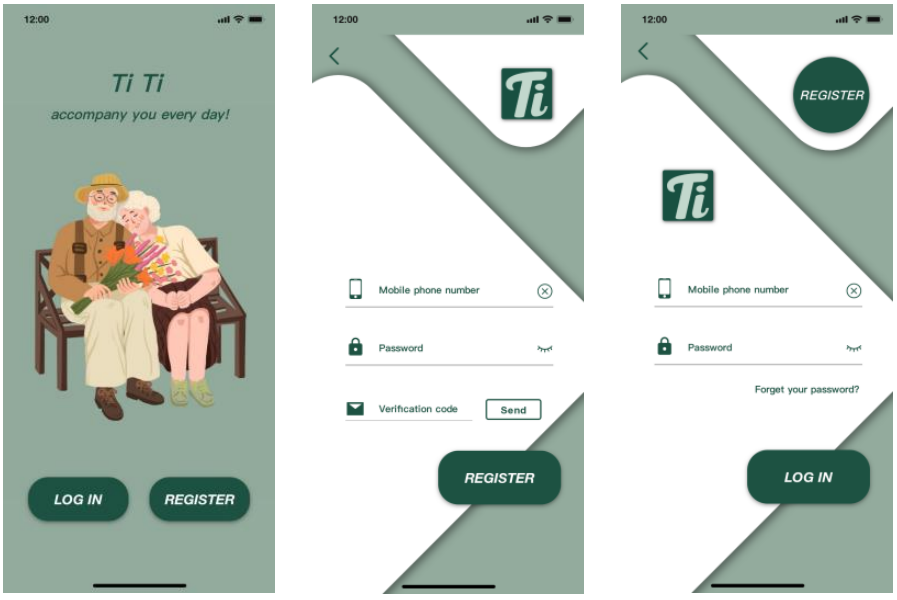

Figure 14: Registration and login interface design

The APP's homepage is a component library, which is an important component of the APP. It outlines various components that the elderly mostly require in life and separates them into simple and straightforward plates. Each plate's font size has been enhanced to make it easier for the elderly to use.

The one-click help in the top right corner is a particular component of the Ti Ti APP designed to assist the elderly who are unfamiliar with mobile phone operation in the event of a hazard or emergency. After the APP has bound the family member's mobile phone account, the family member will receive a pop-up or SMS reminder after selecting the assistance button and further agreeing. If the family member does not press the confirmation button for more than 10 minutes, the APP customer care will contact the old man and his family member to assist him.

Figure 15: Homepage interface Design

Address book with a basic icon and name component, easy and direct click on the section may make a phone call, abandon the old manner of sliding the directory bar, so that the elderly can use it more conveniently. Only significant information is included in the calendar area to make it evident at a glance.

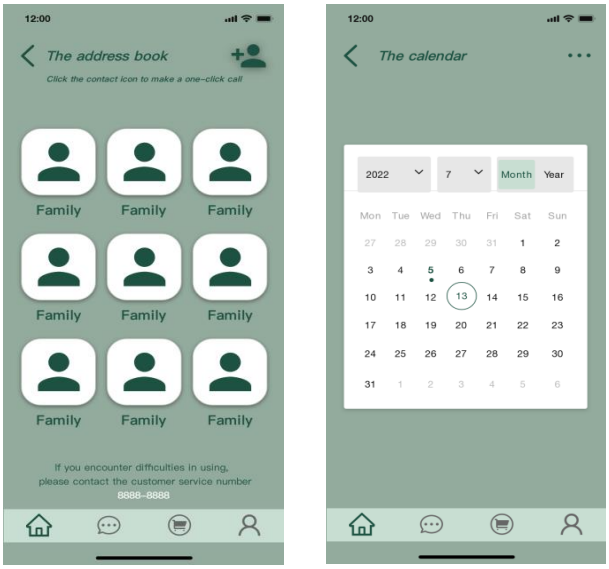

Figure 16: Address book and the calendar interface Design

The interface design of the flashlight uses the amplified interface, the picture is simple, more convenient operation. The health code interface displays the health code, travel code, and vaccine information to meet daily travel requirements.

