

Examples of human computer interface computer science



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The World Wide Web has a massive and permanent impact on our lives in economy, industry, education, healthcare, public administration, entertainment, etc. There is hardly any part of our daily lives which has not been pervaded by the Internet. However, because of poorly designed human computer interface (HCI), human operators make many mistakes in many complicated systems. Computers and the web address the problems associated which require rapid prototyping and agile and quick methods with shorter latent period. The interactivity and visual nature of the medium and multimedia features of Web applications can make HCI aspects highly significant. First this paper makes a critical examination of examples of poor HCI design, then this paper chooses an example a good HCI design and discusses its merits, conducts literature research and find examples of HCI designs in familiar appliances or websites and provide in-depth comments appropriately and predicts the future development trend of HCI design.

Consider this scenario: There is a shopping website which provides all the information, instruction and server-side support required to perform an on-line purchase. However, the users cannot figure out how to find the items they want to buy. We should find a measure of how quickly users can accomplish their objectives or finish their work using the system

From the perspective of theory, the development trend of human computer interaction is becoming closer to nature, the user can use natural ability, get convenience through special efforts and learning and the form of epistemic load to increase work efficiency. Since the 1980s in human computer interaction, this kind of human-oriented technology is becoming more and more important especially.

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Now we look into the future. In the information age, organic system will replace the original housing styles. Home is changing from living machines into a friendly and intelligent robots. In this environment of family, home decorations and household product design tend to gradually harmonize. They separate the individual from home to the road of integration. Modern intelligent home has been integrated into people's daily lives. Future home will become a living interface, through which we exchange the data, images with others. The home environment has been beyond history, virtual reality and the limits of the world, and has been across the limited time and space. We pass it and enhance the interaction of the experience and can feel a new way of life.

What is HCI? HCI mainly research the design, evaluation and realization of interaction systems.

Human: Individual user, a group of users working together, a sequence of users in an organization.

Computer: Desktop computer, large-scale computer system, Pocket PC, embedded system (e. g., photocopier, microwave oven), software (e. g., search engine, word processor).

User interface: Parts of the computer that the user contacts with.

Interaction: Usually involve a dialog with feedback and control throughout performing a task (e. g., user invokes “ print” command and then interface replies with a dialog box).

In the past, computers were expensive and computers were only used by technical people. Now, computers are cheap and used by more and more non-technical people who have different backgrounds, needs, knowledge and skills. Computer and software manufacturers have realized the importance of making computers user-friendly, which is easy to use and can save people time, etc.

In complicated systems, most errors and failures are attributed to humans mistakes made by human beings. They make mistakes to cause incomplete specifications, implementation mistakes and design faults like software bugs and producing faults. But when examining human mistakes in the background of embedded systems, we often focus on operator mistakes and mistakes because of the poorly designed human computer interface (HCI). human computer interface (HCI). Human beings usually conduct the same fault modes and certain situations which will make a human operator more likely to make mistakes. A qualified HCI design is capable of encouraging the operator to perform accurately and keep common operator mistakes from the system. But there is no well defined procedure to construct an HCI for security critical systems. Cost, power, size, and complexity are rather limited in an embedded system, therefore the interface must be correspondingly ordinary and simple to use in condition that system security will not be violated. There must be a distinction made between highly domain specific ports, such as controls of airplane pilot or controls of nuclear power, and more broadly "walk up and use" ports, such as VCR onscreen menus or automated teller machines[Maxion, Roy A.; deChambeau, Aimee L., 1995]. But this difference is not hard and fast difference, because there are ports

such as the one in the ordinary automobile that specifically need certain training and certification (a driver's license test is required in most places in the world) but are designed to be relatively ordinary and commonly used. But there are not the same ports in all cars, and even small distinctions may make the experienced drivers to make mistakes when operating an unfamiliar car, let alone the unexperienced drivers.

In safety critical systems, the main objective of human computer port is to keep the operator from making mistakes and causing hazards.? In most cases usability is a supplemental objective. A highly effective port will comfort the operator for reducing anxiety.? However, there are some tradeoffs between characteristics which can make the interface usable and characteristics which can secure it. For instance, a system which permits the user to conduct a procedure just by pressing the enter key a series of times may make it rather incapable to use, but permit the operator to neglect significant safety examines or easily confirm an action without evaluating the results. This was one of the issues with the rac-25 medical radiation device. Operators could easily overlook fault messages on the terminal and go on to use treatment, without realizing they were conducting lethal doses of radiation to the patient. Also, the fault messages were not very descriptive, which is also another issue with user ports providing suitable information back.? It is also significant to recognize that not all systems are safety decisive, and usability is the main objective of the HCI in those cases. In case that the user must use the system to implement a task, the interface should direct the user to take the suitable measures and offer information back to the user when operations are successful or unsuccessful.

