Chapter 8.7
From E to U:
Towards an Innovative Digital Era

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ABSTRACT

Telecommunications and Internet Technologies have evolved dramatically during the last decade, laying a solid foundation for the future generation of Ubiquitous Internet access, omnipresent Web technologies and ultimate automated information cyberspace. Ubiquitous computing has been investigated since 1993. As a result, current efforts in research and development in the areas of Next Generation Internet and Telecommunications Technologies promote the formation of inter-disciplinary international teams of experts, scientists, researchers and engineers to create a new generation of applications and technologies that will facilitate the fully-automated information cyberspace systems, such as Future House 2015. The authors discuss the current state-of-the-art in the world of Telecommunications and Internet Technologies, new technological trends in the Internet and Automation Industries, E-manufacturing, Ubiquity, Convergence, as well as the concept of the Fully-automated Future House 2015, the 2006 Web Report with the Microsoft project on Easy Living, while promoting research and development in the interdisciplinary projects conducted by multinational teams world-wide.

INTRODUCTION

The past century left us with the legacy of the global Internet, the final flight of Concord Air, CISCO monopoly in computer networking, etc., while large, medium and small corporations alike have discovered the need to adapt to the new technologies, or sink in the emerging global knowledge economy. There is no facet of life in

the industrialized world that has not undergone some form of shift. The resultant new information economy has brought with it different approaches to work. The dawn of 21st Century has come up with new models of Economics, where global barriers are falling, economies are merging, communication is getting better and cheaper (Salvi & Sahai 2002) and "knowledge in the world" becomes more important (Dix et al., 2004). The current 21st century is perhaps one of the most interesting times in history to be alive. We are witnessing a phenomenal abundance of change in societies around the world in a very short period. The sources of most of this change are new technologies and the Internet. In the past decade we have seen every aspect of the lives of individuals and organizations go through many evolutions and uncertainties (Technology Advancements and Government Policies in Canada). There are plenty of publications on the subject of futuristic and ubiquitous computing for the 21st century presenting excellent discussion and possible scenarios in the subject area (Ubiquitous Security; Xerox Paul Alto Research; Course on Ubiquitous Computing; Mark Weiser's Vision; Bluetooth). History proved that one must look forward and accept the futuristic vision as possible scenarios of tomorrow's reality. Nowadays, technologies such as TV, Internet, Mobile Phone, Traffic lights, and cameras are essential part of daily life (AMR Research; Toyota; Military Agile Manufacturing Pilot Program; Convergence; Pervasive Computing; Distributed Systems Online). However, if one would suggest hundred years ago what would be the reality of 2005, surely he or she would be considered "with great caution" (Stajano, 2002; Weiser, 1996). In this chapter, we seek to contribute to the Ubiquitous Computing agenda (Tolmie et al., 2002).

PERVASIVE COMPUTING

Ubiquity postulates the omnipresence of networking. An unbounded and universal network. Omnipresence is the ability to be everywhere at a certain point in time. The widely used definition of ubiquitous computing is the method of enhancing computer use by making many computers available throughout the physical environment, but making them effectively invisible to the user (Wang, et. al., 2007). Ubiquitous computing is a post-desktop model of human-computer interaction in which information processing has been thoroughly integrated into everyday objects and activities. As opposed to the desktop paradigm, in which a single user consciously engages a single device for a specialized purpose, someone "using" ubiquitous computing engages many computational devices and systems simultaneously, in the course of ordinary activities, and may not necessarily even be aware that they are doing so.

Ubiquitous computing integrates computation into the environment, rather than having computers which are distinct objects. Ubiquitous activities are not so task-centric while the majority of usability techniques are. It is not at all clear how to apply task-centric techniques to informal everyday computing situations (Abowd & Mynat 2000). Other terms for ubiquitous computing include pervasive computing, calm technology, things that think and everyware. Promoters of this idea hope that embedding computation into the environment and everyday objects would enable people to interact with information-processing devices more naturally and casually than they currently do, and in whatever location or circumstance they find themselves (Ubiquitous Computing, 2007).

In the ubiquitous computing era, we can expect that computing systems become smaller and smaller, eventually invisible. They will be pervasive into our daily lives (Van de Kar, 2005). With the invention of new interaction devices and the requirements for ubiquitous access to application systems, user's interactions have moved beyond the desktop and evolved into a trend of ongoing development (Hong, Chiu & Shen, 2005). The