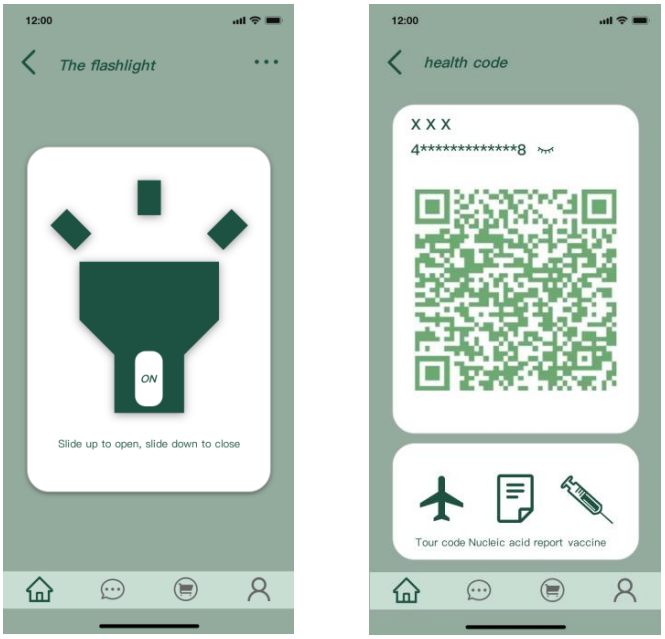

Figure 17: Flashlight and health code interface design

A simple chat interface with larger head ICONS and fonts and eye-catching message prompts is created with the elderly's living patterns in mind. To alleviate the trouble of typing for the elderly, one-button speak and video buttons are placed on the right side of each chat box. You may select voice broadcast in the Settings by selecting the message in the entire chat box interface, which is useful for the elderly.

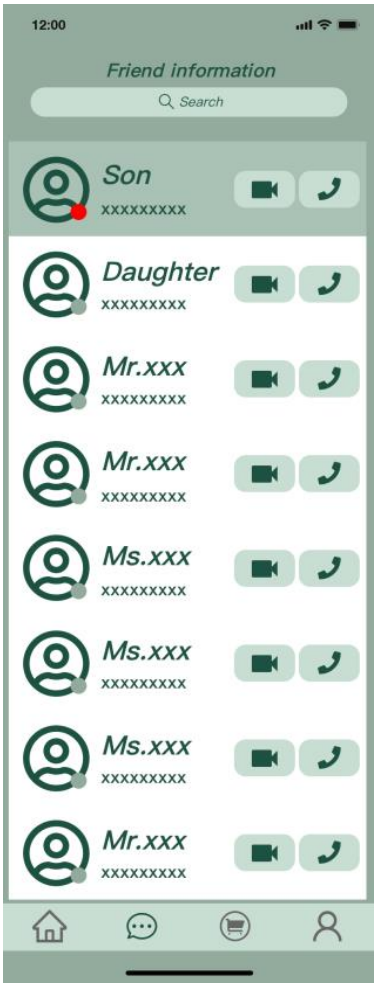

Figure 18: Chat message interface design

Ti Ti Take-out is an essential component of the APP. People's travel habits have altered considerably throughout the epidemic era, and they all require a health code to travel. In an era of epidemics, the elderly cannot order meals or go out to get medicine, and the food take-out applications that young people are accustomed to are extremely difficult for older people to use.

The elderly can clearly view the sorts of goods on the delivery interface, click to pick the items they need to buy, and patiently wait for the delivery clerk to phone to confirm, and the goods will be shipped to the address on the senior's ID card.

Figure 19: Ti Ti APP Take-out interface design

In the personal information interface, only the daily Settings required by the elderly can be kept, and the identity information plate can be added, which is very important in daily life to prevent the elderly from getting lost. The information plate of emergency contact and chronic disease can provide basic information for one-click help and takeaway function.