However, human beings often need to be protected secure in an opposite automated system. Even the most highly cultivated and precautionary operators are apt to getting tired when they are free in normal operation, and when an unusual situation occurs they feel scared, then their stress levels are promoted and lives are at risk. The HCI must offer suitable feedbacks to the operators to allow them to make well informed resolutions based on the most fresh information on the status of the system. The operators should be experienced, diplomatic and knowledgeable. High inaccurate alarm ratios will make the operators neglect a real alarm situation. Means for determining the effectiveness of a HCI, such as exploratory evaluation, epistemic presetting of routes, and experiential evaluations like protocol and agreement analysis exist but they are often unmanageable and do not provide decisive data on the safety and usability of the human computer interface. System designers must guarantee that the HCI is easy, instinctive and easy for human operators to operate. However it is not so ordinary that it cheats the operators into a condition of self-satisfaction and reduces their responsiveness and capability to emergency circumstances.

2. Critical examination of examples of poor HCI design

There are many HCI deficiencies in the devices. Owing to the fast development in the digital technology, the operation of human computer interface is becoming more and more complex. As a result, to catch up with the rapid and fleeting transformation, the user of digital interactive products can only keep on learning all kinds of operating interfaces, programming languages, and development environments. Nowadays, in our daily lives, we <https://assignbuster.com/examples-of-human-computer-interface-computer-science/>

can hear and know more and more people complaining about the poor design in interaction interface. This problem is caused by both the bad design of the interactive products and the lack of users' knowledge about the logics of the human-computer interaction design.

(1) Current mobile computing devices.

Current mobile computing devices such as Personal Digital Assistants (PAD), palmtop computers and mobile phones have the same problem, that is attempting to provide users with formidable computing services and resources through small interfaces[L. Wang and A. S. M. Sajeev, 2007]. Because mobile devices need to operate with restricted battery charge, how to manage the power expenditure has also become one of the most important problems for system architects. And as is usually the case with most mobile devices, limited screen size makes it difficult to efficiently present materials and users can not conveniently navigate to and from the information they want. And furthermore, as mobile devices are often required to have a wide variety of functionalities, the convergence and assemble of electronics, computing, and communication is becoming a necessity in the mobile industry. Therefore we have to make the mobile devices have more and functions and easy to use.

(2) Elevator controls and labels.

On the bottom row, the elevator controls and labels all look the same, so instead of a control button it is easy to push a label by mistake (www.baddesigns.com). On the top row, people do not make the same mistakes for the labels and buttons.

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Figure1 Elevator controls and labels.

(3)A shower control.

In Figure2, you can see a shower control. It is a bad design. You can see a sticker on the faucet which gives command for how to induct the water run out of the shower but not the faucet. It is impossible for you to guess how to turn on the shower control. It is designed so badly. This design is bad for a lot of reasons. On the one hand, nothing else works like this. On the other hand, the control is basically hidden, because the “ control” to turn on the shower appears so different form a control. Continually, there is a problem with the design when devices come with command stuck on them. You have to reach under the faucet, and then hold tight the section where the water runs out, at last you can pull down on it.

Figure2 A shower control.

(4)Men’s room sign.

In Figure3, this is a sign on a men’s room door. One day, a person was going to go in, just to be sure he watched some guys walk up to the door, look at the sign and then walk away, presumably to go down stairs to the IMAX lobby, like the sign says. Other guys went on in, so I did too. But it seemed that maybe this restroom was only for handicapped men. It was a perfectly normal men’s room. He doesn’t really know what he was expecting!

Figure3 Men’s room sign.

(5) The elevator control panel cannot make you get the elevator to go to your floor.

In Figure3, it is a this is a mark on a door of men's room. One day, a person was going to go in, just to be sure he saw some men walk towards the door, look at the mark and then went away. They must go down stairs to the IMAX lobby, just as the mark says. Other men went straight in, so I did too. But it looks as if this restroom was only for disabled men. It was a perfectly normal men's room. He doesn't really know what he was expecting!

Figure4 The elevator control panel

(6) The products make " block" alarm.

