

# Chapter 1

## Purpose, Scope, and Technical Considerations of Wearable Technologies

**Mehtab Mehdi**

*Northern Border University, Saudi Arabia*

**Abdulrahman Alharby**

*Northern Border University, Saudi Arabia*

### ABSTRACT

*The purpose of this chapter is to concentrate on the technical considerations of wearable technologies. Approximately 50% of this chapter will be based on technical considerations while 30% is based on study areas, universities, degrees, and other information related to wearable technologies. For new readers of wearable technologies, we begin with a brief history and cover the scope of the field. The remaining 20% of the chapter covers useful information for interested readers of wearable technology.*

### INTRODUCTION

The terms “wearable technology”, “wearable devices”, and “wearables” all refer to electronic technologies or computers incorporated into items of clothing and accessories, which can comfortably be worn on the body. These wearable devices can perform many of the same computing tasks as mobile phones and laptop computers; however, in some cases, wearable technology can entirely outperform these hand-held devices. Wearable technology tends to be more sophisticated than hand-held technology on the market today because it can provide sensory and scanning features not typically seen in mobile and laptop devices, such as biofeedback and tracking of physiological functions.

Generally, wearable technology will have some form of communications capability and allows the wearer access to information in real time. Data-input capabilities are also a feature of such devices, as is local storage. Examples of wearable devices include watches, glasses, contact lenses, e-textiles, smart fabrics, headbands, beanies and caps, jewelry such as rings, bracelets, and hearing aid-like devices designed to look like earrings (Mann, 1997).

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While wearable technology tends to refer to items put on and taken off with ease, there are more invasive versions of the concept as in the case of implanted devices such as microchips or even smart tattoos. Ultimately, whether a device is worn on or incorporated into the body, the purpose of wearable technology is to create constant, convenient, seamless, portable, and mostly hands-free access to electronics and computers.

The implications and uses of wearable technologies are far reaching and can influence the fields of health and medicine, fitness, aging, disabilities, education, transportation, enterprise, finance, gaming and music. The shared common goal of wearable technologies in each of these fields is to smoothly incorporate functional, portable electronics and computers into individuals' daily lives (Martin, 2007). Prior to their presence in the consumer market, wearable devices were primarily used in the field of military technology and had the biggest implications for healthcare and medicine (Le Tellier, 2009). In fact, just 10 years ago, medical engineers were talking about wearable devices to unobtrusively monitor the health and well-being of patients in the form of a "Wearable Motherboard™" or a "Smart Shirt," aimed at monitoring vital signs sending biofeedback information to a hub station in real time (Park & Jayaraman, 2003).

Even though wearable technology can potentially have the most impact in the fields of health and fitness, the technology also promises a great influence on gaming and entertainment. Augmented reality and wearable technology can combine to create a much more realistic and immersive environment in real time. The concept is not necessarily new, as augmented reality through the use of wearable devices has been discussed since the late 1990s; however, the prototypes are moving away from bulky technology such as large goggles and backpacks, to smaller, lightweight and more mobile systems.

If the more polished designs of mobile phones and digital cameras, currently on the market, are any indication for the future of wearable devices, then fashion, practicality, function and design will all be taken into account as these products advance. This consideration for both technology and aesthetics is already evident in devices such as Google Glass, which has a very sleek, lightweight, almost unobtrusive design.

As the potential uses of wearable technology in various fields continues to grow, the sociological and cultural impact of wearable technology in the future should not be minimized. Already, the current hand-held devices available to consumers, such as Smart Phones, iPods and tablets, have changed the technological and social landscapes on a global scale, such as, walking out in public and seeing an individual engaging with a hand-held device is commonplace. Such an image was nonexistent only 20 years ago. With that in mind, developers and analysts predict wearable technology will very quickly change the technological and cultural landscapes once again, and may even change the nature of mobile phones and other hand-held devices entirely (Mann, 1997; Davies, 2009).

## **BACKGROUND AND HISTORY OF WEARABLES**

Today, wearable devices are exploding onto the market, with everything from smart glasses (Google Glass) to smart watches (Samsung Galaxy Gear) on the rise. As for smart watches, the technology isn't exactly new, however, as it began in the 1970s with the release of the first calculator watch. The calculator watch, specifically first released in 1975 under the Pulsar brand, became a widely popular tool for science geeks and math nerds everywhere. These early "smart" watches had their heydays through the mid-1980s and although their popularity went downhill, many companies still produce calculator watches to this day.

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