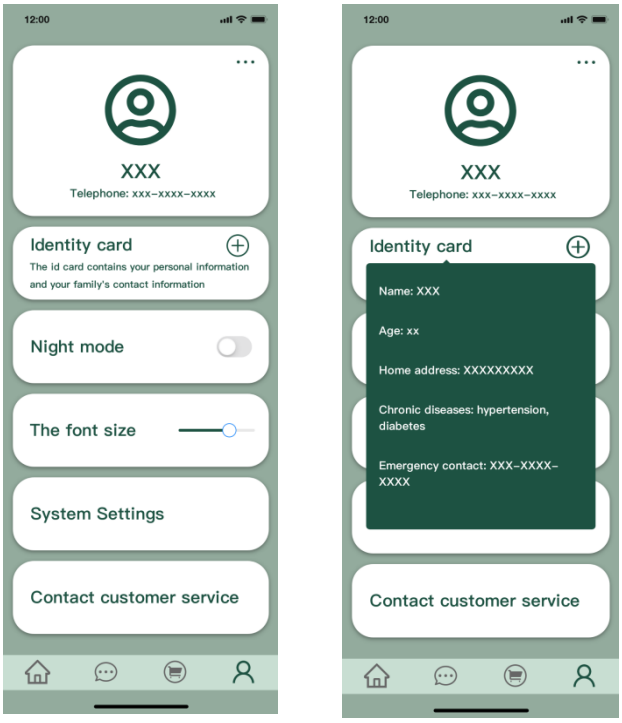

Figure 20: Ti Ti APP Personal information interface design

Display of effect

Figure 21: Ti Ti APP Interface design effect display diagram

3.5 Feedback and Improvement

Following the preliminary completion of the aforesaid Ti Ti APP interface design, the final link is carried out in accordance with the project's design process, namely the phased effect assessment. The quality of the Ti Ti APP's interface design must still be evaluated depending on the user experience.

Consider the effect from two perspectives: deterministic analysis and uncertainty analysis.

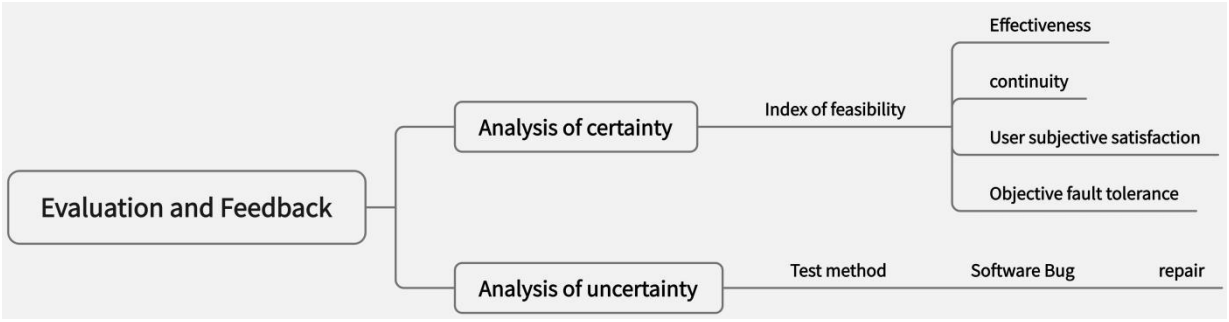

Figure 22: Ti Ti APP Effects and feedback frameworks

a. Analysis of certainty

In the interface design of Ti Ti APP, effectiveness and conforming to the usage habits of the elderly affect the specificity and usability of the interface design, which points to whether the functions, features and experience of the APP in this design scheme meet the actual needs of the elderly users. Effectiveness is usually realized in two ways, one is for the user, the other is for the APP system itself. User-oriented is a function that evaluates the design according to the degree to which the user interface can complete the operation and meet the needs of the elderly users. The system itself closely combines the elderly users

with the characteristics of the use through the APP, both of which are in line with the thesis of the design centered on the elderly users.

Continuity, like effectiveness, is closely related to usage habits that influence interface design. Continuity focuses on the principle of simplicity in design, shows the visual effect of concise expression of the interface, and is used to identify the impact of interface design on users' APP operations. There is an interaction between satisfaction and fault tolerance. In the process of product testing, it is important to observe the user's interface reaction when using the APP, and immediately confirm and find out the fault when there is a delay or interruption. This is also the reason why the fault tolerance index is added. Under the influence of the objective factor of fault tolerance, users' subjective consciousness is changed, thus obtaining satisfaction. Conversely, satisfaction also has a certain influence on fault tolerance.

b. Analysis of uncertainty

For the uncertainty analysis of the interface design of Ti Ti APP, bugs can be found out according to different testing methods. When bugs and crashes occur in the process of users using the APP, the system will automatically record the causes of problems and send them to the background for repair. The designer needs to test the cause of the problem with the programmer and fix it. To listen to and adopt the user feedback of the test, although it cannot meet the specific needs of every user, it can summarize and analyze the feedback data to find the concentrated problem points and optimize the user experience.

