Assignment P2

Lu Han
lhan72@gatech.edu

QUESTION 1

1.1 Five tasks in one hour

In the one-hour interval, I plan to buy a coffee machine on Amazon. So my five tasks in the list will be: log into Amazon, search coffee machines, view the search result, add the coffee machine to cart and then check out.

For the first task, I have to log into Amazon so that the website can have my membership information available and I don't have to type in the address information and card information. My goal is to successfully log into my Amazon account. The object will be Amazon website and the interface will be buttons, email and password box on the page.

The second task is to search for coffee machines and the goal is to find different brands of coffee machines. The object is the website and the interface is the search page with searching bars, dropdown menus.

The next task is to view the searching results of all the coffee machines. The goal is to compare the coffee machines from different brand and choose the best one. The object is the website and the interface is the results page with scrolling bar, the view grids.

The fourth task is to add the coffee machine into shopping cart. The goal is to purchase coffee machine and the interface is the shopping cart page. The object is the website and the interface is the buttons to add item to cart.

The last task is to check out the item in the shopping cart and goal is to purchase the item using visa card. The object is website and the interface is the checkout page with different buttons and forms to fill in.

1.2 Directness & invisibility

The distance is a feeling of directness when the user is interacting with the interface. It represent a distance between a user's goal and the system itself. A shorter distance in between requires a lighter cognitive load for the interaction and the

user will feel more direct when he is dealing with the system. For most of the tasks regarding to purchase a coffee machine on Amazon, the distance is quite short between the user's goal and the system. The user does not need to use heavy cognitive load to figure out what steps he need to take for each task, how to get to the target goal. The user feel he is directly manipulating the object of interest. For example, when the user views the search results of coffee machine, it feels like he is reading the BestBuy flyer to find his favorite brand of coffee machine by reading the price tags, the brief description. The only thing he needs to do is to use the scrolling bar, keyboard or mouse to scroll up and down to browse the whole page. The interaction is a metaphor of model world. The view process only requires a little cognitive load to learn how to use the scrolling bar or page turnover button. The interface becomes invisible and the user doesn't need to spend time on learning how to use the interface once he learns how to click the button and scroll up down. The user is directly engaged with the task to find a coffee machine and he forgets the interaction with the computer or interface. The interface becomes invisible through both learning and good design. The good design is based on real-world practice of shopping: go to the BestBuy kitchen appliances section, look for coffee machine, browse around, add it to shopping cart and check out. The user also needs to learn a little bit how to click the item to see detailed specification and scroll up and down. When I first use Amazon, I do spend some time to learn how to use it. Because everything is quite self-explanatory, most of the time I just follow what the interface tells me to do. When the system changes to another state after my actions, I simply press the "continue" button to go to the next state. With more and more practice, the interface becomes invisible and I now only focus on my task to buy the things of my interest.

Likewise for the adding to shopping cart task, the distance between user's goal and system is also short. The system applies the model-world metaphor. When shopping in real store, buyer will put the items into a shopping cart and bring to check out point to make the payment. The users feel he is directly manipulating the task when he click the button "add to cart". The interface becomes invisible with both good design and learning. The interface is designed in a way that user can easily understand the functions of each button, and expect the outcome accurately. When the user click on the button, he expects that he is adding the item

into “cart”, which the system immediately gives him feedback and bring him to the cart page with his items.

QUESTION 2

I choose the task of writing essays on Word. When I first use Word to write something, I need to learn different components to have a big picture of what it can do. I learned that it has a toolbar which shows all the necessary tools for insertion, design, layout, references, view and etc. To change the format of my essay, I spend time to learn how to change the font, size and alignment from these toolbar icons. Also there is ruler on top of the page, there is “maximize, minimize, close” button to adjust the software window size or close the interface. I also learned to adjust the view size by clicking on the view bar at the bottom of the page. To make my writing more efficient, I also learn to use copy and paste functions.

