

## Assignment P2

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### Question 1

The actions taken by students to search and enroll for classes occurs on an infrequent basis, thus emphasizing the need for simplicity. Unfortunately, this is academia and universities assume that since we enjoy navigating complex problems in class, their websites should be no different (Canvas is an exception). I'll begin by describing one of the only ways that I'm aware of enrolling in a class. To begin, we need to access the correct website. You'd think that maybe the web address would be something along the lines of enroll.gatech.edu. Nope, let's use buzzport.gatech.edu instead. Okay, so now you're on buzzport.gatech.edu, and lucky for you you're cut a break with the relatively clean page with a contrasted login button; enjoy it, because it's all downhill from here. Once you log in, you're onto the main dashboard. Well now you've gone from relatively clean to a mess of different icons, many of which look like Window 2000 clip art. To focus on the process of enrollment, the next step is to select the icon that is... you guessed it, a lock pad (*oh but of course*)! The lock pad icon does redeem itself with the text below it saying registration, but then it also says "OSCAR," which to this day I still don't know or care to know what that means, all I remember is when I first saw it, my thought was "my name ain't Oscar?" Once you're in OSCAR, you're onto a page with four tabs whose titles are copied and enlarged below it and of course not in the same order. From here, you have to go into the "Student Services & Financial Aid" tab, and you'll probably first notice the sole icon and bolded text for "pay now" (I'll be nice and leave it at that) but ignore that and click on the "Registration" link. Now you can either select "Select Term" or "Look Up Classes" which apparently does the exact same thing. From here you're offered a dropdown menu with every option from the semester you're interested in to every other semester dating back to spring 2006. Once you've chosen the current semester you're provided a list of subjects. Ignore all that and click on the Advance Search option. From here, the most frustration free approach to finding your class is selecting all of the subjects (Ctrl + A) and entering the course number of your

desired class, click search, and if you're lucky, only one or two classes appear. Select the one that appears correct, click register, and you're done!

With the goal of searching for and enrolling in classes, direct manipulation can be integrated by allowing people to drag and drop classes into their schedule. Firstly, the enrollment page should only contain a list of classes that is applicable to the student's program and the current semester (maybe from here add a separate "search for additional classes" option). If this is provided, then it will slim down the list of choices and what may be done is an interface that allows a drag and drop system with tiles that represent the classes, and the drop location being the students schedule. The tiles should only display the class ID and title but could enlarge when selected to show additional information. With this implemented the action of dragging and dropping a class into a student's schedule better mimics the action of registration by simulating the acceptance of a class into a user's week. The class should populate the schedule by showing which timeslots it takes up and possibly incorporate some red colored feedback to notify users of overlapping classes.

One of the major benefits of incorporating a drag and drop system for a redesign is leverage of a user's prior experience through mimicking a computer's GUI filing system. This prior experience should aid in increasing the efficacy of the process and the improvement can be measured by analyzing how much quicker, and accurately a user can enroll/search for a particular class.

Another benefit of this redesign is the reduction in the number of pages needed to be used; no need to have separate pages to search for classes via subject and semester. The efficacy of the process is thus improved through reduction in the gulf of execution. There are less tabs, hyperlinks, etc. that the user encounters, thus reducing the number of unnecessary signifiers and ultimately making it easier to understand the state of the system. This improvement can also be measured through simply counting how many links need to be selected, or using the methods mentioned in the previous paragraph.

## Question 2

After moving into the DMV area (intersect of DC, Maryland, and Virginia) one stressful task was adjusting to the metro system for the first few commutes. When I had arrived at the station for my first time, the kiosks were very clearly located, especially with the orange contrast, however that was effectively the end of the simplicity.



Figure 1: Standard Credit Kiosk at a DC Metro Station.

As you approach the machines and choose the *correct* kiosk you are greeted with a ton of text, advertisements, buttons, displays, all the vending machine features in one; it is simply a congested mess as shown in Figure 1 above. To make matters worse, there is often a line that quickly forms behind you since, to my knowledge, all stations only have two machines per entrance that accepts credit cards. This personally adds a lot of stress, limiting the cognitive resources available while in front of a complex interface. To elaborate on the types of machines, at all stations there are two types of fare machines, the one shown in Figure 1 and one that has an all-black design, which only accepts cash. The issue with this is that there are always more of the cash-only machines, which made me initially believe that the metro cards only accepted cash, which is clearly not the case. Additionally, the cash machines are seemingly always open since everyone nowadays uses cards. After first fiddling around with the wrong

machine and moving in line to the correct one, I remember focusing on all the different sizes and shaped buttons which detracted me from the labels that gave the steps to the procedures (labeled 1,2,3 in the circles). Also, with all of the different sized labels and text, I ended up reading a lot of them, which ultimately was worthless because the electronic display eventually tells you the same information and directions.