After completing the design of the mobile phone interface for the elderly, a specific comparative analysis is carried out on the four aspects of legibility, operability, memorability and aesthetics of the two interface forms of the traditional mobile phone APP and the elderly APP interface, so as to explain the advantages of this design case over the traditional mobile phone APP in various aspects and the improvement for the characteristics and needs of the elderly. Detailed description is shown in Table 1 below:

Table 1: Table of comparison and analysis between traditional mobile APP interface and Ti Ti APP interface

	Traditional interface design	Ti Ti APP interface design
Ease of readability	ICONS are usually 48×48px in size, which is relatively small and difficult for older people to see	The size of the icon is 86×86px, which is suitable for the elderly. The size of the icon is adjusted according to the size of the phone, which is convenient for the elderly to read
	The background pattern is colorful and complex, and the color selection is usually not in line with the preference of the elderly	The background and icon color are mostly green, which is preferred by the elderly To better match their visual needs
	ICONS are highly abstract and summarized with simple shape, but it is not conducive to the elderly to understand the meaning of the	ICONS and text are high contrast and modular, the elderly can quickly judge and recognize them

	graphics, often can not find the corresponding function or cause operation errors	
	The traditional mobile phone interface often displays small prompt information, which is not conducive to attract the attention of the elderly in terms of text size, pattern size and color	The interface will enlarge the system prompt screen, and with high contrast module color and large text to attract the attention of the elderly, but also with dynamic effect to increase visual appeal
Easy to operate	The traditional mobile phone interface has many layers and some advanced functions are basically not used by the elderly, so the operation is not very convenient	The interface removes functions not commonly used by the elderly, and only displays basic operations. The process is streamlined, and the basic control is within three levels. The elderly are relatively easy to operate easy
	The target users of smartphoneare mostly young people. Considering young people's strong learning ability and pursuit of cool, they will design some complicated operation gestures, while the elderly cannot remember and operate them well	The interface only selects the basic operator hand most commonly used by the elderly potential, through a simple click, slide, etc., can operate all the functions
Easy to remember	There are many ICONS, text and other contents in the interface, and the combination is random, the elderly can not remember well	There are few functions and information in the interface, which is strictly controlled within 7, which is more convenient for the elderly to find. At the same time, the function also limits the area where the objects are placed according to their characteristics, which is also conducive to the positioning of the elderly
	ICONS and other elements of the pattern are highly refined, modeling abstract and simple, the elderly poor abstract thinking, difficult to distinguish	Modular interface elements, more conducive to elderly understanding and memory
aesthetic	Most of the colors are trendy and jumpy, appealing to young people who are looking for individuality, but too fancy for the elderly	The choice of color and tone adopts the softer green preferred by the elderly, which is more friendly to the elderly
	The interface content is more, the design will add some details and patterns, easy to dazzle people	The interface is clean and simple, the details are restrained, and the whole is more refreshing and comfortable

	Diverse styles, and fit the young people's preferences and pursuits, do not conform to the elderly aesthetic	The flat style and hand-painted illustration are used to decorate, both in emotional and cognitive aspects of the aesthetic fit the elderly

4.0 Results

In this study design, the results will be analyzed in three different parts. Firstly, the structure and existing problems of the current aging society are reviewed, and the design theory based on user habits is studied. Then analyze the conceptual characteristics of the study subjects, the elderly, the smartphoneand the interface design. Compared with ordinary APP interface design, due to its special needs, it is necessary to pay more attention to the actual needs of elderly users in the interface design, improve operability, provide humanized service, and finally lead to the core of this design. The design was conducted based on the design theory and user survey. After the design was completed, the questionnaire survey was conducted based on the user experience to obtain the data. After reading a large number of literature analysis, summed up the interface design focus on grasping the use habits of the elderly related design principles, in order to standardize the elderly mobile phone interface design, reflecting its connotation. First of all, it is necessary to go back to the users themselves, namely the elderly users, and analyze their physiological and psychological influences on interface design from their particularity. The design principles are summarized as follows:

4.1 Legibility

When compared to young individuals, the elderly's reading speed slows, and their capacity to receive and retain information deteriorates (Wang Yue, 2018). Because the elderly's general visual perception capacity is declining, the first problem to overcome in the mobile phone interface for the old is sight. Therefore, the size of ICONS and text must be appropriately increased to ensure that the elderly can see the content of the interface. Interface is mainly concerned with the size of function ICONS. According to the study of Li Yongfeng et al, the elderly are more satisfied with the 96×96px ICONS in terms of size, clarity, operating comfort and overall harmony. Therefore, when designing scene ICONS, can refer to this size for appropriate adjustment of function ICONS (Li Yongfeng et al, 2016). In general, the font size should be larger than 24px. When selecting a font, the font size should be the same, but the increased height of the font will give people the impression of a larger size. Therefore, when the screen resolution is limited, the method of increasing the font height can be adopted to make up for the shortage of the size.

