An Activity Monitoring Application for Windows Mobile Devices

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ABSTRACT

Obesity is rising at an alarming rate. A great challenge facing the health community is introducing population-wide approaches to weight management as existing health and medical provisions do not have the capacity to cope. Technology is fast becoming an important tool to combat this trend. The use of activity monitors is becoming more common in health care as a device to measure everyday activity levels of patients as activity is often linked to weight. This paper outlines a research project where Bluetooth technology can be used to connect a commercial wrist-worn activity monitor with a Windows Mobile device to allow the user to upload the activity data to a remote server.

Keywords: Activity Monitors, Bluetooth, Mobile Device, Obesity, Weight Management

1. INTRODUCTION

Obesity is a pan-European epidemic presenting a major barrier to the prevention of chronic non-communicable diseases. It is becoming an epidemic affecting the life of over a billion citizens globally (MRC, 2009; Hainer, Frelut, & Seidell, 2002; EMHF, n.d.). According to the World Health Organization (WHO), a majority of men are obese or pre-obese in most European countries except for Belgium, Denmark and Italy (IUFoST, 2007; Londahl, 2007). In the UK, two thirds of men and 50% of women are overweight. If current trends continue, the year 2010 will witness over three quarters of the British men being overweight (obesity is also rapidly rising among children with estimates of 12 million children overweight, of which 2.9 - 4.4 million are clinically obese; European Association for the Study of Obesity, 2004; Murphy, 2009). A great challenge facing the community is to introduce population-wide approaches to weight management as existing health and medical provisions do not have capacity to cope. Technology nowadays is being an essential tool to provide worldwide healthcare especially for those who are not able to visit their physicians or healthcare providers more.
often. The encouragement of taking preventative measures to the upward trend in chronic diseases is getting through and more people are self-managing their health. That makes an opportunity for companies to develop medical devices and services to empower individuals to manage their own healthcare (Murphy, 2009) (Figure 1).

Current common methodologies for measuring the activities of daily livings (ADL) such as direct observation, self-report questionnaires and diaries, Doubly Labeled Water (DLW) - the measurement of energy expenditure- and heart monitoring can be inaccurate in measuring physical activities and are inconvenient for their time consumption. In addition they are unreliable since it could depend on the subject’s memory and intrusive for the patient/user (Steele, Holt, Ferris, Lakshminaryan, & Buchner, 2000; Firstbeat Technologies, 2007; Rowett Research Institute, n.d.).

Over the past few decades, the need for smart applications and devices that sense, classify and provide automated feedback related to the user’s physical activities has relatively increased with the awareness level of the communities about health and physical fitness. However, such advanced technologies are still a challenge for the market to cohere because of the limitations that small monitoring devices could have such as the processing speeds, storage and display results. Nevertheless, companies are developing platforms for the sake of providing the next generation with medical devices to connect seamlessly to one another. This achieved by making these platforms act as enabling tools for the integration of devices with co-developed systems and through the promotion of the transmission of care beyond the hospital and doctor’s office to the consumer’s home. Such devices will offer services in many aspects including disease management.

Figure 1. Overweight and obesity in Adults. All figures are based on the IOTF criteria for defining overweight and obesity in children using age and gender-specific cut-offs equivalent to adult BMIs of >25 (overweight) and >30 (obesity) (The Oxford Health Alliance, 2010)
Multilogistic Regression by Product Units
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