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An Ui Design Optimization Strategy for General App in Big Data Environment

Hangjun Zhou[1], Jieyu Zhou[1, *], Guang Sun[2, 3], Wangdong Jiang[3], Chuntian Luo[1], Xiaoping Fan[1], Haowen Zhang[1] and Haoran Zhang[1]

Abstract: Due to the huge amount of increasing data, the requirements of people for electronic products such as mobile phones, tablets, and notebooks are constantly improving. The development and design of various software applications attach great importance to users' experiences. The rationalized UI design should allow a user not only enjoy the visual design experience of the new product but also operating it more pleasingly. This process is to enhance the attractiveness and performance of the new product and thus to promote the active usage and consuming conduct of users. In this paper, an UI design optimization strategy for general APP in the big data environment is proposed to get better user experience while effectively obtaining information. An experimental example of a library APP is designed to optimize the user experience. The experimental results show that the user-centered UI design is the core of optimization, and user portrait based on big data platforms is the key to UI design.

Keywords: UI design, big data, general APP, user portrait.

1 Introduction

According to "China's Internet Network" Information Center (CNNIC) in Beijing released the 43rd The China Internet Network Development State Statistic report statistics, as of December 2018, the Chinese Internet users has reached 829 million, including mobile Internet users up to 871 million, new in 2018. Increased mobile phone nets up to 64.33 million. Massive traffic data is filled the whole society. People only need to connect to the Internet and enter a number of items in the search box to get a lot of information. Social networking sites store a large number of users' personal data, which brings much convenience to data analysis [Wang, Wang and Chen (2019)]. But at the same time of access to information, because the data volume is too big, and the data itself quality can't be guaranteed, although can solve the problem of the past that cannot rapidly access to information, but how users quickly select from huge amounts of data easily to obtain the effective information, and in the process of the whole experience comfortable

[1] School of Information Technology and Management, Hunan University of Finance and Economics, Changsha, 410000, China.

[2] The University of Alabama, Tuscaloosa, Alabama, USA.

[3] Institute of Big Data, Hunan University of Finance and Economics, Changsha, 410000, China.

[*] Corresponding Author: Jieyu Zhou. Email: zafish1997@163.com.

joys, became a new problem. And the UI (user interface) has been designed as a new research direction.

Data science and technology are constantly updated. The form and requirements of data processing have changed. In the past, random sampling and analysis for different regions have been gradually replaced. Nowadays, With the help of big data technology to optimize information resource retrieval, all information resources can be covered. Collect, summarize, and organize information data, such as the traces of users' browsing, the habits of surfing the Internet, the topics of concern, and the hotspots of participating in comments. This massive information published on the Internet can be easily obtained after the processing of the user's preferences. Traditional methods of accessing information, such as small-scale surveys, are more convincing [Sun, Fan and Jiang (2019)].

Science and technology constantly updated, the modernization of our country data technology combine with big data technology development, the data processing of the situation has changed, in the past for different areas to random sampling, and analysis has been gradually declining, now can be directly with the help of big data technology, the information network of information resources retrieval, all information resources can be included. Collect and sort out the information data, such as the traces of users' browsing, their habits of surfing the Internet, the topics they pay attention to, and the hot spots they participate in the comments. After the massive information processing on the Internet, users' preferences can be easily obtained, such as small-scale surveys, are more convincing.

After deriving the user's preferences, the user keywords are divided and the users are classified into different groups according to the keywords, that is, the corresponding interaction design is needed, so that the user can obtain unforgettable and effective work, entertainment and communication. Simple, and beneficial experience, this is a powerful force for interaction design.

From the 1970s and 1980s, from the Xerox Parc to the Stanford International Research Institute (SRI), and finally to Apple Computer, people have begun to discuss the creation of usable and easy-to-use humanity for digital products. What does the interface mean? In September 2005, the Interactive Design Association (IxDA) was established. In 2012, the "Interaction Design Award" was first introduced. Today, the Interactive Design Association has more than 70,000 members, distributed in more than 20 countries around the world, and interactive design as a UI. The indispensable part of the design has been paid more and more attention by modern people. The importance of UI is immeasurable. While meeting the substantive needs of people, spiritual needs are becoming more and more important. If the APP products planned and developed by the enterprise are not injected into human nature, the technology will be advanced but difficult to use and control, which will bring a very poor user experience. Excellent APP is not only technically excellent, but also follows the principle of "people-oriented" in design.

