Chapter 7
Pervasive Healthcare Services and Technologies for Memory Loss Diseases Support

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ABSTRACT

With an increasingly mobile society and the worldwide deployment of mobile and wireless networks, the wireless infrastructure can support many current and emerging healthcare applications. This could fulfill the vision of "pervasive healthcare" or healthcare to anyone, anytime, and anywhere by removing locational, time and other restraints while increasing both the coverage and the quality. In this chapter the authors present applications and requirements of pervasive healthcare, wireless networking solutions and several important research problems. The pervasive healthcare applications include pervasive health monitoring, intelligent emergency management system, pervasive healthcare data access, and ubiquitous mobile telemedicine. On top of the valuable benefits new technologies enable the memory loss patients for independent living and also reduce the cost of family care-giving for memory loss and elder patients.

INTRODUCTION

Pervasive computing (also referred to as ubiquitous computing or ambient intelligence) aims to create environments where computers are invisibly and seamlessly integrated and connected into our everyday environment. Pervasive computing and intelligent multimedia technologies are becoming increasingly important, although many potential applications have not yet been fully realized. These key technologies are creating a multimedia revolution that will have significant impact across a wide spectrum of consumer, business, healthcare, and governmental domains.

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Pervasive healthcare has the potential to reduce long-term costs and improve quality of service, but it also faces many technical and administrative obstacles. The healthcare industry has introduced wireless technologies on a limited scale for many simple tasks. However, researchers and advocates must overcome many challenges before a truly pervasive healthcare environment can become a reality.

Pervasive healthcare would improve the productivity of healthcare practitioners and greatly facilitate the delivery of a wider range of medical services. The rapidly increasing use of handheld devices and the deployment of wireless-based solutions should accelerate the development of such services, especially in areas where a wire line infrastructure is minimal or impractical. Faster and more accurate communication would result in substantial savings that could be used to expand basic healthcare to everyone, thereby reducing costs in the long run.

DEFINITION OF MEMORY LOSS

Many studies have been made by neuroscientists in order to analyse the structure of human memory, to assign how many kinds of memory there are, and how the brain selects, stores and retrieves information in each memory's part. In general, memory divided into three parts:

- Immediate or working memory which refers to the structures and processes used for temporarily storing and manipulating information. The Immediate memory includes information about the current task such as the name of a person you met moments ago or a phone number just to place the call.
- Short-term memory for holding in mind information of the recent past. This memory's part refers to memories which last for a few minutes such as events that happened in several seconds or minutes ago, and what you ate for breakfast.
- Long-term memory can record the remote past. It is the part which contains everything we know about the world, semantic information as well as autobiographical experience, and memories of childhood (Familydoctor.org Editorial Staff, 2006).

Each memory part can be affected by different reason and can lead us in memory loss.

Memory loss disease can appear after brain damage due to physical trauma or disease, as well as, due to emotional trauma. Memory loss can affect memories partially or totally, slowly or suddenly, temporary or permanent. Anything that affects cognition - the process of thinking, learning, and remembering - can affect memory (FDA, 2009). In many cases, alternative names are used for memory loss, such as forgetfulness, amnesia or impaired memory.

Some causes which affect the memory's parts and enforce memory loss are listed below:

- ***Depression*:** Depressed patients performed significantly worse on measures of both processing speed and working memory (Nebes, Butters, et al, 2000). The major depression significantly affects working memory (Pelosi, Slade, et al, 2000).
- ***Alzheimer disease*:** Alzheimer's destroys brain cells, which control short-term memory (Alzheimer's Association, 2009), causing problems with memory, thinking and behaviour severe enough to affect work, lifelong hobbies or social life, and difficulty in remembering recently learned facts. Usually, Alzheimer's disease is diagnosed in people over 65 years of age (*Alzheimer's disease*, 2009). In addition, many other known chronic diseases such as Parkinson, Diabetes can lead in memory loss as well.
- ***Dementia*:** Short-term memory deficits in Dementia can be summarised as follows: