Yesterday's Tomorrows
Envisioning ubiquitous computing
Sam Kinsley

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This presentation

» Ubiquitous Computing

» Case: HP's CoolTown

» Anticipatory knowledge

Image: HP CoolTown

In this presentation I will explore the inherently future oriented nature of the development of nascent technologies. Such research has to a significant extent been driven by various anticipations of technological arrangements set in a proximal future but acted upon in the present.

I will focus on a particular example that has come out of my fieldwork, that of Hewlett Packard Labs' 'CoolTown' research agenda: a set of projects that ran between the late 90s and the early part of this decade.

Ubiquitous computing

Foresight? -

The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it

Weiser, 1991

Image: Weiser 1991

To begin with, I'd like to do some stage-setting and reflect on the stories of the development of ubiquitous computing.

Mark Weiser, Senior Research Scientist at Xerox's Palo Alto Research Center in the early 90s coined the term 'ubiquitous computing' to describe the diffusion of computers throughout the everyday lived environment. In the first sentence of Weiser's now oft-quoted article 'The Computer for the 21st Century' he sums up the ethos of the research and development he anticipated for ubiquitous computing:

> The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it

Ubiquitous computing, or 'ubicomp', research, as laid out by Weiser, is characterised by a concern with potential worlds of computational plenty. Since the earliest days of such research ubicomp discourse has been a research agenda with prolific envisioning of futures.

In a paper from which I borrowed the title of this presentation, Genevieve Bell, an anthropologist, and Paul Dourish, a computer scientist, examine the continuing agency of Weiser's vision. They suggest of his 1991 article that:

> 'Rhetorically, Weiser situates the research activities that he describes as initial steps upon a path of technological development inspired by an explicit vision of possible future relationships between people, practices and technology' (2007).

As Dourish and Bell go on to assert, Weiser's article was doubly influential, not only did it describe a research agenda that many went on to adopt but it also set a rhetorical tone that many have adopted.

The centrality of a 'proximate future' in ubicomp research continually places its achievements out of reach, while simultaneously masking us to current practices. The framing of ubicomp as to-come allows researchers and technologists to absolve themselves of responsibilities for the present – the problems are described as implementation issues that are, essentially, someone else's problem. Yet, it is in the production of these visions that futures are acted upon and brought into a present.

The mode of anticipation that underlies the future tense of ubicomp, as conceived by Weiser, I suggest, is one of foresight. The notion of 'vision' as a means of foresight has been suggested to perform 'the mapping of possibility spaces' acting as 'narratives and codes that bind together communities of interest in practice'. However, forecasts envisioned rest in rhetoric and image, which, when recorded, are depthless, insofar as they have little phenomenological purchase, yet they have 'epistemological depth' in the extraordinary capacity for humans to subjectively construct and represent, in a 'visual imaginary' or "*mind's eye*". This imaginary is an 'intuition: a thinking feeling' (Massumi 2002, 134)[1]. When consciously (post-) rationalised, predominantly in a Cartesian manner (cf. Crary 1992, 25-66, Pickles 2004), this 'feeling of thought' is figured within the normalised discourses of 'vision'. One might argue that the sensation 'must' be named and so, in process of familiarisation, there has been a turn to the metaphor of sight.

And it is to the practices of envisioning that I will now turn. I want to focus upon the case study of Hewlett Packard Labs' 'CoolTown' research agenda.

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[1] Massumi (2002) makes it very clear, however, that this is not an externally-oriented feeling of *a thing* but rather the feeling of *thought*: 'Not feeling something. Feeling thought – as such, in its movement, as process, on arrival, as yet unthought-out and un-enacted, postinstrumental and preoperative' (134).