This article will use the library applet as the experimental object to optimize the interface and explore how to better serve the user's needs.

2 Related work

Carrying out relevant literature review and research, Zhao [Zhao (2018)] believes that

user-centered UI design is the core element of modern economic product design, which is also the main trend of future development of various industries; Jilin Art Institute [Guan (2018)] is in the Internet in the context of data, UI design research is carried out. It is believed that the iterative impact of big data thinking on Internet products is very huge. Big data knowledge has become an important part of knowledge that enterprises need for innovation [Wu, Chen and Li (2018)], while cloud computing as an advanced technique can provide huge storage space and on-demand access service, thus becoming a research platform for the multimedia big data [Xiong and Shi (2018)].

The data runs through the whole process of design. UI designers should use data to make better design decisions and create more. Good product. Yang et al. [Yang, Hu and Meng (2015)] conducted a preliminary discussion and analysis on the interaction design of electronic products in the era of big data, and believed that big data interaction design is the development trend of future electronic products; Zhang [Zhang (2018)] analyzed and analyzed the interactive interface of smart phones. Through interaction design to improve the visual experience, operation fun, operation logic of the smart phone interface, etc., pay attention to the interactive experience between the interface and the human, and improve the value of interaction design; Li [Li (2018)] through the information exchange design process in the big data environment The research on its development trend has concluded that its transformation process is data analysis, virtual technology, art design change, its development trend is digital development, information development, information art design transformation trend; Zhu [Zhu (2019)] through the big data background The exploration of the transformation of graphics processing technology has led to the emergence of big data and opportunities for the development of graphics processing technology, and the ability to better handle graphical information through big data.

Based on Donald A. Norman's three-level theory, Ma et al. [Ma and Zheng (2018)] analyzes from three different levels of instinct, behavioral and reflective layers, and analyzes the graphic design of different logical levels of APP. It is concluded that emotional design can be mobilized from emotional The perceptual influence and anthropomorphic start, graphic emotional design at different interaction levels, can make the APP interface have good aesthetics and fun, and can bring users a deeper emotional experience; Shan [Shan (2018)] believes that under the social background of high-tech development, to effectively integrate the relevant functions of smart phones and establish communication vehicles for information and emotions, it is necessary to proceed from the humanized design mechanism of UI interactive interface to comprehensively deal with the corresponding problems. In the process of use, it must meet the basic needs of human-computer communication, handle the user management mechanism, and comprehensively apply the interaction concept to enhance the value of the experience, provide guarantee for the overall upgrade of the entire system, and ensure that the user interface of the UI interactive interface truly plays its role. actual value; Li [Li (2017)] believes that in order to truly design a user-friendly interface, the most important point is whether the visual performance of the design fully reflects the user's real needs, whether it is beautiful and convenient to operate, which is not only the main content of this research. It is also an ideal state of excellent UI design.

Taking an educational APP interface design as an example, Gao [Gao (2018b)] analyzes the factors of emotional design from the three levels of instinct, behavioral and reflective. He believes that the APP market has great potential, and emotional design will be more valued by people. It will also become a major development trend; Xi'an University of Architecture and Technology Zhang [Zhang (2017)] combines iPhone and Android mobile phone user survey analysis and analysis to discuss the importance of emotional design concept to guide mobile phone UI interface design, and discuss its specific methods and Significance; Chen [Chen (2018)] of Shan xi University of Technology has studied how to solve the similarity of the same type of mobile APP interface, and believes that the interface is not only to meet the needs of the function, but also to meet the user's visual needs; Yang [Yang (2019)]. It is considered that visual thinking is an important part of the UI design interface. It can integrate user perception, thinking and art, and create a close connection between the user's visual sense and graphic design. UI interface design based on visual thinking can meet the needs of interface heterogeneity, and can also update and debug the user's aesthetic function, so that users can get a better interactive experience in the process of using the product; Gao [Gao (2018a)] in the APP interface In the visual design research, it is concluded that the element splitting method can effectively summarize the APP interface, and the [removal] factor analysis method has a guiding role in APP style design research.

