

UNIVERSITÀ DELLA SVIZZERA ITALIANA

FACULTY OF COMPUTER SCIENCE

Master in Artificial Intelligence

Topic: Ubiquitous Computing

By Heider Jeffer

instructor: Mehdi Jazayeri

assistant: Sasa Nesic

Speaker: Prof. Marc Langheinrich

2014

Summary

Ubiquitous computing (ubicomp) is a post-desktop model of human-computer interaction in which information processing has been thoroughly integrated into everyday objects and activities. In the course of ordinary activities, someone ”using” ubiquitous computing engages many computational devices and systems simultaneously, and may not necessarily even be aware that they are doing so. This model is usually considered an advancement from the desktop paradigm.

This paradigm is also described as pervasive computing, ambient intelligence. When primarily concerning the objects involved, it is also physical computing, the Internet of Things, haptic computing, and things that think. Rather than propose a single definition for ubiquitous computing and for these related terms, a taxonomy of properties for ubiquitous computing has been proposed, from which different kinds or flavors of ubiquitous systems and applications can be described.

At their core, all models of ubiquitous computing (also called pervasive computing) share a vision of small, inexpensive, robust networked processing de- vices, distributed at all scales throughout everyday life and generally turned to distinctly common-place ends. For example, a domestic ubiquitous computing environment might interconnect lighting and environmental controls with personal biometric monitors woven into clothing so that illumination and heating conditions in a room might be modulated, continuously and imperceptibly. Another common scenario posits refrigerators ”aware” of their suitably-tagged contents, able to both plan a variety of menus from the food actually on hand and warn users of stale or spoiled food.

Ubiquitous computing presents challenges across computer science: in systems design and engineering, systems modeling, and user interface design. Contemporary human-computer interaction models, whether command-

line, menu-driven, or GUI-based, are inappropriate and inadequate to the ubiquitous case. This suggests that the ”natural” interaction paradigm appropriate to fully robust ubiquitous computing has yet to emerge - although there is also recognition in the field that in many ways we are already living in a ubicomp world. Contemporary devices that lend some support to this latter idea include mobile phones, digital audio players, radio-frequency identification tags, GPS, and interactive whiteboards.

Ubiquitous learning

For some, ubiquitous learning (or u-learning) is equivalent to some form of simple mobile learning, e.g. that learning environments can be accessed in various contexts and situations. A ubiquitous learning environment is any setting in which students can become immersed in the learning process. So, a ubiquitous learning environment /ULE/ is a situation or set of pervasive /or omnipresent/ education /or learning/. Education is happening all around the student but the student may not even be conscious of the learning process. Source data is present in the embedded objects and students do not have to DO anything to learn. They just have to be there.