

Research on Interface Design of Graphic Design System Based on User Experience

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Abstract

To effectively improve the user experience of mobile products and meet users' diversified demands, and based on the background of the information age, this paper analyzes the interaction design, human-computer interaction and user experience under the background of mobile Internet information, and proposes the design idea of the graphic interface display system of the embedded Linux technology. Meanwhile, it summarizes the main structure of the system, and establishes the Microwindow system architecture. Besides, it designs Framebuffer device driver design and system hardware circuit design, and then deeply discusses the characters, graphics, color and style in interface design. Combined with the design and application, it is found that the interface design of the graphic design system based on computer technology can realize the key points of the system interface design in the specific operation process and improve users' operation comfort of the interface.

Keywords: *Graphic design, Interface design, User experience*

I. Introduction

With the arrival of the 5G era of mobile Internet and under the development background of information age, the number of system users of Web terminals and mobile terminals is also continuously increasing, and a large number of catering and entertainment applications are developed to integrate various kinds of information through terminals so that users can browse resources anytime and anywhere. Therefore, to solve the problem about how to enrich users' diversified experience in the application system, this paper puts forward the design idea of graphic design system interface based on computer technology and introduces the embedded system Linux computer technology. As one of the technologies developed under the new field of IT, this technology is characterized by a lot of technical performance, such as high efficiency, easy customization, supporting hardware and stable operation. Combined with its open-source codes and characteristics of free of charge, Linux embedded operating system is gradually widely used in various fields of computer at present, such as PDA, WAP mobile phone, set-top box, etc, which can satisfy the system to provide functional Web browser.

This technology includes HTML support, Java Script technical support, as well as Java Virtual Machine technical support. To realize these operation techniques in computer terminals, it is necessary to attach importance to GUI support based on high reliability and good operation performance. Characters, graphics and colors in the graphic design of mobile interface all serve as the main bridges to spread information to the operating users. Therefore, it is particularly important to complete the interface design of the graphic design system by using the embedded system Linux, in order to give full play to the functions of the graphic design system, and this paper will carry out the relevant study.

II. User experience of graphic design system interface

(1) Mobile application interaction design

The concept of human-computer interaction initially came from the field of IT technology and mainly refers to the interaction between the human-computer interface and user operation. Since the concept of “interaction design” was put forward, the core design elements of the interactive system have included people, action, auxiliary tools and technology environment required by completing the operation action. By comprehensively analyzing product factors, the system meets the system requirements through the functional system, interaction model and information architecture, and then coordinates and designs the relationship between the factors. The two basic goals of interaction design are to achieve product usability and product experience. Taking the mobile interface as the primary interaction bridge between user devices enables users to quickly enter the interactive operation process.

(2) Human-computer interaction and user experience

Since the end of the 20th century, Donald Norman has demonstrated and interpreted user experience design. Currently, user experience design has been regarded as the key lifeblood of Internet technology products. User experience is the psychological feelings formed by users when using products, and it is the inevitable result by gradually extending to the spiritual level of users. When realizing product interaction, users reflect on the next step of product technical operation by combining with the information on product equipment. Information feedback is a technical operation responding to users, and through a series of responses, users can confirm whether their request is being processed. To ensure that users can acquire good technical feedback, users also hope to better acquire system processing and immediate feedback during the operation of mobile operating devices.

III. Overall system architecture

In this paper, the interface design idea of the graphic design system based on the embedded Linux technology is proposed, which is based on the uClinux embedded graphic interface display system. As an embedded Linux operating system that can specially complete the customized protocol processor of the memory-free management technology unit, uClinux embedded operating technology can realize the embedded Microwindow, so as to provide good technical support for the system interface of the graphic design of the embedded system. It is composed of hardware and software in total. The software mainly includes the following three parts: uClinux, Framebuffer driver, and Microwindow. The hardware adopts Motorola series embedded CPU 5272, EPSON series 13506LCD controller, and MCT-G320240DNCWLCD system interface design display hardware system produced by TRULY Company. The version of the uClinux embedded kernel is 2.4.17. The overall interface architecture of the graphic design system is shown in Figure