After a few more iterations of this process, it became a lot more fluid and clearer. I've been conditioned to ignore all of the text and more importantly realized that the only buttons I needed were in the middle of the machine. There are roughly five signifiers on the interface that is dedicated to cash, but there are always multiple cash only machines! While the thought process is now clear, it is still more tedious than required from the perspective of just wanting to add money to my card. A lot of the time and mental well-being was wasted at the interface when trying to focus on the text and analyzing the different signifiers. Once the important signifiers are captured in mental memory, it both reduces the stress of holding up a line, as well as the need to read all the different text options.

From a redesign perspective, the text is understandably there for less experienced users, but there is no logical reason to have multiple machines dedicated to cash only, and then also have a cash option for the limited credit machines. Removal of the cash option on the credit machines would both clear up some real estate by reducing the clutter of text and buttons, as well as reducing the anxiety of a longer line. In addition to removing the cash options from the credit machines, the clutter of text can further be reduced by just having the steps highlighted and displaying the removed text on the electronic display. There's no need to have a redundant display of information, especially when a lot of the physical text does not correspond to a particular action. The electronic display will provide the relevant information as processes are executed. These modifications will reduce the gulf of execution of the system, and hopefully make the first few and crucial experiences a lot easier and enjoyable for users.

### Question 3

In the context of driving, the user interface is flooded with visual, auditory, and even haptic cues. To begin with visual cues, this is obviously a challenge as the goal from a safety perspective is for the driver to maintain focus on the road. What most vehicles do well is the design of the interface to alert drivers with visual cues for only important information. As mentioned in the lectures, we as humans tend to shift attention towards changes in colors and movement. Cars take advantage of this human perception through leaving the most important alerts as red and/or flashing. Indicators such as when your RPMs are reaching redline, if your seatbelt is not on, if your hazard lights are on, etc. are all in red and in some cars, all flash as well.

Integrating new visual cues is tricky as they need to be curated in a way that does not distract the driver and also follows regulations. One feature that may be helpful as well as lawful is for modern cars to link the GPS system with the dashboard to change the color of the speedometer (or other the dash as a whole) when the user is significantly exceeding the speed limit (eg. 10 over). Especially with the adoption with digital speedometers, drivers are less aware of their speed as they do not visually see a needle moving on analog meters (Rothengatter 2004). The implementation of a simple color change from green to red would follow the trend in vehicles where red means bad, and also not require drivers to take off precious seconds to look down to read the display.

In comparison with the visual cues for a driver, auditory has a lot more freedom as it doesn't distract the driver from looking at the road. As a result, the feedback systems integrated are often a lot less intricate. There are different pitches for different issues and the volume often indicates the importance. An example of this is the turn signal, which returns a relatively soft clicking sound, whereas the seatbelt indicator is a lot louder and higher pitched.

In order to prevent too much auditory feedback while driving, an improvement I believe would be helpful is for a racing environment. While on the track, drivers often take off their traction control, but it's often helpful to know when it would kick in (based off electronic sensors). So I believe an auditory modality can be created when traction control is off to alert the driver of when the car is nearing the edge of its traction, or when slip is being felt, possibly a progressively louder beep.

Lastly, modern cars are integrating a lot of haptic feedback features, primarily through vibration and pressure. Modern lane departure warning systems will

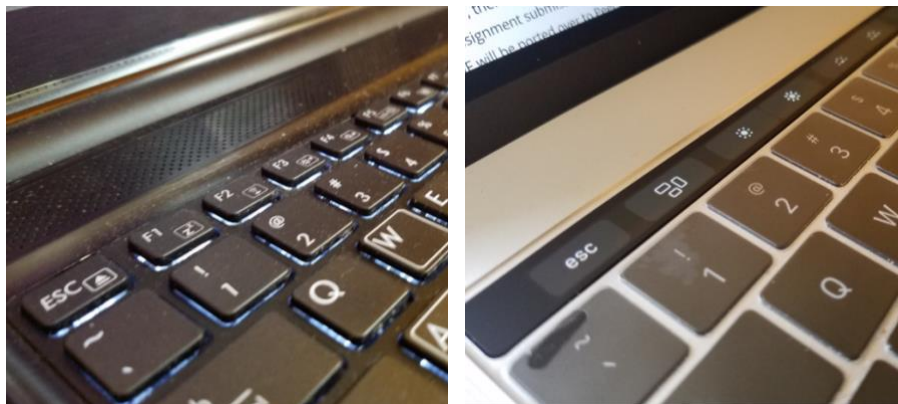
vibrate the steering wheel as well as give a small pressure feedback towards the direction that you should move the steering wheel. The vibration is often fairly significant as to not confuse it with the general vibration of the road, and the pressure applied feels as if someone is gently moving the wheel for you. Both these actions are implemented to provide the user feedback of swerving.

