

Chapter 2

The Internet of Things and Assistive Technologies for People with Disabilities: Applications, Trends, and Issues

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ABSTRACT

With the Americans with Disabilities Act (ADA), the past two decades have seen a proliferation of Assistive Technology (AT) and its enabling impact on the lives of people with disabilities in the areas of accessing information, communication, and daily living activities. Due to recent emergence of the Internet of Things (IoT), the fields of rehabilitation, healthcare, and education are challenged to incorporate the IoT applications into current AT services. While IoT applications continue to be developed and integrated into AT, they are still at a primitive stage where clear guidelines are yet to be developed and benefits are yet to be substantiated to ensure the quality of lives of people with disabilities. This chapter provides an overview of the IoT and AT integrated applications based on the building blocks of the IoT, along with recent trends and issues relevant to accessing technology for people with disabilities.

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INTRODUCTION

The IoT is reshaping our society by changing many aspects of everyday life of potential users (Bandyopadhyay & Sen, 2011). Smart health, assisted living, smart homes, and enhanced learning are only a few examples of possible application scenarios in which this new technology will play a leading role in the near future for people with disabilities (Atzori, Iera, & Morabito, 2010). The IoT for people with disabilities is likely to become more personalized to meet individual needs and user requirements. With large IT companies such as Intel, Cisco, Samsung, Google, and Apple developing the IoT ecosystems, newer and revolutionized IoT innovations for people with disabilities are emerging. The IoT allows medical devices and assistive devices to collect, store, send and receive patient and customer data and is likely to become an important part of their lives. While the IoT is one of the hot technologies of this decade and a large number of studies focus on the technical aspects of the IoT such as management of resource constraint devices and mechanisms of interconnection mechanisms (Bui, Castellani, Casari, & Zorzi, 2012; Gluhak et al., 2011; Atzori et al., 2010; Sehgal, Perelman, Kuryla, & Schonwalder, 2012), a paucity of studies exists on the use of the IoT for people with disabilities.

There is little doubt that the IoT is highly likely to enhance the use of Assistive Technology (AT) by increasing the accessibility and functional capabilities for people with disabilities in the areas of communication, self-care, independent living, health care, mobility and transportation, and education and learning (Lee, 2009). While the IoT is at the early stage of making a positive impact on the lives of people with various disabilities, the potentials for the range of benefits are unlimited. According to Gartner (2013), people with disabilities make up 15% of the world's population. Assistive technology devices marketed to people with disabilities can also be sold to the other 85% of the population that is "situationally disabled" during some part of their day. With the growing population of elders, more attention needs to be given to the elderly citizens who require accommodations in the areas of cognitive, physical, and sensory abilities that are associated with aging (Morris, Mueller, & Jones, 2010). Hence, healthcare and related area professionals need to have a better understanding of how people with disabilities may interact with various IoT innovations to help researchers and AT developers to develop more user-friendly and effective IoT-based AT applications. In the following, basic building blocks of the IoT architecture are explored for AT integration.

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