When you try a new embedded products, you have your own understanding of equipment according to the operation. Unfortunately, your operation is wrong, then, the product made " block" alarm, then it is cold prompt: " you are wrong, please input weight lost!" Maybe somebody will be attracted to your voice, and, you also feel very fast. This is one of the frustration, equipment for sound interface design, user input the blame, rather than other appropriate feedback. Don't put all the mistakes are pushed to the user, perhaps because of this many users will abandon the use of products to frustration.

Figure5 The products make " block" alarm.

(7) Excessive congestion.

In Figure6, there are excessive congestion. Designers should not accumulate icon and text, excessive congestion will produce visual fatigue and accept mistakes. Below is a sparse degree small screen design, we can see that the improper directly sparse degrees will affect the normal use of the user.

Figure6 Excessive congestion.

(8) Something wrong with the intersection.

In Figure7, there is an intersection that causes people problems in the picture. Imagine that you are getting close to the intersection in a automobile. If there is a traffic light before you and what you can is to turn left or right. If you go straight, you will enter a parking lot. The lower traffic light has a green arrow that allows you to turn right without stopping. You can see a large number of people getting close to this intersection hoping to turn right. They stop at the light and then turn right if they happen to see the green arrow. On the one hand, it is difficult to see the blue arrow. But it is easy to see the two red lights. On the other hand, the second possibility is that people aren't accustomed to turning right at a red light without stopping. I regard that it is these reasons join in a common effort to cause the issue.

This issue might be made up by making the blue turn arrow more prominent. We should make the arrow more prominent and brighter. Or we should increase another blue arrow to the above traffic light.

Figure7 Something wrong with the intersection.

(9) Ergonomic toothbrush.

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In Figure 8, it shows us a toothbrush which has both right-handed and left-handed versions. It is contoured so that the hand can be fitted and there is a depression for the thumb. This bright idea comes up as you probably use your preferred hand to hold your toothbrush, why not contour it so that it is comfortable to hold?

Holding it only one way is the problem with using this toothbrush. Generally, as they change from brushing one side of their mouth to the other, people will reposition the toothbrush in their hands with an attempt to reach every corner of their teeth. People who use this toothbrush will face a difficult position: whether he or she should rotate the grip on the handle and go against how the handle is shaped.

Figure 8 Ergonomic toothbrush. Possible solutions in developing a good user-centered design

Based on the problems in HCI design for mobile devices mentioned above, we should find possible solutions to such problems in developing a good user-centered design. Therefore, it is very crucial for interface designers to make efforts to develop interactive products that are easy to learn, effective to use, and provide an enjoyable user experience. Nowadays, devices are widely used by different types of people who have different objectives of operating such interactive products. Designing applications for usable and useful devices to meet the requirement of different types of interface users encounter a couple of challenges. Users, designers, and technical practitioners should cooperate and collaborate to contribute to its success.

(1) Iterative design, evaluation, and redesign are good methods available.
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If we can perform resultful evaluations and correctly recognize as many faults as we can, we will improve the product greatly. Also, precise estimates earlier in the process design stage can save money and time. However, when you have to work with a physical interface, it is easier to find HCI flaws. To separate the design of the HCI from other modules in the system is very important too. Therefore, defects in the HCI do not reproduce faults through the system. [Burns, A., 1991, p. 168 - 174] In hard real-time systems outlines an architecture for uncoupling the HCI from the application in which way complexity is lowered and timing constraints can be solved.

(2) Another usability inspection method is the epistemic presetting of a route.

Another usability inspection method is the epistemic presetting of a route.

Like the exploratory evaluation, the epistemic presetting of a route can be put into use to a client product design without practically using a constructed product.

(3) Several inspection means should be applied.

Experiential means can also be put into use at the prototype stage to actually watch people's performance. There is a compromise between how many resources can people commit and how drastically the interface is thoroughly checked at this infant stage in the cycle of system life.

(4) Avoid unnecessary input.

In human computer interaction, in addition to the user use the keyboard and screen etc, it can input means using speech recognition, gestures, facial recognition as input, the identification of input method is more advanced than the keyboard input. Although it's technical level is enough to support embedded equipment for daily use, but in all conditions permit shall, within the scope of the top priority by the input mode, because they improve the speed of user interaction.

In a graphical user interface design, avoid input can be used to select list, fuzzy query, additional information display mode, can input keyword search target or contains a list of objectives for users to select, or according to the user's intention, provide customer need inquires ahead of the target or related information, simplify the operation and improve user use efficiency.