The elderly have low contrast sensitivity, and the APP interface on the market today is not particularly excellent at distinguishing between the target and the backdrop. To make it easier for the elderly to distinguish between the icon and the backdrop, the contrast between them should be increased while creating the interface. You may achieve this by creating the icon form, contrast the icon with the backdrop color, or adding a drop shadow to the symbol. A good interface layout is helpful for the elderly to recognize and read the interface content (Yang

Yuxuan et al, 2022). For example, the functions commonly used by the elderly are put on the main page, which fits the cognition and operation habits of the elderly and facilitates their search and use. In terms of the density of layout, it is not suitable to design too compact interface layout in view of the visual degradation of the elderly and the characteristics of poor concentration and easy dispersion of attention. The enlarged modular layout should be used to make the contents of an interface as simple and orderly as possible. Because the elderly's attention span is less than that of the young, it is difficult to capture their attention if the message prompt interface is too tiny or difficult to discern from the backdrop. As a result, while creating the message prompt interface, it is vital to alter the size, color, form, location, prompt tone, and other components of the interface to ensure that the message prompt is clear and evident and easy to understand by the elderly.

4.2 Easy to operate

The elderly frequently struggle to complete activities with complicated operations and many processes due to the effect of attention characteristics and psychological variables. As a result, the interface architecture and interaction method should be designed to eliminate repetitive effort and require fewer layers to achieve the equivalent function. Some non-essential services and procedures, when removed, can make it easier for the elderly to use. The navigation of a chat software interface for the elderly differs from that of other types of software. The elderly often only use basic functions and perform simple operations. As a result, on the one hand, navigation design should provide simplicity and clarity, while on the other hand, the priority and habit of the elderly in operation should be considered. When the elderly wish to make a phone call, they normally call a family member who has preserved their contact information.

It is rarely to dial a new number. However, because the elderly frequently use the phone book because they can't recall the number, the navigation in the phone book should be the most evident, followed by the navigation in the phone book.

In the face of smart products, the elderly will have a certain sense of psychological strangeness and resistance. At the same time, the slow reaction caused by the decline of various physiological functions will lead to certain mistakes in the specific operation process of the elderly. If the mistakes cannot be easily withdrawn and corrected, the overall experience of using the products will be affected by the elderly. And further increase their fear of smart products (Liu Baoshun et al, 2016). The mobile phone interface of the elderly should ensure high fault tolerance, and appropriate reminders or multiple confirmations should be given to places prone to misoperation to reduce the error rate. Once there is misoperation, it should be easier to undo. Complex interactive gestures are not welcoming to the elderly, in contrast to young people who strive for a cool demeanor and high learning capacity. The aged hand's fine motor skill deteriorates as they age, their reaction speed decreases, and their learning capacity suffers. Their smart touch screen mobile phone operation mode is only restricted to basic and in accordance with their living habits various operations, including as combination, long press, zoom in, zoom out, and other relatively

complicated gestures, are not well employed. As a result, the major gesture design of a mobile APP interface for the elderly should be click and slide, in order to better meet the cognition and habits of the old.

4.3 Easy to remember

Memory is one of the very important cognitive abilities for human beings. Different from the perception ability that reflects the current external stimulus information, the object of memory is the past experience, which can remember, maintain and reproduce the past information (Yang Qingfeng, 2018). In view of the weak short-term memory of the elderly, the number of information and functions in the interface should be controlled when designing the mobile phone APP interface for the elderly. At the same time, information should be combined as much as possible to help the elderly increase the memory capacity. In the way of information combination, it is necessary to design a reasonable scene according to objective laws and practical usage habits, so that each function can be structured and logically reasonable combination. The elderly have an excellent long-term memory. When creating the background and other visual aspects, it is critical to consider the information and elements that will impress and make sense to the elderly. The modular function key design aids the elderly in remembering the functions and placements in the interface.

