

Chapter 17

Enabling Technologies in an Ambient Intelligence (AmI) System

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ABSTRACT

This chapter introduces the concept of Ambient Intelligence (AmI) with regard to the enabling technologies and how they are combined to assist e-entrepreneurs. AmI is a new paradigm in the area of Information and Communication Technology (ICT). AmI allows for seamless interaction between the human and technology. The AmI system provides the human user with information and decision support tailored to their specific needs. To achieve seamless interaction between the human and technology requires the environment that surrounds the human to be embedded with technology in everyday objects. These technologies gather information that the AmI system uses to adapt its responses to the human user. The aim of the chapter is to provide a better understanding of the AmI process and knowledge of the AmI system and tools. To this end three of the enabling technologies are discussed: semantic web, multi-modal services, and radio frequency identification tags. These technologies are then examined within the AmI reference model. The reference model provides an understanding of how the technologies can be combined to achieve different AmI features for the human users. This toolkit can be used by a new venture in the area of e-entrepreneurship to provide AmI to service providers, new businesses and traditional industries.

INTRODUCTION

Entrepreneurship is about creating new ventures (Barba-Sánchez, del Pilar Martínez-Ruiz, & Jiménez-

nez-Zarco, 2007; Tetteh, 2008; Wienclaw, 2008). New ventures are young agile firms that can implement more effectively new concepts in many areas such information and communication technology (ICT). E-entrepreneurship can be defined as new ventures that apply and exploit e-technologies (Koll-

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mann, 2006). E-entrepreneurship is a knowledge intensive concept that requires up to date information on products and services which are offered (Kollmann, 2006; Matlay, 2004, 2005). There is a need to provide information and decision support to human users. This needs to be supported by an interactive man-machine interface that captures, analyses, and delivers information tailored to the human users needs. In the production setting for example, knowledge and decision support are critical to maintaining a competitive advantage in an environment where there is a rising cost base, inflation and higher wage demands. Improvements in providing knowledge and decisions-support to the stakeholders in all areas of the process setting can assist in improving flexibility, effectiveness, efficiency and adaptation to changing needs and requirements (MANUFUTURE, 2004). A new strategy needs to be adopted to assist industry to retain its competitive advantage. The new approach needs to be able to adapt seamlessly to the changing business environment and help companies become more flexible, dynamic, efficient and effective (Koska & Romano, 1988; MANUFUTURE, 2004). Ambient intelligence (AmI) is a strategy that can assist in achieving a knowledge-intensive concept like e-entrepreneurship. AmI is a young technology which holds great opportunity for new ventures in the ICT sector. The new venture can exploit AmI by implementing the concept in service providers, new businesses, and traditional industries.

AmI is a user-centered concept in the area of ICT (Giuseppe Riva, 2005). It places the user at the centre of a technology embedded environment. In essence the move is away from one computer, one user to an environment where many computers interact seamlessly with one user (Giuseppe Riva, Vatalaro, Davide, & Alcaniz, 2005). Technology in the AmI environment moves to the background by becoming embedded in everyday objects like clothes and furniture. The AmI system works on the principles of evaluating inputs and outputs from the user, as well as the process, and environment

in which the user inhabits. The technologies cater to the needs, habits, gestures, emotions, and the context awareness of the users' interaction with the environment, by tailoring its responses to the user. The responses are provided through the technologies that are embedded in the environment, being people-centered and having the ability to be intuitive and adapt to changes in the environment. The surrounding environment is sensitive and responsive to the changes in the user. It also has the ability to adapt to these changes due to its omnipresent nature (DG Information Society, 2004; Gill & Cormican, 2008a). AmI is a system composed of technologies that have the ability to adapt and learn in the physical environment that encircles the user. Different combinations of technologies are used to create different levels of human computer interaction. The use of speech recognition software (SRS) to collect user inputs to the system combined with semantic agents to assist in annotating and storing information in the most effective way to assist in retrieval of information in the future. The use of semantic agents to store information that is gathered from users, processes and the environment allow for the use of semantic searching of information that is stored. This provides for more intelligent searches of databases through improved search parameters (ISTAG, 2002).

This can be of benefit to manufacturing in the case of the shop floor operator. The AmI system can assist the shop floor operator by providing each individual with skills level task information for each task that they need to perform. The AmI system can also assist the operator in recoding machine breakdowns, material shortages, reject quantities, product traceability, and other task related issues that arise. The information that is gathered is then promptly sent to relevant personnel so that action can be taken to rectify any problems that arise on the shop floor. The value proposition for implementing AmI in a new venture can be summarized as follows:

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