HP 'CoolTown'

HP video circa 2003
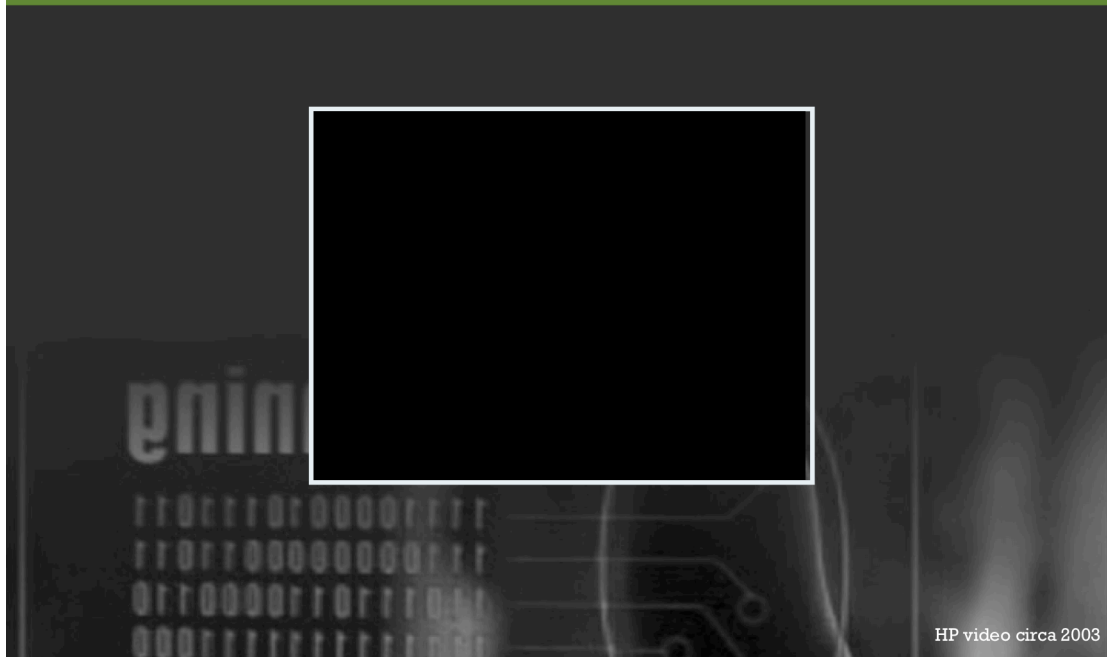
[COOLTOWN VIDEO 1: 40 secs]

This opening segment of HP Labs' CoolTown 'vision' video introduces the spaces of imagination implicated in HP's broader uptake of a vision for mobile and distributed technologies. I am going to look at three different groups of actors that played a role in the development of CoolTown.

Researchers: Practicing vision

» '*People, Places, Things*' ~ 'CoolTown'

» Increased prominance of WWW

» Hope: 'What happens when everything is part of a connective fabric?'

Image: HP CoolTown

In industrial research labs the principal task is to create and develop technologies that could lead to opportunities in the future. As one HP research scientist put it to me: 'by definition you work in a future tense'.

In the late 90s researchers at HP Labs came together around various projects which were a part of research into creating consumer-oriented web technologies. This mostly focussed on embeding web servers into things. So, physical objects have a web address a bit like web 'pages'. Web services thus become not just things in the browser but services served by devices, places and even humans.

The tagline 'people, places, things' (Kindberg et al. 2000) thus became associated with this research at HP. It alludes to the broader thinking going on amongst the group of engineers, which was described by one senior research scientist as 'what happens when everything in the world becomes part of the connective fabric'.

Furthermore, if people are more mobile and they wish to take technologies with them, or have them accessible in multiple places, you raise the broader implications of what happens when you start populating the world with inter-connecting devices.

The projects were not necessarily conceived as 'ubicomp', in the minds of the research team they were simply investigating an interesting system of control for remote devices – based on the increasing prominence of the internet and the world wide web. One of the first prototypes was playful - a hot-tub which you could turn on and off and control the temperature remotely.

As more projects centred on this particular theme the researchers started coming up with names under which to collect the research. One of the initial suggestions was in fact

'cool city'. However, a pornographic website already exited under that name and so the researchers went for 'cooltown'.