Now I no longer spend as much time as before to figure out what components the software has and how to use them correctly. Because I learned each components by practicing. If I want to copy something I just press the shortcut of “control+c”. if I want to change font to bold, I just press “control+b”. The thought process for me now focuses more on the task. For example when I need to write a paragraph, I first think of the font I want to use, then I use the styles function to format my writing properly. When I want to resize the window, I just drag the edge inward or outward to make it smaller and bigger. I learned from these practice that those tools can help me achieve goal. And when using these tools, the outcome is immediate and direct, showing that my goals have been fulfilled by performing these actions.

How to redesign the interface to make it more easily get to the point of invisibility? Well there are multiple ways. One is to know the user because different uses might have different demands. For example, I feel the color palette for color-blind people is hard to use as there are no labels to indicate which color is which. A label can be added to each color so it clearly shows the color to color-blind people. Also the interface design should consider differentiating users as users may come from a different culture and background. The interface might allow the user to customize the toolbars according to their own habits and needs. For example, I use Word mostly to write essays and take notes. For me, the font and

style are more important while the design and draw functions are less important. So I can customize the interface into more essay- and note-focused style. While for designers they may want to customize it into a more artistic way. With these possible solutions, the interface may become more invisible for the user when they become expert of it.

QUESTION 3

1.1 Three types of perception in task domain

The third task domain of "washing the dishes, including rinsing in the sink, placing in the dishwasher, and unloading the dishwasher" was selected to discuss the three types of human perceptions.

When I wash the dishes I rinse the dishes in the sink to remove the big chunks of food debris to prevent them from blocking the dishwasher pipe. When I rinse, I use my visual and haptic perception to tell me whether I use the cold or hot water and whether the dishes have been rinsed well enough to go to dishwasher. With my visual perception, I can easily tell if there are oil stains, chunks of food, or any sauces left on the plate. If there are still a lot of stains, I probably need to rinse them for a longer time to fully get rid of the debris. Meanwhile I use my visual perception to change the tap water to either hot or cold water for rinsing. Also my haptic perception helps me to confirm that the water is hot water as my skin sensor detects the warmness of water. With my haptic perception, I usually use my finger tips to feel the surface of plates. Sometimes the surface feels greasy even though it's perfectly clean by looking at it. When I place the dishes into dishwasher I use my visual perception again to load them properly to avoid them being over-crowded and not cleaned well. When the dishwasher finishes the washing and rinsing, I hear an audio music and use my auditory perception to process the signal that washing process is over and I can open the door to unload them from the dishwasher.

1.2 Perceptions not used in task domain

In the dish rinsing process, what kind of visual and auditory feedback can be given to users? Usually when user rinses the dishes with tap water, he uses haptic and visual perception to help him perceive the temperature of water. If the faucet points to the "hot" sign, it means the water is hot, otherwise it's cold. And

his skin sensors also detect the warmness of water and help the user have a more precise perception of how hot the water is. To further improve the user's experience to figure out the water temperature, we can incorporate a digital screen that reads aloud the accurate temperatures and so the user will not risk burning their hands or have cold shock when they adjust the faucet to the extreme temperature. The digital sensor will also use different colors to help the user differentiate between hot and cold water. When the water is hot, the readings will be labeled as red and when it's cold, the readings will be blue color.

In the step of placing dishes into dishwasher, usually we use visual perception to tell whether the loading is under-loaded or over-crowded. If the dishes are overcrowded in the drawer, the dishwasher may not be able to effectively wash them as some parts of the dishes may be hidden by each other. On the other hand, if the dishes are underloaded, you will waste water and electricity and some of the fragile glasses might be broken with the strong washing cycle. To prevent these issue happening, an audio or haptic feedback can be used to inform the user for the proper load. When the dishes are underload or overload, the dishwasher will make different sounds so that the user know he needs to make the dish load to a proper level. In addition, a haptic feedback can be added to object to let the user know that a target level of dish load has been reached, if the user keep loading it, the dishwasher will be overloaded. The haptic feedback may be a vibration or a simple but clear click that the user can feel when they try to place the dish into drawers. Upon the vibration, the user will understand that the he cannot load extra and it's the right load for dishwasher.

