CSC2524 Assignment 1

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References

1. "The computer for the 21st century", Mark Weiser, SIGMOBILE Mob. Comput. Commun. (1999)

2. "The Human Experience", Gregory D. Abowd, Elizabeth D. Mynatt, and Tom Rodden, IEEE Pervasive Computing (2002)

Mark Weiser. 1999. The computer for the 21st century

Mark Weiser was the CTO at Xerox Palo Alto Research Center (PARC), where he created the concept of ubiquitous computing. His paper "The Computer for the 21st Century", published in 1999, presents this visionary concept, where computers integrate into our daily lives, becoming virtually invisible. This concept tends towards a world where technology augments human experiences and interactions with the environment.
He establishes a few principles for ubiquitous computing, and here is one that I found really interesting: people shall use computers in the most intuitive and unconscious way possible, so that they become an extension of one's brain the same way pens have become an extension of one's arm.
Most of the envisioned applications in the paper are work and productivity related, such as having instant access to relevant data without being tied to a specific location or device in the office, or enhanced collaboration, with real-time interactions with colleagues no matter their location.

Weiser's visionary paper accurately foresaw the space computers are occupying in our everyday lives. Smartphones and tablets are highly personal and customizable devices, and have become indispensable and instinctive tools for communication, productivity, and entertainment.
IoT devices, and smart-home systems have also become commonplace, and they respond to context as imagined by Weiser: voice assistants, smart-lighting systems and others adapt to user preferences, location and the presence of an user.The use of technology has also become less demanding requiring less attention but instead enhances our experiences. Minimalist user interfaces and devices designed to minimize distractions, like e-readers and smartwatches are now the norm. Their interconnection allows for easy data exchange between devices, as seen in the Apple ecosystem.
Real-time collaboration with coworkers from all around is also now a reality, and pretty much everything in the fictional story about Sal is now feasible and even common, except for the electronic tracks in her neighborhood, which raises a major privacy issue in my opinion. This will be discussed later, along with what they he wrong or didn't think about in the paper.

However, some limitations still exist to what Weiser had in mind: if I mentioned earlier the Apple ecosystem, it is not that simple to maintain a simple and intuitive interconnection between devices from different brands or using different operating systems, and sometimes requires a few more steps. This could happen if every company agreed on unified standards and leaned towards compatibility.
Quite a few next steps were not developed and will be discussed in this section, starting with the data privacy and surveillance aspects. In the workplace, ubiquitous computing can lead to extensive employee monitoring, including tracking computer usage, email communications, and even physical movements within the office. This can raise concerns about intrusion into employees' lives. The example of Sal and Joe "sharing an office" - which involves sharing their live locations and the content of their screens - sounds quite frightening and could easily lead to abuse or surveillance of employees. The same concern can be raised when Sal mentions her neighbours' and kids' electronic trails and time markers, which sounds like a Black Mirror scene.
Even though those kind of data are only shared within a small and private circle (work colleagues, family or friends), one could imagine how compromising a security breach could be, and how a robust cybersecurity system is essential.

There are also some points Weiser got wrong in his forecasting exercise, such as the size of devices, and he mentions palm-sized computers, underestimating the computational power of the smallest devices we have today. He also mentioned that no revolution in AI was needed, and only embedded computers would be enough, which is not untrue, but today, AI plays a pivotal role in helping devices making autonomous decisions and adapt to user preferences. I find it frustrating that the only purposes described in the paper are the workspace-related ones. For example, wearable devices for healthcare purposes aren't mentioned, which have been a huge portion of ubiquitous computing in the 2010s.
In conclusion, Mark Weiser's vision of ubiquitous computing has seen significant progress, but challenges like interoperability and data privacy remain. Additionally, environmental consequences have not been discussed but are now a rising concern with the huge consumption of energy and production of electronic waste. Furthermore, the integration of AI has become central to discussions surrounding the future of technology and computing.

Gregory D. Abowd, Elizabeth D. Mynatt, and Tom Rodden. 2002. The Human Experience

"The Human Experience" authored by Gregory D. Abowd, Elizabeth D. Mynatt, and Tom Rodden, three experts in the ubiquitous computing field, in 2002, provides a visionary exploration of ubiquitous computing, following the principles of Mark Weiser. In this vision paper, the authors present a vision of the future where computing seamlessly integrates into the fabric of everyday life to a point that it becomes virtually invisible.
They outlined three goals that have influenced research and development: firstly, understanding and supporting people's everyday interactions with their environment. Secondly, offering a diverse range of interactive devices to augment the world and lastly, interconnecting those networked devices for creating holistic user experiences. Throughout the paper, they explore how these goals have affected research in three different areas of ubiquitous computing: the physical interaction experience, the discovery of general application features, and the design and evaluation of the human experience.

Some of the ideas presented in the paper have taken shape, such as NaviCam. Nowadays, a smartphone is sufficient to live-translate writings on paper or a wall by taking a picture of it, and Google's latest AR (augmented reality) glasses enable this seamlessly. Another focus they put is on the context, and how to have a better capture of events: they suggest that contextual information such as a person's body temperature, heart rate and so on, and this is now possible and recorded by wearable devices such as smartwatches for analyses purposes in the fitness and wellness world. The *automated capture* they mention has fully taken shape now, whether it be using our smartphones to record everything everywhere, or in a professional context (classrooms or work meetings) with softwares like Zoom, MS Teams or their alikes that allow to record, provide a transcript for the meeting, can summarize and extract highlighted portions of the recording.
However, some of the mentioned ideas are not fully developed even now, as for Weiser's paper. While substantial progress has been made for a seamless integration of computing into everyday life, there is still room for improvement. Currently, most of our interactions with technology are consciously initiated, and mostly through smartphones. True seamless integration would mean that computing operates in the background, without requiring explicit user input, like J.A.R.V.I.S in Iron Man. To achieve this, we need more natural and intuitive interfaces that understand user intent and context. For example, instead of pulling out a smartphone to check the weather, a seamless system would provide the information based on your location and daily routine, like in the fictional story of Sal.

Some of the ideas presented in the paper have taken shape, such as the NaviCam: nowadays, a smartphone is enough to live-translate writings on a paper or a wall by taking a picture of it, and Google's latest AR (augmented reality) glasses allow it too, in an even unconscious and smooth way. Another focus they put is on the context, and how to have a better capture of events: they suggest that contextual information such as a person's body temperature, heart rate and so on, and this is now possible and recorded by wearable devices such as smartwatches for analyses purposes in the fitness and wellness world. The *automated capture* they mention has fully taken shape now, whether it be using our smartphones to record everything everywhere, or in a professional context (classrooms or work meetings) with softwares like Zoom, MS Teams or their alikes that allow to record, provide a transcript for the meeting, can summarize and extract highlighted portions of the recording.

Although, the authors foresaw a change from structured work settings, which has not occurred as expected. Despite progress in remote work and flexible scheduling (mainly thanks to the pandemic crisis), conventional office environments and industries continue to rely on structured tasks and desktop computing. As in Wieser's original paper, there is no concerns raised on data privacy and cybersecurity challenges, whereas with the increasing number of sensors, cameras, and interconnected devices, people are often unaware to what their activities are being monitored. Ethical concerns can also be raised for ethnography, as a biased description of a particular community could lead to algorithmic bias and issues while interacting with computing systems.
Therefore, the conclusion aligns with Weiser's paper, as they both share the same vision of ubiquitous computing.