I suggest that the predominant mode of anticipation underlying the work of the researchers engaged in CoolTown was 'hope'. 'Hopes provisionally emerge from within sets of relations and encounters that make up processes of hoping, as does a source that gives hope or in which hope can be placed' (Anderson and Fenton 2008, 78). To paraphrase Anderson (2006): hopes disclose the creation of potentiality or possibility. In a relatively optimistic effort to change the world, researchers are hopeful that they can produce meaningful and desirable technologies that will be used in peoples' lives.

CEO: Hard sell of the future

» Corporate vision

» Business development ~ show rooms

» Spin-outs (which failed)

Image: HP Labs

Carly Fiorina, CEO of HP, toured HP Labs in her first week. The director of HP Labs wanted her to see CoolTown, which he considered emblematic of the type of creative research it can be hard to do as a company focussed on boxed products. Something clearly stuck because within two months Fiorina was using a somewhat embellished version of this vision in her keynotes and as examples in press conferences. With this CEO level interest 'CoolTown' became a broader corporate vision through which executives tried to tell a story of a big company's 'relevance to the future'.

Business development units were asked to make CoolTown demos, some sites were created around the world as a showcase. In Palo Alto it was a small converted conference room, to demonstrate specific concepts. In Singapore and Canada more elaborate show rooms were created. Many clients have viewed these show rooms.

Service and product spin-outs were created around several of the particular concepts that came out of CoolTown. Yet the spin-outs and the consulting practice struggled to get traction - trying to sell 'the future' as seen in CoolTown proved to be difficult.

Producer: Screening futures

» Vision video

» Emotive scenarios with technology vignettes

» Researchers: 'we didn't say it would work like that'

HP in the past had used a particular person who creates 'vision' videos to express the ethos of a particular line of research or product. Her signature style was very human-oriented, very emotional situations weaving in interesting technology vignettes, creating a hyper-realistic mode of story telling.

After CEO prominence came, some HP managers went to this producer to create a 'vision' video for CoolTown. From a corporate 'vision' perspective: the video was a very compact articulation of a lot of things CoolTown as a research project was trying to say about the type of world being created by these types of technologies. From the technology research scientist standpoint - there were things about the video they liked, but many things that made them cringe and say 'we didn't say it would work like that'. As some of the researchers saw it, the producer wasn't very 'tech savvy'.

The video became an interesting double-edged sword. It had a particular effect on how CoolTown was received. It wasn't accurate to technological development the ensued but represented a 'vision'. The researchers felt that the overly emotive and simplistic corporate vision elided some of the interesting and important things they were trying to achieve to make the world better.

Futures date

» 2001: Tech crash + 9/11 + HP-Compaq merger

» Management of expectation: 'All thinking about the future was put on hold'

» Wireless web servers in printers ~ 'retroactive power' of CoolTown

Image: Blast Theory

In the wake of the technology industry crash, the terror attacks of 2001 and the heavyweight HP-Compaq merger, HP changed focus as a company. All discretionary spending dried up and to quote a former HP executive: 'all thinking about the future was put on hold'. All corporate visions of what were deemed 'crazy' futures disappeared. The HP Labs researchers found themselves amongst the pervasive/ubicomp community. They felt the fundamental research behind 'people, places, things' was done, as scientists most wanted to move on. As a senior HP Labs researcher said during an interview: 'even futures date'. The practice of anticipation at play in this corporate activity becomes something like the management of expectations. Such expectations exact or affirm authority in different groups yet their variability over time leads to different stakeholders attempting to redefine and redirect what they might consider their obligations.

Some of the CoolTown research spawned further projects, which have been opened to the public such as the 'mediascapes' project led by HP Labs in Bristol. The elaborate devices of the visions remain as such. Many of the underlying ideas found their way into more modest applications. The single biggest output from the range of research conducted under the banner of CoolTown was internet protocol-based printer sharing. This includes the introduction of wireless communications into printer, a now widespread phenomenon. In a sense these 'actual' products and the videos are what Bergson would call the 'retroactive power' of the event of envisioning that was CoolTown. The products, videos and associated news stories are a partial account of the event and go some way to explain it. However, there remain aspects of the event that were not actualised or operated in different durations such that they exceed such an explanation.