Yang [Yang (2018)] believes that the arrival of the information age has caused a very serious impact on the university library industry. At the same time, it also provides strong technical support for the information management of the library. Through big data technology, it can provide readers with more independent choices and more humanized. Strong, this has a great role in promoting the modernization of the library; Chen et al. [Chen and Liu (2018)] believe that in the current era of mobile reading, the theoretical research and practical exploration of strengthening the mobile library APP is that the university library conforms to the trend of the times and expands the book. The need for library service methods and innovative service models.

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3 Cases analyses

The rapid development of information technology and the widespread popularity of mobile devices have made it possible for people to have a long blank time to read paper books in the library in a fast-paced life. At the same time, e-books are easy to carry and price. Low-cost and other characteristics, can read activities in the fragmentation time, paper books are still a symbol of culture, but e-books in the era of big data today and even more technologically advanced future will certainly not be replaced, more likely to become mainstream reading Carrier, the application of mobile library has become the product of satisfying the diversified and personalized needs of users in the information age environment. In 2008, the first library APP was published in the United States and Columbia Public Library in the United States, and the first book in China in 2010. The

museum app has been opened. So far, the functions of traditional and conventional library services, such as the collection of bibliographies and personal borrowing information, and literature retrieval, can now be analyzed by big data technology. Data analysis is becoming more and more mature. Mobile electronics the achievable functionality of the device has changed dramatically, and the user is in the case of sufficient functional requirements, the demand for the experience of the APP is greatly enhanced. For the mobile service of the library, a good user experience and search form are crucial for obtaining good search results APP service system design and implementation, the interface design of the library APP should pay more attention.

This experiment will use the library APP interface as an optimization object to carry out optimization strategy research.

Figure 1: loading page and "Me" page

Design is a people-oriented activity. UI design realizes human-computer interaction. It needs to understand user's expectations, needs, motivations and usage scenarios, so that people can easily achieve goals, including interaction design, user research and interface design. In part, based on these three parts, the product needs demand analysis, design analysis, research and verification, program improvement, and user verification. Due to the space setting, this paper will focus on the two parts of demand analysis and design analysis.

Firstly, let's go through a case.

The APP Boku library is an e-book online reading software, mainly introduces five functions: E-book loans, recommendations, book reviews, comments and rewards, its core concept is dedicated to being a digital library beloved by readers, developing with users, forming reading a habit.

Making loading pages simple and comfortable, enables users to receive messages intuitively: The APP is Kubo library, it wants reading to be my habit.

The widgets such as: “Account” (账户). “My notes” (我的笔记). “My favorites” (我的收藏). “My comments” (我的粉丝). “Messages” (消息) in “Me” (我的), enables users to know this page belongs to private domain explicitly,where can check traces of his own clearly.

Figure 2: “Home” page and “Categories” page

“Home” (首页) has the main function of recommendations, which has search bar to scan on the top when having specific bibliography, if users have a demand for a certain type of book can enter “Categories” (分类) to filtrate by the needs.