4.4 Aesthetic

Compared with the young people who pursue individuality and fashion, the aesthetic of the elderly is relatively traditional and conservative. The choice of color should not be too trendy and jump off. The collocation should also be soft and coordinated, so as to better take care of the elderly's psychology and bring them a comfortable visual experience. The design of mobile phone interfaces for the elderly should be clean and simple, avoid complex and gorgeous backgrounds and too much detail description, which is easy to cause visual fatigue of the elderly.

User Survey Results

According to the statistics, the average score of satisfaction with various factors of the common mobile phone interface and the mobile phone interface of the elderly can be obtained. Since this paper studies the mobile phone interface design of the elderly, the data results of the elderly, namely those aged 60 and above, are separately extracted for comparative analysis. The average score of satisfaction with various factors can be obtained. And the weighted average score calculated by combining various weights is shown in Table 2.

Table 2: Satisfaction score sheet

Description of the Problem	Total sample mean		Average sample age 60 and older	
	Normal mobile APP interface	Mobile APP interface for the elderly	Normal mobile APP interface	Mobile APP interface for the elderly
1. Whether the size of the interface icon and font is reasonable	3.92	3.83	3.26	3.61
2. Whether the target and background are easy to distinguish	4.24	3.57	4.13	3.56
3. Whether the interface color is used reasonably	3.72	3.69	3.61	3.99
4. Whether symbols and ICONS are easy to understand and distinguish	4.35	4.78	3.59	4.88
5. Whether the interface layout is reasonable	4.03	4.41	3.79	4.79
6.Whether the information prompt is clear and clear	4.13	3.86	3.86	4.37
7. Whether the interaction process is brief	3.95	4.11	3.16	4.12
8. Whether the operation error is easy to correct or undo	4.15	4.21	4.07	4.11
9. Operation feedback is clear and timely	3.56	3.61	3.43	3.88
10. Is the amount of information in the interface small and easy to find	3.49	4.03	3.58	4.59
11. Whether the information is assembled in a way that is easy to remember	3.66	4.28	2.64	4.58
12. Whether the color collocation is beautiful and harmonious	4.58	4.26	4.07	4.33
13. Whether the interface is clean and concise	4.37	3.89	3.71	3.95
14. Interface style is harmonious and satisfied	4.28	4.33	3.28	4.68
Weighted mean score	4.03	4.12	3.58	4.19

As can be seen from Table 2, in terms of the satisfaction of each question, for all of us, the ordinary mobile phone interface scores higher in questions 2 and 13 than the elderly mobile phone interface, while the elderly mobile phone interface scores higher in questions 4,5, 10 and 11. For the elderly, the ordinary interface performs better than the old interface in problem 2, while the elderly interface has obvious advantages over the ordinary interface in problems 4, 5, 7, 10,11,14. In addition, there was little difference in overall and older adults' satisfaction with the two interfaces in other ways. From the above analysis, it can be seen that the advantages of the mobile phone interface for the elderly, no matter for everyone or the elderly, lie in the following five points: appropriate symbol and icon metaphor and easy to distinguish, reasonable interface layout, small number of information blocks, easy to remember information combination, visual elements in line with cognitive habits, and unified visual elements. The survey results are basically consistent with the design principles mentioned above.

In order to verify whether the interface design scheme of Ti Ti APP is more conducive to the use of the elderly, the offline survey method is adopted to verify the interface satisfaction of this design. The satisfaction survey questionnaire is adopted (Appendix 1). Since this survey is only conducted for the elderly over 60 years old to investigate their

satisfaction with all aspects of the design case, only statistics are carried out on the satisfaction score, the weighted average is calculated, and a comparative analysis is made with the evaluation of the elderly's satisfaction with the traditional mobile phone APP interface obtained in the previous survey. In order to enable the respondents to evaluate the interface better, 100 elderly people in urban communities were asked to simulate the prototype of the design scheme in this research, and 100 realistic satisfaction evaluations of the design scheme were finally obtained. After calculation, the average scores of each satisfaction and the total weighted average were obtained. The statistical details of satisfaction results are shown in Table 3.