For a new feedback feature that can utilize the haptic modality, there can be an addition to the first improvement in exceeding the speed limit significantly. The alert I'm envisioning is a brief vibration in the steering wheel, probably a different sequence from the lane departure warning, which notifies the user that they have exceeded the limit; feedback should obviously not be constant and just occur briefly and with some hysteresis as to not constantly vibrate at the set limit.

For a new human perception that can be integrated into a vehicle feedback system, I think smell would be a fun one to approach. For instance, once a car exceeds its emissions or inspection testing date, some of the emissions can be redirected into the cabin, which would be really annoying to tolerate (I'm aware of the questionable ethics and state emission laws around this, but I figure if you're okay with damaging the environment, the owner should suffer as well). This feedback system would encourage people to either get their emissions and inspection performed or have them waste a lot of money on car air fresheners.

## Question 4

Through my daily life, I have to shift between my personal Gigabyte laptop and a work Apple laptop. One of the most irritating differences that results is the transition from a physical upper key bar (ESC and F-keys) to the Apple Touch Bar.



**Figure 2:** Left: Gigabyte Layout. Right: Apple Touch Bar.

The reason for the difficulty isn't the completely the positioning or requirement for the "fn" key to be held on the Mac to access the F keys, but the fact that it does not provide any haptic feedback or sense of activation when selected. To make matters worse, the Touch Bar rests flat and below the keyboard area without any ridges to provide feedback that you're near the keys. This results in so many accidental taps, which can cause various errors (I'm aware that you can default the Touch Bar to default display F keys, but that just causes me to accidentally tap those, which can cause a lot more issues). The Touch Bar does not offer any feedback option outside of what occurs on the screen, which is often skipping music, changing the volume, or activating "Mission Control."

An improvement to this system could be the integration of a pressure and/or haptic feedback system. This would be similar to a cell phone, such as providing the option for the touch bar to require the button to be selected with a certain amount of pressure and/or to vibrate underneath the key to provide feedback to the user that the key was pressed. In addition to these modalities, adding an inactive raised edge below the Touch Bar will provide the user feedback that their finger is near the area. Alternatively, the Touch Bar could be moved further away from the number keys to reduce the possibility of an accidental touch. All of these options would reduce cognitive load through use of additional modalities.

In contrast to the issue of a lack of multiple options in design, an example of too many options and violating the tip of emphasizing essential content to minimize clutter, can be found in the Outlook interface. The default interface for the application is shown in Figure 3 below.



**Figure 3:** Default Outlook task bar

In my experience users commonly only use this bar for a few functions, namely New Email, Delete, Reply, Reply All, Forward, and maybe Meeting. Literally the major daily functionality for the application encompasses a third of the real estate on the left side of the bar, and you'd be a mad to use all of those buttons on a daily basis. To make matters worse, a lot of the other functions are redundant, such as moving files, which can be done through direct manipulation by clicking and dragging; finding contacts can also be done through the search bar in the top right corner, the list goes on. I would consider two-thirds of this bar to be cluttered with unessential content.

An improvement to this would be to simply remove them! The unnecessary functions can still be performed through drop down menus, right clicking, and direct manipulation. Discoverability will allow the tasks to be performed when needed and clears up the space to relieve clutteriness. The design should take the primarily used buttons and enlarge them horizontally to cover more space, which makes their presence more pronounced and limits the users gulf of execution. Rearrangement of the icons may also be desired since people tend to initially direct their attention towards the middle of a bar. Overall, the Outlook task bar can be easily cleaned up to help reduce cognitive load.



## References

1. Rothengatter, T., Huguenin, R. D. (2004). *Traffic and Transport Psychology: Proceedings of the ICTTP 2000*. Oxford, UK: Elsevier.