(5)Interface design in ease of navigation is an important role, a software, a web site can provide information to users and allow users to browse the non-linear way. Due to the complexity of existing structures, and interface node and key chain while increasing number, users will face a potential problem - lost. User may lose direction, don't know where to know the operation or back to the starting point. Then I think a lot of people feel there are also have perplexed, be fooled, eventually give up. Therefore, the design must be based on content before building to determine the navigation menu of all kinds of levels.

(6)Fun and sense of humor.

In Figure9, it is a picture of Google search results. Usually the interest and humor is the product through innovation, actually making the form of boring <https://assignbuster.com/examples-of-human-computer-interface-computer-science/>

data into interesting, humorous and not hard data, GOOGLE company uses a humorous way of joy in logo and search. Some people sometimes want to see how long the GOOGLE OOOOO use GOOGLE. While GOOGLE fonts are often full of humor, anniversary of the festival, which makes people feel very interested. The changes in Google are also very attracting people's attention. Watching the changes of the font, we can find that designers often use figure character based on the font by increasing the graphics or glyph graphical and then process to get the desired effect.

Figure9 Google search results.

(7)Using visual metaphor elements which expresses the function.

In Figure10, there are some designs which can clearly express products' functions. Choose some plants, animals, or forms for the reference, and after summary, refining and appropriate deformation?? they can be used in the interface design, still can make interface design of the linear modelling of original curve and surface smooth and fuzzy boundaries, strengthen the graphic interface, or the fullness of the icon, the thick fat to overall look round, honest, lovely, funny and interest sex. I think the design can best embody the icon from bionics design or "chubby" of a sense of humor.

Figure10 Using visual metaphor elements which expresses the function. 4.

An example of a good HCI design and its merits

In Figure 10, this product is a multi-function intelligent electric pressure cooker which was invented by a famous appliance brand. The tank of the cooker is made of stainless steel, and in the bottom of a pan there are three

layers which are used to transfer heat. Moreover, to meet consumer tastes, the high-end product introduced is “ one-button”. The price is about 420 yuan and it is an intermediate product. This product has three cooking function: steaming, stewing, boiling. Eight food modes: soup, porridge, Meat/chicken, rice and beans/leg-muscles, rice porridge, cake, grains. Three choices: fragrance, standard, enriched flavour. Two user customization features: appointments and customize pressure.

Figure10 An example of a good HCI design.

Target user group: not clearly defined

Product image: no clear image

Objectives: a brand household electric pressure cooker

Task: usability testing and the improvement plan

According to the function design of the products and the basic functions which are often used by people, the target user common samples are to complete the following tasks:

- (1) cook a pot of rice
- (2) make an appointment of three hours to cook porridge
- (3) modify the appointment time, add 50 minutes on the basis of 3 hours
- (4)boil a pot of chicken soup which has enriched flavour

Note: Tell the user privacy statement and the data clearly. Try to create natural true cooking space for users, avoid users from being monitored.

Explain to the users that the test is for the product and the test is not for experience and ability, and reduce the difficulty of the task during operation

User operation process? s

Figure11 User operation process.

Through the test of the product, we find that the functions of the product are reasonable, the interface is beautiful, the message is clear and it is simple and safe for users to operate. Therefore, it is a good HCI design.

5. Conclusions

In the following, I give some important ideas:

(1) Shorten user perception of system response time by way of effective HCI design.

Humans are the most unexpected part of many systems and have higher failure rates under pressure, but humans can have strategies to recover from emergency situations and underlying disasters. Therefore, aiming at solving some problems in the poorly HCI design for the product with new means, to shorten user perception of system response time by way of effective HCI design can be another way to improve user satisfaction and system usability.

(2) The emotion should be considered during designing the HCI.

Everybody generally think the science and technology in UI interface design is the only important one. In UI interface design based on scientific and technological high development, the emotion should be considered, otherwise the designer's interface is considered to be unwisely and lack. Design the emotion of reviewing refer to some information that the products transmit, after causing people's association, sympathetic response and thinking, experience a kind of advance. From "products" to a series of development that "thinks" and then to "experience". The important ones include the following several points: Understand the culture and ideology and symbol, remember oneself and the individual character of the product.

Human computer interaction and computer user interface based on character have just passed the command of language manner, and is currently in the interface graphical user interface. Computer scientists, however, are not satisfied with the status, they are actively exploring new styles of human computer interaction.

Interface between different products is embedded in our life in various content, the fundamental purpose of the design is to make people get rid of barriers from product technology and operation. The usability research is a necessary means to reach the purpose. User-centered design will change the way we live, a pursuit of "harmonious interface" is closer to us.