

Natural User Interfaces in games – Essay Ambient Screens by Siewart van Wingerden

Is it the future

Introduction

For the Course Ambient Screens I've mainly experimented with the recently hacked Kinect, Microsoft Xbox' 3D camera. There are many technical and creative possibilities using the Kinect, but I choose to use it to explore the latest technology of interaction. I rebuild the famous computer game Tetris with another student and made it controllable with gestures, by using the Kinect as User Interface (UI). Even though the technology is still young, it worked quite well, most notably for people who didn't play the original Tetris, who seemed to pick the controls up faster than in the original. The results of this small exploration persuaded me to go a little deeper with this essay and explore the possibilities of similar technologies. These new technologies are usually called Natural User Interfaces (NUI) a growing type of UI that allows the user to interact with a computer with native actions. What are the current forms of NUI in gaming and is this the future for gaming or an ever broader public?

User Interface

A User Interface is part of the interaction between a human and a machine. It is where the interaction physically takes place. (e.g. mouse or LCD-screen) The interaction consists of Input (e.g. Mouse or Microphone) and Output (e.g. LCD-screen or LED). Most often it is desired to keep the required amount of input and output to a minimum.

The first User Interface for personal computers was the command-line interface (CLI). In a CLI all commands must be typed strictly followed by an "Enter" to execute the command. These commands should be learned by heart (or a printed reference chart) and can be listed and explained with a help command (or similar). CLIs are still used by most programmers, but rarely by the mainstream public. Some companies made games with this principle in mind, so called text-adventures. Commands used in these games could be as simple as *use sword*, to use a sword, and *look around* as a sort of help command.

The current most used type is the Graphical User Interface (GUI) consists of icons and visual indicators, usually called Metaphors. These can be manipulated by the user, which allows for a rapid in- and output between the user and the computer. This is usually done by a mouse, touch-screen or keyboard. In games this is usually the manipulation of characters by using mouse and keyboard or a



game controller.

The Natural User Interface is not very well defined yet, according to the NUI Group, founded to make NUI more accessible by programmers, a NUI relies on a user being able to carry out relatively natural motions, movements or gestures that they quickly discover control the computer application or manipulate the on-screen content.

This means that things that are learned naturally should be used to control a machine. Good examples of this are sliding a finger over a smart phone, like the screen is on a long paper roll you can move with a finger, or stretching the screen with two fingers to zoom in, like stretching out a balloon with the picture on it. When the interface can be compared with a common human behavior, and therefore feels more direct to the user it is usually a NUI.

Also the interaction does not have to be intentional by the user. When you walk to your computer and it goes back from standby this wasn't intentional.

But not just the input of a device can be a NUI; feedback from a device can behave like what the user expects to be natural. A technology used in games is vibration in controllers to alarm that a user has e.g. been hit by a bullet. Other less common technologies are 3D touch devices that simulate weapon recoil, but is used 3D modeling as well, where it can push back when using sculpting tools, like modeling real world clay. This type of technology is called haptic.

Bill Buxton, Microsoft's NUI expert, gives an even broader definition, where interaction with machines is based on motor-sensory, cognitive, social, cultural, and emotional skills of users. While these skills are sometimes hard to measure, these can actually make interaction with a machine easier and potentially faster. With these inside the definition many things that define the user can be used for the NUI.

Kinect

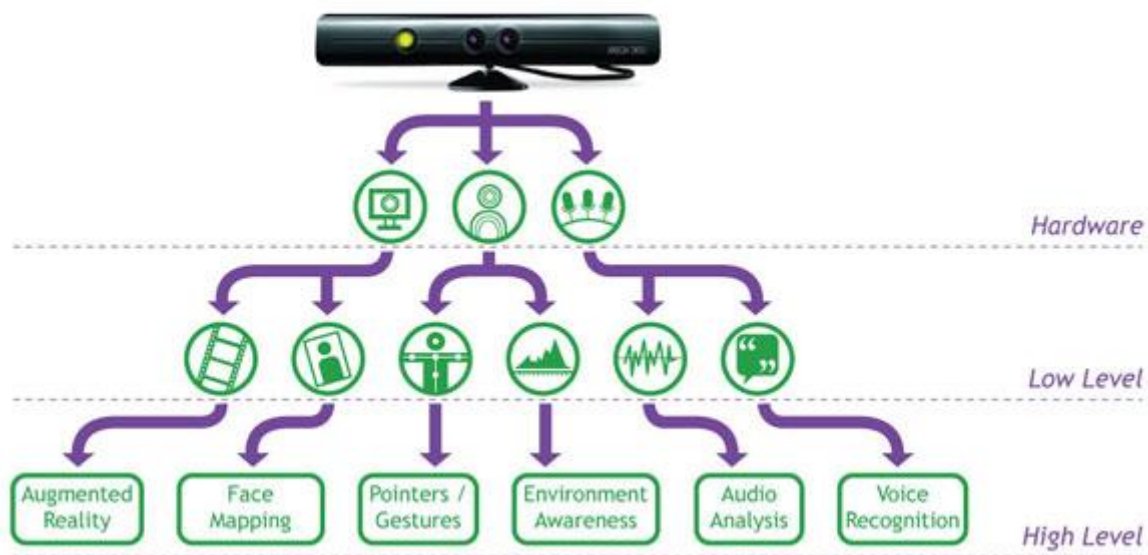
The Kinect is debatably the first widely available NUI device for video gaming. While the Nintendo Wii and Playstation Move also provide similar functionality, they still use it as a part of the interaction where the Kinect uses as the main interaction. Touch screens are not a NUI while there are games using them nearly exclusively, these games are not very common.