5.0 Discussion

The goal of this research is to talk about and examine the interface design of mobile phone apps for the elderly from the standpoint of user habit design. This paper, in conjunction with the characteristics of elderly users, applies the principles and methods of user usage habit design to change the user experience of mobile phone APP interface design for the elderly, and designs mobile phone interface products that can provide them with a pleasant operating experience. This paper discusses the necessity and feasibility of integrating the interface design of mobile phone apps for the elderly with the design of user usage habits, and conducts a comparative analysis and research on the key points of the elderly's needs for mobile phone interfaces from three perspectives: positioning features, interactive logic, and feedback evaluation. This paper conducts in-depth research on the mobile phone APP interface for the elderly using case analysis, questionnaire survey, and other methods, fully demonstrating the advantages of the mobile phone APP interface for the elderly in appropriate metaphor, small number of information blocks, easy to remember information combination, visual elements in line with cognitive habits, and draws a conclusion that the elderly are more satisfied with the mobile phone interface for the elderly than the traditional interface.

This paper defines the application of project information function modules, interprets and extracts them based on previous research literatures, and summarizes the influencing factors of their usage habits with the goal of realizing the transformation relationship between users' demand points and product development points. This study ultimately provides particular mobile phone interface design ideas that are more suited for the elderly in four aspects: simple recognition, easy operation, easy memory, and beauty, targeting at the features and demands of the elderly. On this premise, in conjunction with experience, it provides a case of mobile phone APP interface design based on the usage behaviors of the elderly. Further validate the positive effect of design theory in line with user habits on elderly users, promote the elderly's life with technology and technology life through the medium of mobile phone, broaden their social participation, and ultimately promote the economic society's sustainable development.

There is and will be a huge elderly population problem, and the elderly market is expanding with limitless possibilities. Faced with this unique demographic, one of the most significant responsibilities for many designers will be to actively investigate the age-appropriate design of intelligent goods. Building a simple, clear, friendly, and smooth interface in accordance with the habits of elderly users will assist the elderly in getting rid of the strangeness and fear of smart products, allowing them to better enjoy the comfort and convenience brought by science and technology, which is beneficial to the physical

and mental health of the elderly, as well as to the family and society.

However, there are several shortcomings in this paper. First, owing to survey technique restrictions, this article only performed a survey on the senior people in one city, and the survey findings cannot fully reflect all of the elderly people, resulting in a lack of data representativeness. Furthermore, there are currently very few real instances of mobile APP interface design for the elderly, and the study' results may contain certain omissions and inadequacies. The interface designed to satisfy the use patterns of the elderly has limits and cannot fulfill the demands of the majority of people at the same time. Through the analysis of this paper, it can be seen that it has huge advantages in the interface of the elderly. However, the current theoretical research on the interface of the elderly is not enough. This paper hopes to provide a certain theoretical basis and guidance methods for the application of the mobile phone APP interface of the elderly on the mobile phone of the elderly through exploration and research, and help relevant personnel to design better interfaces for the elderly in the future.

6.0 Conclusion

The rapid aging of the social situation and the current design trend for contemporary interface design put forward higher expectations. With the advent of the intelligent age, the design should not only pursue the aesthetic feeling of the visual effect of the interface, but also integrate the technology into the user experience on this basis. The core requirements of the current interface design are pleasure and satisfaction.

Designers should have a deep understanding of various theories of design trends, and in order to carry them into practice, they must first determine the target user group of the product, study and analyze the particularity and actual needs of users, so as to satisfy the needs of users in the interface design, achieve the optimization of user operations, and finally generate emotional identification.

One of the essential attributes of human beings is group, which determines that communication is their necessary behavior. Ti Ti APP is a mobile phone APP that integrates chat and daily functions based on the usage habits of the elderly. Design in line with user habits can give the product vitality, can conclude a good emotional connection. Based on this, on the basis of understanding the theory of usage habit design, it is combined with the three elements of old people and interface design, and the design principles are specifically applied to analyze the relationship between them. In the form of questionnaires and interviews, the design practice of Ti Ti APP is defined as a functional product for daily chat. In the actual case, more consideration is given to the needs of the elderly user group, and different expression techniques such as color, text and graphic ICONS are used to create a good user experience for the design. At the same time, the interface design further sublimates the experience conforming to usage habits in detail, and expresses the prompt feedback and the interactive force of switching mode of the association between users and products. Such a design idea is based on the design principle that conforms to the usage habits of the elderly. The combination of theory and practice makes Ti Ti APP better applicable to the target user group of the elderly. It is a special and intimate product, which achieves the purpose and significance of the research and realizes the form, operation and product itself in line with the usage habits of the elderly.

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