Virtual Reality
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Lecture - 20
Interfaces (system control)

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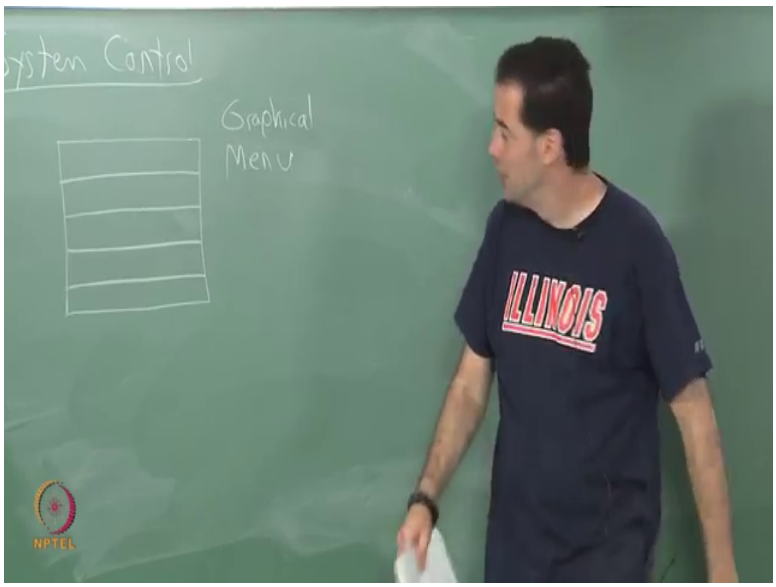

All right, welcome back. We were talking about interfaces for virtual reality. In the last lecture I went over locomotion and manipulation; I am going to continue on with a couple more topics this time. And then we will talk about evaluating a virtual reality experiences; and then we will be finished with the course. So, remember one of the topics I mentioned under a interfaces with system control. So, you want to interact with the program somehow it is in many ways disruptive because if you just simply believe that you are in some other world, why are their menus appearing and other kinds of things like that.

So, one of the most common interfaces that we use for system control with regard to our computers, smartphones, laptops, pc with a screen is a graphical menu. And you of course, have the usual questions of you know how readable are the fonts, you keep the number of colors to a minimum and so forth so some basic style and comfort issues. You know how else could you select options from a menu, you could do it entirely by which way your head is looking I guess you could look at a particular menu option, you could

have a menu appear up in front of you, try to select things that way or you may use some controller buttons or keys if you have a keyboard.

In addition to menus, I suppose you could do voice commands or some kind of gesturing to do interactions like that and an interface with the system it is up to you. But I think voice commands versus simple pull down menus that have been used in software for decades seems like voice commands are not as popular as a just simply selecting options on a menu. So, maybe similar kinds of things would happen in virtual reality.

There is an interesting question if I have a menu appearing in virtual reality how should that work exactly. So, one thing to pay very close attention to is that the menu should be somehow embedded in this alternate world, so that it does not feel like it is just attached to your face. So, that when you turn your head, the menu should not just stick in front of your eyes because that would be uncomfortable, and you might start to get confused about am I rotating or is that rotating you start to get confused about that. So, it is best to have the menu appear like a kind of billboard let us say or a sign in front of you.

Now, how far away should the sign be or if it is 10 centimeters in front of you, you are going to have difficulty focusing on it, wait a minute, it is always in focus. We have difficulty converging on it. If you put it a little bit away, it may be clear, but there is always this mismatch in the types of headsets and a hmds that we that we make there is this mismatch between (Refer Time: 03:03) and accommodation remember I went over that. So, it is best to keep it at least a meter or 2 away, I would say about 2 meters away, I would recommend to have it be comfortable so that your eyes are not converging too much and it is far enough away so that you would not have accommodation issues, so that is very comfortable. So, embedded environment keep it that far away.

You may have another issue of what if you are just simply not looking in the right direction right. So, maybe it is to have the menu gradually go and follow the direction that you are looking, but do not make it look like it is rigidly attached. So, have it gradually to come over and appear in front of you may be a useful I mean reasonable kind of compromise. If the menu is large, and it suddenly appears, you might get the feeling that you are rotating instead. So, you have to be careful of that.

