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The Computer for the 21st Century

In the text "The Computer for the 21st Century" by Mark Weiser, there is an exploration of ubiquitous computing and the invisibility of technologies which blend into cultural and/or political events, times and spaces. In the introduction of the text, Weiser begins to frame the loss of awareness of technology stating, "the most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it." This leads into the analysis of precedent "technologies" that our society has used to spread information including semiotic communication methods of speech and writing. These two gestures have become increasingly unconscious and involuntary that he labels them as the first forms of ubiquitous technologies produced my man. As modern technologies of computer have come to the forefront, Weiser argues that computing itself has not physically disappeared and has increased exponentially in culture, rather our physiological consciousness of these technologies has faded. He additionally explains "in essence, that only when things disappear in this way are we freed to use them without thinking and so to focus beyond them on new goals.

These ubiquitous computers and the network that acts as the connective tissue between objects at the surface seemingly unconnected and allow the user to view the context or act on other desires than purely interacting with technology. The computers are therefore developed on a vast range of scales to serve different tasks and create flexibility through specificity. In the text there are four scales which make up Weiser's narrative including tabs, pads, displays, and boards. While authoring this text in the 1980's, the remnants of these scalar modes still exist in exist user interfaces, for example Windows on Mac OSX and tabs in the Windows 10 internet browsing program.

Envisioned as a global network of communication technologies, hundred and thousands of multiple scales computers create a embodied virtuality which blurs the distinct between physical and virtual realities into a augmented society and world. Weiser describes this condition as one that can overwhelm people if exposed outside of its intended environment similar to an example of how architectural infrastructure in a home if viewable through the walls would overwhelm a resident. "Hundreds of computers in a room could seem intimidating at first, just as hundreds of volts coursing through wires in the walls once did. But like the wires in the walls, these hundred of computers will come to be invisible to common awareness." In conclusion of the text, Weiser highlights the ideology of unified networks and the connection of what is considered today as the Internet to physical microprocessors and scaled computers. These networks will allow for new opportunities that will make the user aware of the content on the other end of the communication or the media that is being accessed. Presently, the idea of ubiquitous computing is becoming even more in the forefront with the ever increasing amount of "mobile" in a large range of forms and specificities. From the iPhone and Androids of cell phones, tablets, the Internet of things technologies such as home appliances and home security, and microprocessor attached to the body, Weiser's notion of the invisible network of computers is beginning to emerge. Overtime, the ability for technology to become dispensable and economically feasible for all socio-economic statuses to have these technologies,

older forms of communications such as paper and connected phones will be eliminated. Additionally, with new forms of network programs such as Skype and FaceTime, these invisible computers allow for access to new spaces and bring together once distance spaces into a reality that feels unconsciously intimate. Therefore, as technological developments progress overtime, technology and space in-between users become irrelevant and encourages for the dialog between information and ultimately ourselves.

Man Computer Symbiosis

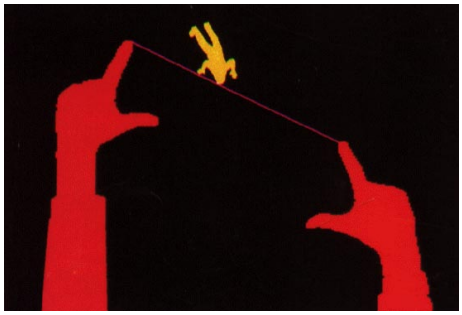
In his paper *Man Computer Symbiosis* J.C.R Licklider begins to point out that the computer has and will have an increasing role in our day to day life. He noted that computers will only aid in the decision making helping us to make faster smarter decisions. He notes that there are man-machine systems but there are no man-computer symbioses. His hope was that “in not too many years, human brains and computing machines will be coupled together very tightly, and that the resulting partnership will think as no human brain has ever thought and process data in a way not approached by the information-handling machines we know today”. If we look at today's world, would you say that such a state has been reached? We have systems in place that augment our world such as our smartphones, tablets, and smartwatches, but licklider is saying that these are more akin to extended machines not sympotic systems. He calls them “semi-automatic systems, systems that started out to be full automatic but fell short of the goal.”