IV. Miceowindow technical architecture

Miceowindow technology used in this design has a lightweight GUI, can control the resources that are occupied less, and has high system reliability and lightweight technology, so currently, it is widely used in the field of industrial information technology. At present, Miceowindow technology is very suitable for industrial real-time control systems and embedded systems, and can complete delicate, compact and customized user interface support systems. Miceowindow is a layered architecture, whose bottom layer is compatible with screen, mouse/touch screen, and keyboard interfaces without being overly dependent on any particular hardware. The middle layer acts as a transplanted graphics engine. The top layer can satisfy the program call of the graphical interface system of many kinds of API. Currently, there are two types of API in the system application, including ECMA APIM and NANO-XAPIS. The above two types of API are basically compatible with 32/64-bit and X Window systems of current computers. Meanwhile, they can be easily and successfully transplanted. The system operating programs of the Miceowindow are shown in Figure 2.

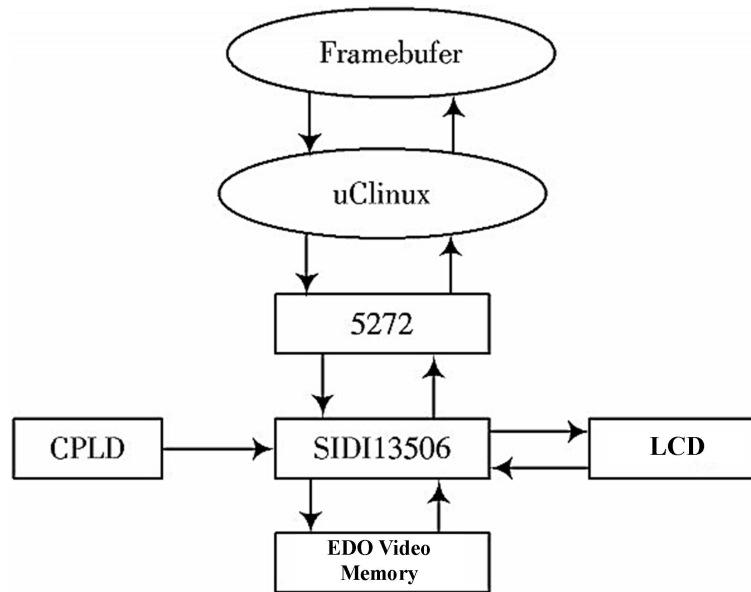


Fig 1: Major components of the uClinux embedded graphic design system interface

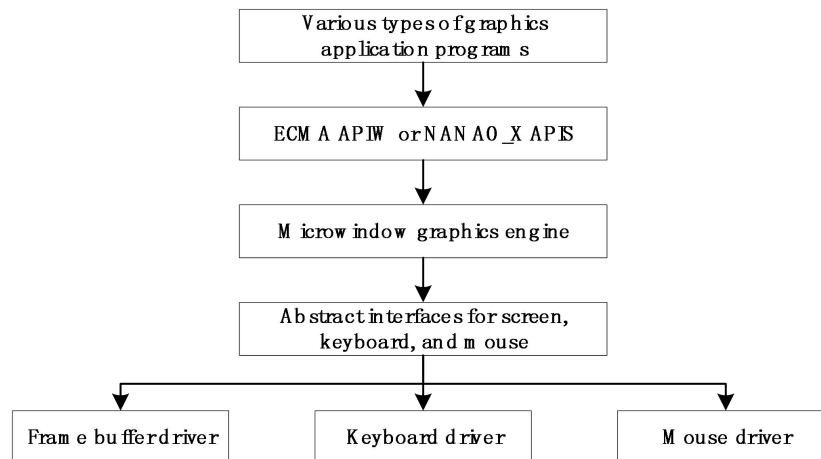


Fig 2: Architecture of Miceowindow system operating program

As for the Microwindow bottom SCREEN abstract interfaces used under uClinux technology, their applications can be developed based on the Linux Framebuffer device interface. Framebuffer device can abstractly display the graphics device and represent the hardware frame cache of the interface of the graphic design system. Next, the hardware design environment of the Framebuffer device driver will also be discussed.

V. Hardware circuit design

The 5272 embedded CPU model of the Coldfire series is used. This series is used as the current middle and low-grade product, but it does not mean that they have low application efficiency. Because they can achieve 63MIPS under the main frequency interface of 66 MHz, which is close to MPC860MIPS. Besides, they have extremely abundant peripheral circuit interfaces and achieve a high Coldfire system integration degree. Among them, as a 32-bit data synchronization bus, 5272 bus frequently supports asynchronous and synchronous termination when designing the transmission bus. As for the transmission cycle achieved by 5272 peripheral devices, TA signal can be used to realize the bus transmission cycle and complete the asynchronous termination of the bus transmission. Using BS0~BS3 as the main bus interface signal, it shows that there is no memory mapping in the I/O space, and

there is no special I/O space address. The interface circuit of the 5272 series and 13506 is shown in Figure.