The two most obvious ways NUI is used in the Kinect are speech recognition and gestures.

Speech recognition has been used for some time in computer games, but it was not very popular yet, and even the Kinect still has to prove itself. While it has some advantages over the traditional controller, its major addition is probably where it can be used to skip scrolling through menus or as addition besides the controller. You could tell the friendly NPCs to flank the enemy while you are confronting them head-on.

The gesture control is not entirely new, but the Kinect allows only for control with gestures (and speech recognition). By this approach most of the games are controlled by doing what the character must do. For example when you want the character to jump, the user should jump. Even the control

of the menus is done by making a push gesture on the right place.



The Kinect allows for a basic level of NUI output as well. While it is not entirely new, the Kinect can use the surroundings of the player with augmented reality to give additional feedback. Because the surroundings are natural to the user this can be seen as NUI. With the extra data the depth camera can add more accurate augmented reality without adding markers in the room.

Future

Since the Kinect is currently very new it is the only widely available form of NUI for games it's still the question if this will be the future for gaming. There is a demand for (potential) gamers for different ways of interaction. (Although it could also be true that with new ways of interaction (new) groups can be attracted and entertained) There are many possibilities but currently the focus by many companies is on NUI. Because it is in very busy development more and more technologies become available allowing for many new ways of gaming.

The next question is what can be used for a game as input device.

After teaming up with Novint to integrate the Falcon in all of their games, Valve software is now looking into eye tracking. While the cursor of a computer is usually going to where the user is watching this might be a next step to gaming as well. With this technology Valve is looking into what data can be gained from this. Controlling the character with your eyes, or more and faster blinking when in a fight, all this information can be used in a game.

The best approach however for designing this new interaction might be not looking at the technology, but looking at the player's behavior. In fact the game designers could probably design the new way of interaction without worrying about technology. An approach could be to measure how players behave while playing a game. What behavior does someone have when doing a certain action? For example what does a player do with his body when trying to sneak past a few guards? Maybe the player holds his controller tighter. This could be used in the game to play different music or even let the character walk slower making less sound.

In the same way the output can be designed. What feedback can the user expect when firing a gun or walking on grass. While this is further away to reach with technology, this can be a next step to look at. There is already a research ongoing in Tokyo using acoustic radiation to make 3D holograms give a pressure sensation.

This measuring of the body of a player does not have to be used by the customer as the technology is usually very expensive, it can also be used for testing purposes. Did the player see the secret passage, is this part of the game exciting, did the user feel to death intentionally? All these questions can be answered by measuring the many things the player's body gives away.

Problems

Is NUI really the next way of interacting with computers, is it not too expensive for a user to need more and more hardware, and aren't there other possibilities to look at?

Most of the technologies will slowly be integrated into devices and become cheaper to make when the demand is higher. Also NUI has a very wide definition, and many companies call new interaction technologies a NUI, so it will become wider.

Another problem is how the users will react, it should, and it currently is, slowly integrate itself into many applications. Gaming is a great first step as its target group is very open to new technologies as its short life has shown. Other ways NUI will enter the world is through ubiquitous integration in many places where users will be unknowingly get accustomed to them.

For games it is the question where gamers will pick it up or not, and if they do

Conclusion

While there have been many games that used NUI in games as minor addition, the Kinect is the first time that nearly no other UIs were used for games. Because this is a new technology this is the only widely used example.

The future will hold more of these UIs for sure, which is something we should look forward to. When it is coming is hard to say, even when we can already touch holograms. The technologies will come faster and faster. And when it has matured it will also be used for many other daily used devices so the entire world can enjoy the new ways of interacting with machines, and interact with them easier.

If the name NUI is the right one is another question which I will not answer here, it is very broad and maybe it is too early to label it. Whatever will happen, one thing is for sure: we should not adapt to the machine, it should adapt to us.

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