In the process of unloading the dishes from dishwasher, currently audio and visual signals most widely used to as feedback. Tactile feedback might also be another option to make the user realize the end of dishwashing. When the user uses the hands to open the dishwasher door, different opening angles for a specific mode can be applied to show whether the washing process is completed or not. For example, a 5° angle from the vertical position shows that dishwasher is in the state of releasing steam. The user might be able to open the door to max 5° position if the dishwasher is in the stage of releasing the steam. When the dishwash process is completely done, the user can pull the door to a wide opening state of horizontal position and start to unload the dish. The door might also be able to detect user's force of opening and automatically open the door for them.

1.3 Different kinds of perception

Smell perception enables human to perceive odors. When I am in the shopping center, I can tell which cosmetic brand I am passing by telling the smell from different brands of perfumes. The smell perception can be used as feedback in the task of dishwashing. When the dishwashing process is completed and steam outlet is finished, the dishwasher can release a specific smell such as fruity smell that shows the dishwashing is over and the user can open the door and unload the dishes. However, some research show that the smell tag has poorer sensitivity comparing to other perceptions. And the user find it difficult to recall the smell after the event. It's also challenging to control smell intensity and it's difficult to keep it same before the user comes. The challenges limit the use of the smell perception and better solutions need to be proposed to improve the usage of smell feedback.

QUESTION 4

1.1 Giving the user control of the pace

A good design to reduce the cognitive load by giving the user control of pace instead of controlling the pace by interface itself. A bad example is the Canada immigration, refuges and citizenship online application system. Every time I try to apply my visa or government ID through this website, I got stressed out as I only have limited time to figure out all the information. If I exceed the time limit to finish the form when I try to dig out the history information, the system automatically signs me out and I lose all the contents I already filled in. To improve the usability and give user a better control of the pace, the system can use a time count down sign to show user the remaining time and make them be aware of the time. If the time is close to end, the user can be given options to prolong the time that they need to complete the form.

1.2 Emphasizing essential content while minimizing clutter

To reduce the cognitive load from user, the interface design should emphasize essential content while minimize the clutter. To discuss this solution, TV remote control was selected as an bad example for interface design. I never find it easy to use a remote control for my TV.

Figure 1 — TV remote controls (https://www.lifewire.com/universal-remote-controls-4171822)

As shown in the figure 1, the buttons on the remote control are located very close to each other. As a result when the user presses the buttons, it's very easy to mistakenly press the other buttons and make errors. The interface is so crowded with over 20 buttons in a small surface and it's hard for people to use with big fingertips. The accuracy of the usage is very low. Some buttons are not clearly labeled and seem to be redundant. The first remote control in the picture has circle-shapes buttons and they look confusing to me as it doesn't have a clear label. By looking at the five controls, you also notice that the design is not consistent as the power buttons are placed into three positions and the it's hard to find similarity of other buttons as well. One thing consistent is the numeric buttons are all placed at the bottom and the layout is similar.

Meanwhile it's easy for the user to feel overwhelmed when they first time learn to use the control. I remember my grandparents used to put labels beside each button to remember what the buttons are for in order to learn how to use them properly. In the real life, only some of the buttons are frequently used like the volume buttons and the channel buttons. Other than that, I rarely use the other buttons in the daily life. The design violets the tip to maximize essential parts and minimize clutters.

To improve the design, we might remove some clutter to make the design more clean the simple, easy for the user to learn so that it reduces their cognitive load. We need to decide what are the essential contents. People use certain buttons more frequently than they use the other buttons, such as power button, navigation button, volume/channel button. So we decide to keep these on the interface. The layout will be similar to the current control layout: power button on top, the volume/channel, navigation in the middle. At the bottom, we want to summarize the other functions in into one single button that can represent the functions that are not used often. When pressing this single button, the screen will show all the original functions and the user can choose from there.