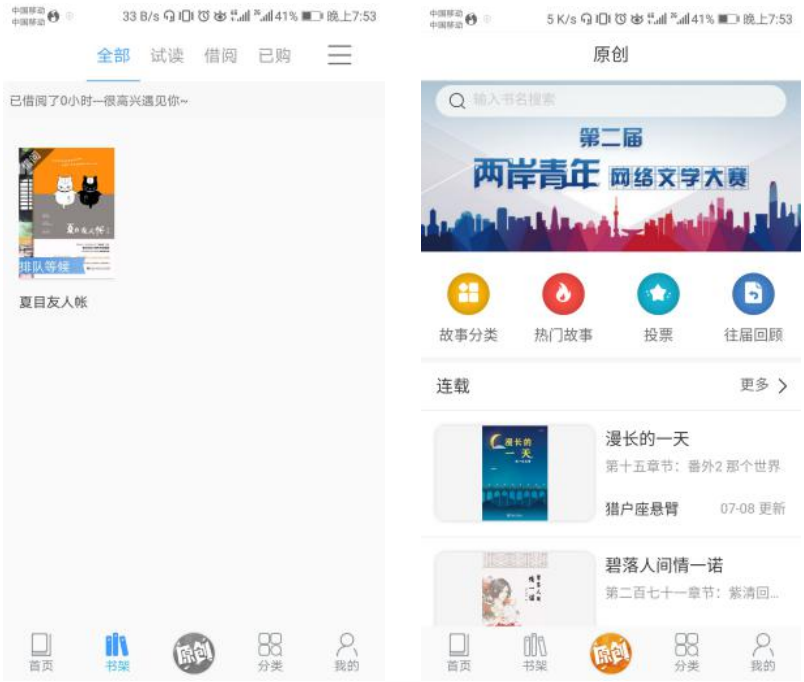

Figure 3: "Bookshelf" page and "Origin" page

It will be automatically stored in the "Bookshelf" (书架) page when users leave, clicking on a book on the shelf will automatically take users back to where they left off, "Origins" (原创) page at the centre of the downstream page widget, providing users with writing, sharing, communication and all kinds of interactions spreading.

Analysis: When users see a function or a screen, they will search for visual design to help with deciding what to do on screen, "the principle of availability" split up into the space and categories of layout, icons, visual symbols, evaluating the most important object information on the interface, these visible items interact with the space, and previewing the stadia effect when possible. At the time, to make users receive information easily, designers create information level, using the difference of visual properties, such as on "Origins" page, "Origin" not only the color of space is vivid orange, and the fonts widget itself, ensure users to know exactly on the page, can having original activities. Upon entering the APP, to the usage of every page, the APP Boku library can output exactly information to users, let them know where they are, where they can go, the visual effect may unified, widgets also have the same meaning as functions, having apparent memory points, is a reasonable design in total.

Let's look at another example, personal library APP-

The personal library APP is an APP that enables users to manage and share knowledge, providing with various kinds of essays access services. Users can set up exclusive library by sending articles in APP, offering others good quality essays, and making friends via articles, the APP mainly provide one-click saving & copying, automatically classification of articles.

Figure 4: "Loading" page and "Origin" page

"Loading page" has the same effect as the first project, as sane as Boku library after loading, the bar menu has five widgets fir the main function operation, "Creation" can have wring articles, essays, extracts.

Figure 5: "Favorites" page and "Reading room" page

"Favorites" find the most favorable articles, essays for users to collection, function as a locker cabinet, putting the favorable item in it.

Figure 6: "Learning circle" page and "Address list" page

Learning circle page for user to cluster activities, namely two or more persons group communication, address book for one-to-one communication between user and other users' activity.

Analysis: Can be seen from the interface, no matter which interface will create controls and controls on the green at the same time, the interface for using this APP for the first time the user cannot know clearly the page information focus, affect the use of the user, the user is easy to get lost in addition, Address books and collection controls are similar, the same character ICONS can cause confusion, visual elements, not enough to attract users should ensure that the quality of the content relevance and integrity, not because technically feasible and simple display information, ignoring the low quality of visual effect in a user perception of discontent, destroyed by production.

4 Experiment

Doing the optimize experiment based on the second project.

Firstly, establish Persona (user portrait) according to the APP's function, "the portrait", is a target users model based on sets of real statistic, also the most representative image set of users' characteristics.

What are users' behaviors like, how they think, what is their aim to use the APP, why they hold such aims.... When it comes to these questions, Persona provides us with a way to think and communicate clearly. Persona is not a real person, but its origins from several real users' behaviors and motivations. In other words, Persona is "composite model". Based on

the behavior patterns that discovered during the experiment, the synthetic prototype has been officially finalized, providing support for product design. By using Persona, we can understand the users' aims under specific circumstances, it is an important tool for conceiving and defining design concepts, the set-up process is as follows:

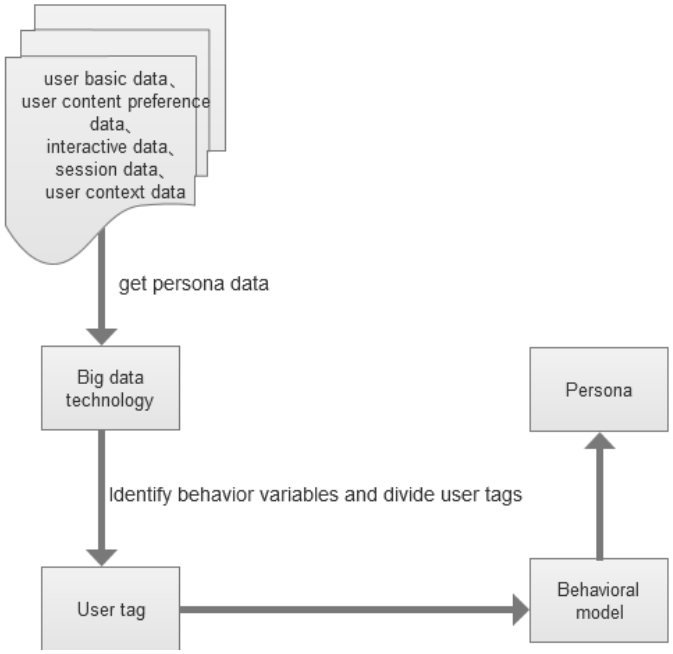

Figure 7: Flow chart of user portrait

The key to using this approach is to firstly choose the right design object,which represent the needs of the vast majority of users [Xu (2018)]. The target users of APP personal library have a wide range, the Persona established for this as follows:

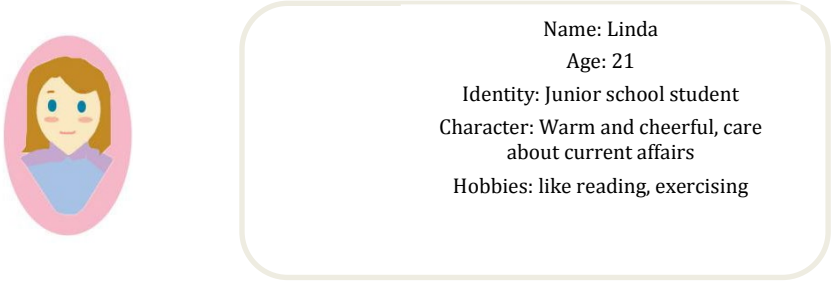

Figure 8: Personal introduction

The second step, find the situation Linda will use the APP personal library-searching for pain spot.

- The key to find pain spot is establishing character situation scene.

According to the information offered by Persona, we can know: Linda, a female junior student, enjoy reading, exercising and listening to music in free time. The characteristics and behaviors can be further described based on this, for example: Linda is a novel lover, enjoying reading good-writing essays as well, keeping track of national events. Linda has her own mobile phone after entering university, e-reading becomes her new reading way, Linda wants to save her favorite words and stories so that she can reads afterwards, Linda can screen print but it is too troublesome, the APP personal library can solve her problems.

Imagining ideal user's interaction process by using stories or scenarios, then defining requirements from these scenarios and other sources. After finishing preparations, begin to design.

The sample can fulfill the basic needs of Linda, but with a good user experience, the design of form and behavior must be harmonious and visually better presented.

The experiment is doing optimize design based on the second project, can export the existing framework directly, doing further modification and optimization from the existing one.

Final optimization is as follows:

Figure 9: "Address list" page's optimize

Analysis: Integrating vision design, you would better use colors to pass important meaning. To create an effective system which allows users to track hidden meanings, you ought to use a limited number of colors, the green that button widget shows in the experimental sample is major tonal of optimized interface, the interface keeps consistent and new icons are replaced, add "banner", which can show some activities, important notifications, will make users know about some messages about the library more quickly. "Address list" can show personal information directly, which decreases operating level.

Figure 10: "Learning circle" page's optimize

"Learning Circle" page mainly on text and layout re-design, product interacts with the user's process to have the basic courtesy, text and layout should also be noted that the different behavior of the element to be clearly distinguished visually design, clearly defined interface content focus.

