Ubiquitous/Pervasive Computing

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Abstract

2013: The year of the Internet of Things; The Internet of Things probably already influences your life. And if it doesn't, it soon will, say computer scientists; Ubiquitous computing names the third wave in computing, just now beginning. First were mainframes, each shared by lots of people. Now we are in the personal computing era, person and machine staring uneasily at each other across the desktop. Next comes ubiquitous computing, or the age of calm technology, when technology recedes into the background of our lives. Alan Kay of Apple calls this "Third Paradigm" computing. Ubiquitous computing is essentially the term for human interaction with computers in virtually everything. Ubiquitous computing is roughly the opposite of virtual reality. Where virtual reality puts people inside a computer-generated world, ubiquitous computing forces the computer to live out here in the world with people. Virtual reality is primarily a horse power problem; ubiquitous computing is a very difficult integration of human factors, computer science, engineering, and social sciences.

The approach: Activate the world. Provide hundreds of wireless computing devices per person per office, of all scales (from 1" displays to wall sized). This has required new work in operating systems, user interfaces, networks, wireless, displays, and many other areas. We call our work "ubiquitous computing". This is different from PDA's, dynabooks, or information at your fingertips. It is invisible; everywhere computing that does not live on a personal device of any sort, but is in the woodwork everywhere. The initial incarnation of ubiquitous computing was in the form of "tabs", "pads", and "boards" built at Xerox PARC, 1988-1994. Several papers describe this work, and there are web pages for the Tabs and for the Boards (which are a commercial product now):

Ubiquitous computing will drastically reduce the cost of digital devices and tasks for the average consumer. With laborintensive components such as processors and hard drives stored in the remote data centers powering the cloud , and with pooled resources giving individual consumers the benefits of economies of scale, monthly fees similar to a cable bill for services that feed into a consumer's phone