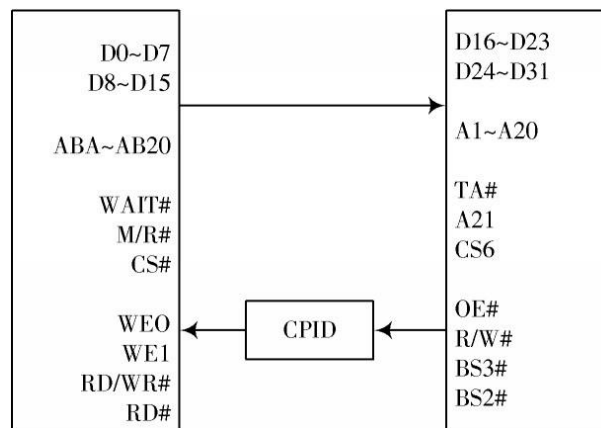


Fig 3: Interface circuit of 5272 series and 13506

VI. Application examples of system interface design of graphic design

(1) Interface style design

Considering that young people are the main user group of system interface design of graphic design, they have a great demand for color richness, but require simple operation for system software functions. With the help of a mouse click, users' operation schedule information can be easily viewed. It mainly requires gray color, and the color matching should be light and vivid. The use cases of the interface style are shown in Figure 4.

(2) User navigation display

It is necessary to guarantee simple and intuitive user navigation, adopt specific text description, realize the use case of text combined with icons, so that users can quickly think of and execute corresponding functions as soon as they see the buttons. The use case of user navigation display is shown in Figure 5.

(3) Usability evaluation of interface design

After entering the interface of the design use case, the system user navigation and guidance of the new will appear, which can more easily guide users to better understand the software functions. As student groups and office workers are the main user group, so the interface design needs to be clear and concise as much as possible. The specific button text can clearly show the corresponding functions, so that users can quickly learn to use the graphic design system in a limited time.



Fig 4: Use case of interface style

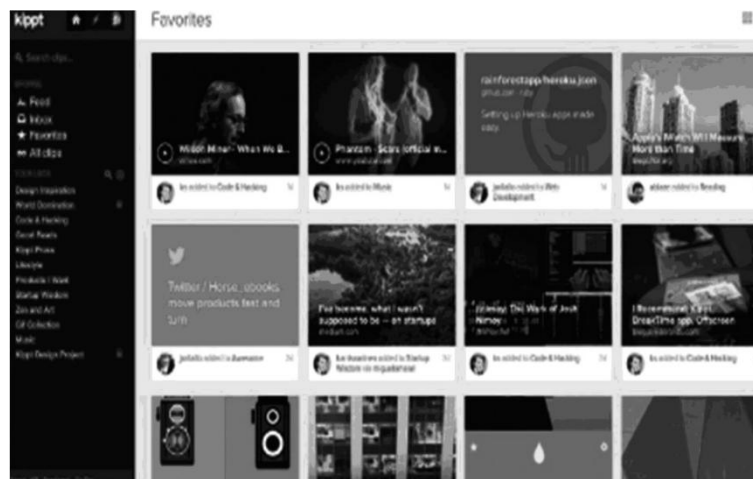


Fig 5: Use case of user navigation display

The software data designed by the interface supports users to realize local storage and successfully upload relevant information to the server during operation. Affected by a series of factors such as network speed, a local operation is required when it is inconvenient for the server to read data, so as to fully enhance the operating speed. The interface of the graphic design system consists of three layers, all of which are realized in the main interface, helping users complete the to-do list in time and integrate visual functions.

VII. Conclusion

Currently, a lot of embedded systems have been used in interface design, especially in the field of industrial control. In this paper, by introducing the embedded Linux technology, the interface design idea of the graphic design system based on computer technology is proposed, and the four major data structures in the design are analyzed in detail. Combined with the use cases of interface design, it is found that it can effectively improve the user experience of mobile products and satisfy users' diversified demands.

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