

# SmarTV Care: Benefits and Implications of Smart TVs in Health Care

**N****Eliseo Sciarretta***Link Campus University, Italy***Filippo Benedetti***Link Campus University, Italy***Andrea Ingrosso***Link Campus University, Italy***Roberta Grimaldi***Link Campus University, Italy*

## INTRODUCTION

The Smart TV is a digital TV set connected to the Internet that offers web-based functions and services. This consumer device offers more advanced computing ability and connectivity than a basic television set and is considered the technological convergence between computers and television with advanced multimedia and interactive features. It provides online services typically intended for normal personal computer (e.g. internet browsing, video on demand, Internet TV, home networking access, streaming services, social networks, etc.), maintains the basic function of broadcasting media and enhances the interactivity of the user with the television set and other connected devices. Smart TVs run complete Operating System and also provide public Software Development Kit (SDK) and/or Native Development Kit (NDK) so that applications can be developed from third-party companies. Apps can be implemented on the browser and ran on the TV screen. Smart TVs technology can also be integrated in set-top boxes (i.e. external devices that enhance basic television features), digital media players, game consoles and other network connected interactive devices. Thanks to the creation of this new convergence area, Smart TV demand is likely to significantly grow and is expected to play a central role in the future smart homes (MoonKoo Kim, 2011). In 2013, global sales of smart TVs have increased 55% over the previous year, with a 33% share of the total number of flat screen TVs purchased during the year. Soon overtaking will come and in 2017 old generation TVs still circulating on the market will be less than a third (Compagnucci, Croce, Da Empoli, & Zambardino, 2014).

The interest in Smart TVs is very high, especially because unlike other devices that may ensure the provision of similar services, such as set-top-boxes, the market growth advances much more quickly (Pant & Greeson, 2013)

The core concept of the device is progressively turning from a convenient use of broadcasting and Internet to a hub of smart life via TV.

In this chapter, the potential of this device to deliver health care services is discussed, by highlighting its strengths and weaknesses and with a focus on usability issues.

## **BACKGROUND**

The potential of this technology makes possible to be directly connected to users and patients at home with a wide range of information and services. In this way, a significant impact on the quality, timeliness and availability of health services can be reached. Since it is a rather new topic, researches on it are few and quite lacking at the moment.

When it comes to a target audience with special needs such as elderly and disabled patients, it is also important to plan eHealth services with solutions that allow overcoming the technological barriers (Cashen, Dykes, & Gerber 2004). The employment of an easy-to-use consumer device as Smart TVs can be crucial to address the usability needs of this kind of users who are not familiar with PC or the more recent smart devices. Currently, for this category the TV remains the most well-known technological medium, widely adopted and most familiar as entertainment system and equipped in almost every house. By using this kind of device in the e-Health and Telemedicine area, easily accessible systems can be designed to assist users directly at home. In this way, a Smart TV based telemedicine system can provide a cost effective and user friendly device in terms of interface and acceptance, since the TV is a familiar and the most common household appliance. By taking advantage from this technology, users can easily access medical services from their own environment with comfort, privacy and a significantly positive impact on health condition.

Considering these factors, several services have been proposed by adopting Smart TV sets.

Some applications focus on a telematic rehabilitation exercisers in form of a game for physically limited people (Epelde, et al., 2013; Hinderer, Friedrich, Hobel, & Wolf, 2013; Hinderer, Friederich, & Wolf, 2012). This kind of therapy at home usually aims to preserve or restore mobility. In these cases, gaming is conceived as a tool to objectivise the performance improvements and increase the motivation for a self-directed rehabilitation. Since interaction is also a crucial part of the system, the therapeutic recommendations for further exercises are delivered while monitoring and collecting data during the rehabilitation.

Telemonitoring services have also been deeply embedded in healthcare industry through Smart TV sets. The purpose of this kind of service is on one side to reduce the hospitalisation of patients by taking care and supervise them directly in their own domestic environment, on the other to provide a more independent life while being able to rely on help in case of emergency. Due to chronic illnesses, a continuous monitoring is required with aged patients. Systems can be designed to detect abnormalities, provide temporary advice or send alerts to the medical staff in case of emergency (Sorwar & Hasan, 2012). In order to help care-dependent people to be more independent, television services have been designed so that patients can access their own medical reports (Raffaeli, Gambi, & Spinsante, 2014), receive reminders or check their status displayed on screen (Lorenz & Oppermann, 2009). In all of the different telemonitoring frameworks composed by smart devices, Smart TV technology can be used as the mean of interaction between the user and the health care providers.

Monitoring is a solution that let the aged patients to live in their environment as long as possible. In addition, the social isolation problem has been deeply considered in the design of systems for this population. Regarding this issue, Smart TV applications have been proposed to support socially oriented activities for older people to improve psychological well-being (Alaoui & Lewkowicz, 2013). Providing individuals with the opportunity to use Internet allow them to access information and communicate with others. On one side this contributes to reduce their isolation and on the other makes possible to reconnect to the world in a new way. Projects (e.g. FoSIBLE), Virtual communities (e.g. Australian GreyPath) and Social TV systems (e.g. i.TV, Boxee, Telebuddies, NDS Social TV, iNeighbour TV) (Abreu & Almeida,

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