Anticipatory logics & techniques

» 'Proximate' future tense

» Range of logics:

    » Expectation, foresight, hope

» Technological determinism?

» Visons = Representational constructs that shed light on anticipatory logics

Image: Flickr user 'JMichaelSullivan'

It was recently highlighted in a special edition of the journal 'technology analysis and strategic management' on the 'sociology of expectation' that:

> 'By definition, innovation in contemporary science and technology is an intensely future-oriented business with an emphasis on the creation of new opportunities and capabilities' (Borup et al. 2006, , 285)

Yet this future orientation is problematic. The tense in which ubiquitous computing discourse operates is what might be called the near or 'proximate' future. As Bell and Dourish have suggested, what are produced in practice are narratives of particular futures 'just around the corner'.

Amongst the Human-Computer Interaction research community many see a distinction between those who conduct technology-centred design and human-centred design. To grossly simplify: Technology centred design can be figured as the negotiation of two questions 'what is possible' and 'what is needed' from a new technology. Technologies in this sense are distinct from us as human, social beings. Human centred design can be thought as asking 'how are particular practices changing' and 'how do we support them'. Such a design process becomes less about technologies as such and more about systems of practice.

So, it would be reasonable to say that the issue of technological determinism has been widely discussed roundly dismissed in philosophy and in the social sciences. Yet it appears to remain a very real thread to some of the visions espoused in computing development. For some technologists, technology is exterior, but manufactured, and variously impacts on society producing various effects.

The assumptions upon which such understandings are based contain a peculiar sense of progress in time and space, a teleology, in which we are headed in a particular direction.

Now, it would be easy to accordingly discount the entire process of constructing 'visions' in technological development. Yet, I feel I have illustrated in my example that whilst visions are not necessarily realised, nor likely to be, they are productive of particular types of relation between researchers, business managers, clients and various places and things. Indeed, by focussing only upon the vision as the representational construct of the video, or any other slick exposition of a 'vision', we would affirm the teleology presented. It would be a mistake in any analysis of nascent technology research to focus upon such 'visions'. By which I mean either to hastily discount them as froth or too readily accept them as authoritative. Vision texts and videos are, in most cases, certainly not glimpses of a future. Rather, they are representational constructs born of anticipatory impetus. In this sense practices of vision-ing, and their products, shed light on the means and modes of anticipation as practiced in nascent technology research and development. Such anticipatory 'knowledges' are significant in ubiquitous computing.

These practices are, of course, not directly acting upon the future, as conceived. Neither are they bringing the future to the present. Instead, I would argue the various participants in R&D are enacting potentialities in the present. To paraphrase Deleuze (2004) it is in our encounter with the world, in this fleeting present, that differentiations and relations are made, and the productive capacity of thought is exercised. In this way, future orientation, not as a determinate state, but as an openness to potential is a strong underpinning to the performance of life. Which is how anticipatory knowledges are derived, and for which various techniques are developed. I have suggested that modes of anticipation such as: expectation, foresight and hope all featured in the envisioning of CoolTown, and do so more broadly in ubiquitous computing R&D. The central anticipatory technique examined in this presentation has been the creation of corporate research visions.

Summary

» Ubiquitous computing: centers on anticipatory practices

» 'Visions' shed light on anticipatory knowledges

Image: HP CoolTown

What I believe can be identified in this mix of anticipation, is a sense in which certain actors have more influence than others and particular visions of the future are perhaps given more ground than others. One of the tasks of analysis in the development of nascent technology must surely then be to attend to the various entangled and perhaps abrasive anticipatory techniques at play. I would argue to do so requires attending to the full range of participants in the ecology of design and development, and to the variety of anticipatory practices in which they engage.

Questions / Contact

» samkinsley.com
» sam.kinsley@bristol.ac.uk

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