Figure 11: "Reading room" page's optimize

The "Reading" screen: "hot text" (热文), "social" (社会), "Culture" (文化) and other sub-hierarchy under the "Bibliographic Classification" control them, click on the category of the query would like to know to control, the past seven content in the "hot week "(一周热点) Search, we need a clear hierarchy in the case of a large amount of information, which will help users to navigate and find useful information, if exceptional circumstances leave the page, or in the"query" page (一周浏览) to browse through the history of navigation.

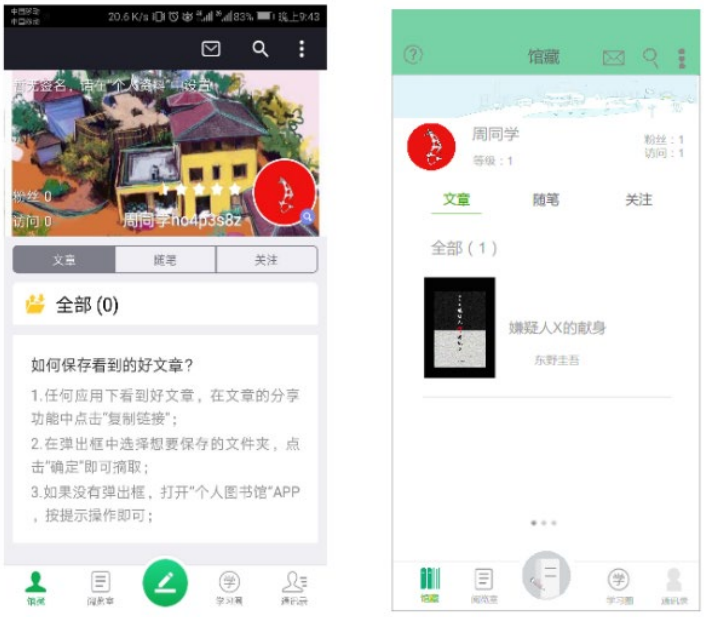

Figure 12: "Favorites" page's optimize

The high similarity between the icons of the collection and the address book in the sample can easily lead to confusion, so new icons are replaced in the hierarchy within the question mark in the upper left corner of the page. The whole page is also more tidy, with an orderly layout and clear primary and secondary relationships.

5 Summary

Due to limited space, the optimized content only shows a part. However, it is not difficult to see that the overall optimization effect is more uniform than the sample, the primary and secondary levels are distinct, the appropriate font and size are selected on the interface, the text is succinctly organized, and different visual symbols represent different types of objects. It is more attractive in aesthetics.

The primary goal of UI design is to meet people's needs and desires. APP must express its own behavior, not only to respond appropriately at the logic, data entry and presentation levels, but also to respond at a more humane level. Focusing on the reasons

people use a product at first, as well as expectations and attitudes, can design solutions that are both effective and enjoyable.

User portrait plays a very important role in the design process. It is a user model that builds user requirements and preferences on a multi-series of real data. Although it is not a real person, it can be more directly related to users due to real data. Appeal and guide the design direction. On the big data platform, accurate, personalized and diversified services can be provided for individual user data mining, analysis and labeling to maximize the positioning of user needs images [Wei (2018)].

A paper cannot include all the content of UI design, but some important principles and essence [Cooper, Reimann and Cronin (2008)] can be summed up, to meet the needs of most users, in the case of technical standards, interface design should be done to:

1. Communicate a unified style or brand
2. Guide users to separate hierarchical relationships
3. There are clear instructions at each level
4. Communicate to the user with valid information
5. The interface remains simple and not monotonous

The interface should be visually efficient, and the best performance for the smallest visual and functional elements is what every great UI designer needs to do. Most importantly, everything is user-centric and designed for the target user to achieve the best results.

The combination of design principles, processes and models is the key to designing efficient product interactions and interfaces. It is necessary to study the target areas, use big data technology to understand the extreme needs of users, define the solution framework, fill the design details, and then repeat Testing and verification can get a good APP product, which is also the UI design optimization process shared by the general APP.

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