How big should the menu appear to be? So, if you have a kind of menu, and this also could apply by the way to just making a maybe I want to make a virtual or a web

browser appear as well right. So, I just want to start reading a newspaper articles could be anything like that in addition to menus, how large should this appear. It is best to have it be about one-third of your field of view. If it gets much larger than that then you will be moving your head back and forth to read and that may be uncomfortable. Why are you using your neck muscles, you would not be using that in the real world if you are reading a magazine article or a newspaper for example. So, these are some subtleties to pay attention to for making system control.

Another general thing to think about is what if I need to enter a lot of text. So, it may be that in system control or box appears I need to type something. What if I want to write an entire paper, how do I do that? If you just have the keyboard, then you need to remember that there was a table in the physical world, you put your hands on it, you cannot see the keys anymore, but if you are good enough typist maybe it does not matter too much little frustrating I think. You can feel the bumps on the keyboards in some cases on some of the keys to try to find your location.

But generally speaking if it were up to me to completely reengineer the way we type then at least the way we commonly type they are certainly all sorts of different keyboards and things, then I would recommend separating the keyboard into two parts. And then just putting my hands one on each part and I would like to train myself to just sit and type like this, so that I do not have to reach around for some table and remind myself of that exists in the virtual world. Maybe I can even not have to press buttons and just rig something up to my finger, so I can just very easily do some motions and the typing happens.

Now, it takes a lot of time to learn how to type. Remember we talked about learnable motor programs. So, somehow we have these, this kind of motor programs that correspond to typing and then text appears. And I do not know about you, but I find that more comfortable and efficient than writing with a pencil and paper. So, it is very nice, if I am just doing text. So, so how can we generate text very quickly maybe with some kind of very simple motions without trying to find some a keyboard and or table that is in the physical world that were supposed to be forgetting about right.

So, these are interesting challenges that remain and that is part of interfaces part of system control and just more general how do we input text into our systems comfortably once we are wearing a head mounted display which is a kind of blindfold.

Student: (Refer Time: 06:24).

What is that?

Student: Based on voice (Refer Time: 06:26).

So, you could do it by talking that is right. I think I can still type faster than I than I talk, but I am not sure I have to take a look at that. I certainly like the reliability of typing over voice commands, but we will have to see you know the kind of once it comes to automatic, I get afraid that it is not going to understand exactly what I want and I spend a lot of time correcting that certainly happens with my smartphone when it is trying to figure what words it thinks I am trying to use, you may have sent bizarre text messages to your friends lately because of that right its always trying to fill in other words and things like that.

So, I am a little afraid he is too much automation on that, but that is right voice. As I mentioned voice commands are another option that could do all with gesture commands as well, you could just input in sign language right so.

Student: (Refer Time: 07:13) we can have a touch pad.

Yes.

Student: Using a pen we can write it, and by the writing like a magician.

Yea, very good, very good. So, you could you could do that, you could do some kind of entry by writing. I am more biased towards typing. It is very interesting if no one had ever invented the typewriter then that would seem like the most natural and reasonable thing to do, but the fact that we have learned typing and I find it very fast clean and efficient. I am hesitant to then switch back to writing for myself, but my writing is usually unreadable, I am not very fast with it. So, it just depends on your style, you may prefer writing over typing, and then it becomes very natural for you.

But there is still the issue of you are now talking about holding a pencil in a space where you brain has somehow forgotten that you are there. So, should you just be writing in the air and tracking the tips somehow, do you need that force feedback how important is that?

Student: (Refer Time: 08:04) like writing pad or kind of things.

Ye that is right and it gives you some kind of feedback that is right, but you will not be visually seeing that device.

Student: We can see that text appearing on your screen right.

You see the text appearing on the screen that is right. So, it is undergone some transformation, but it might be reasonable. I think it is I think it is I think it is a reasonable alternative you know I still prefer something that is like typing, but I guess my personal preference I may be very biased by decades of typing you know. Yes.

Student: Sir, we split the keyboard, we will have to keep the qwerty layout (Refer Time: 08:33) everyone is used through it.

Yea, very good that is right. Retraining people on a new keyboard does not work very well. There is been a lot of attempts, the original locations of the keys for the qwerty keyboard was to minimize the amount of mechanical jamming in old typewriters right. There are over a century old, but nevertheless we still have this ridiculous placement of keys right which are not optimized for frequency of letter appearance in the English language. Of course, we use a different language than you need to like optimize it again it is probably a good thing that we are all using the same keyboard regardless of the fact that is that the keys are not placed optimally in terms of frequency of use. Yea, very good, all right other comments?