As he continues, Licklider sees a problem with the computation of the process. All present day computer are designed primarily to solve preformulated problems or to process data according to predetermined procedures. In other words, if something unexpected happened the system would fail until it had been given a way to work around it. It could not adapt to changing environments. “One of the pain aims of man computer symbiosis is to bring the computing machine effectively into the formulative parts of technical problems. the other main aim is to bring computing machines effectively into processes of thinking that must go on in real time, time that moves too fast to permit using computers in conventional ways.”

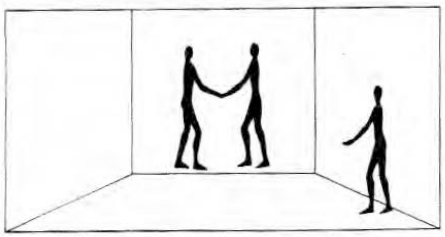
As real time thinking and data collection progressed Licklider came to conclude that “the main suggestion conveyed by the findings just described is that the operations that fill most of the time allegedly devoted to technical thinking are operations that can be performed more effectively by machines than by men.” However sometimes within the earlier systems that could not adapt to anything other than what it was given they would get an extreme amount of data that would in most cases not help them. With the time set aside before input into the system they were able to produce more focused data than before. The system had flaws in that it could not do everything, but it has a purpose in generating results faster than by hand.

The final thoughts in this paper focus on the separation between man and machine by way of language, speech production and recognition. A precursor to UI or User Interface that would help bridge the gap between man and computer. The importance of Lickliders work can not be understated as his research pioneered the way for hardware integration to the extent that we have it today.

In the text “Responsive Environments”, Myron Krueger investigated the limited extent to which man-machine interactions occur, while researching new ways in which men and machines can relate to each other. The results of his research is known today as “Responsive Environments”. In Krueger’s first installation, known as GLOWFLOW, he felt that it was important that “the environment respond, but not that the audience be aware of it”. By introducing a delay into a system, the participant’s actions might not be recorded or responded to for several seconds or minutes. The relationship of man and machine within this installation was more one sided. The user provided an input that was then subject to a delayed output where the user might not even experience a change at all. Krueger interpreted GLOWFLOW more as a kinetic sculpture rather than a truly responsive environment.


An example of METAPLAY

Krueger gathered the information from GLOWFLOW and created a new experiment, METAPLAY. The system developed for METAPLAY allowed for real-time interaction between man and machine. A set of variables (people) played a major role in this experiment. One participant acted as an “artist” and the other as a “subject”. The two were located in separate rooms, the subject acted in front of a projector, while the artist watched on a TV monitor. The artist had the ability to draw over the person and the result would then be projected over the subject in the other room. This experiment reacted to the location of the user in a space by altering the environment in which the user was occupying. A series of unexpected results occurred, which where dubbed the “Graffiti Games”. Krueger states “One day I was trying to draw on a student’s hand, he became confused and moved it. When I erased my scribblings and started over, he moved his hand again. He did this repeatedly until it became a game. Finally it degenerated to the point where I was simply tracking the image of his hand with the computer line. In effect, by moving his hand he could draw on the screen before him.” The relationship established by this alteration of the system could be interpreted as one of the first motion tracking systems ever developed.


An example of VIDEOPLACE

In his most ambitious experiment, VIDEOPLACE, Krueger created a conceptual environment with no physical existence that united people in separate locations in a common visual experience. This system was almost like the “Skype” of the 1970’s. People in different locations around the world could enter a space where their body would become projected onto a surface. Then, another person’s projection, located somewhere else on the planet, would appear next to that person. The two could interact on a 2-dimensional plane through movement without actually ever talking to each other. The user’s bodies could overlap, which people began to interpret as a new sense “touch”. This new interpretation of “touch” was then augmented by vision and physical dimension.

All of Krueger’s experiments in forming new responsive environments included two variables; people and machines. His experiment’s started as human-machine interaction with GLOWFLOW. They then progressed to human-human interaction through a mechanized interface with both METAPLAY and VIDEOPLACE. It is important to ask; in the responsive environments that Krueger

is creating, who controls what. Is the person controlling the machine? Is the machine controlling person? Or are they both controlling each other? A system with more than one variable (participants) produces a very different environment. Do the people cause this change, or does the computer?