Electronic Multi-User Randomized Circuit Training For Workout Motivation

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ABSTRACT

The Electronic Multi-User Randomized Circuit Training (EMURCT) system has been developed using pervasive computing concepts to address the issues of monotony and lose of motivation in routine circuit training workouts. EMURCT is implemented with 7 PDA's (used by 7 trainees using a 7 station circuit) and 1 desktop computer that aids in the synchronization of the PDA's (i.e. preventing trainees from using the same stations simultaneously). By randomly generating station sequences and round times for each trainee, EMURCT is capable of producing a totally different workout session every time. This has the potential of keeping trainees from getting bored while undertaking a circuit training workout regimen, which could lead to abandonment of training. This approach also supports the physical training concept known as muscle confusion, which some fitness experts believe greatly enhances the physical gains for trainees. Here the development of the EMURCT System is described, and the results of preliminary performance and robustness evaluations are presented.

Keywords: Context Awareness; Distributed Systems; Multimedia Applications; Mobile Technologies; Pervasive Computing; Smart Devices; Smart Spaces; Wearable Computing

INTRODUCTION

This research uses techniques in the field of pervasive computing to design a system that can potentially motivate a user to stick with a long term circuit training routine. This goal is very worthy in light of the national (and global)

problem with obesity and overweight that society faces (Lafontaine, 2008). A major contributing factor to this problem is our increasingly more sedentary lifestyles at home, school, and work (King, 1990). This lack of needed physical activity in a person's daily routine can be effectively combated by a regular physical training schedule (Lafontaine, 2008; Marcus & Forsyth, 2003). However, for many, starting and maintaining a regular workout schedule can be difficult, largely due to reasons based on monotony and boredom (Marcusand & Forsyth, 2003). Our proposed system utilizes mobile computing and wireless communications to potentially keep a trainee motivated to continue a circuit training workout plan over a long period of time.

Circuit training is a popular physical fitness technique in which users are required to traverse amongst various physical exercises, spending a designated amount of time at each one. A training circuit could consist of anything from aerobic exercises to strength exercises (Henry, Anshel, & Michael, 2006; Schnirring, 2005). When done properly and on a regular basis, circuit training can contribute to reversing the negative effects of a sedentary lifestyle, such as obesity and other diseases (Henry, Anshel, & Michael 2006). However, doing the same circuit training workout each time (i.e., exercises in the same order for the same durations) may become monotonous pretty quickly to someone just beginning a physical fitness plan

(King, Haskell, & DeBusk, 1990; Marcus & Forsyth, 2003). This could lead to abandonment of the fitness plan before any positive effects can be seen.

A long-term circuit training workout plan can possibly be made more interesting by varying parameters associated with it, such as resistance, time per exercise, and order of exercises (Henry, Anshel, and Michael, 2006; Marcus & Forsyth, 2003, & Marx et al, 2001). We propose Electronic Multi-User Randomized Circuit Training, or EMURCT (sounds like "immersed"), as a tool that prompts one or more trainees randomly through a circuit training workout. EMURCT also randomizes the time per exercise for each trainee. Therefore, no two workouts will ever be identical for any user of the system. An auxiliary benefit of such randomization is that it may promote *muscle confusion* to some degree. The idea behind muscle confusion is that a person's muscles should not be allowed to become accustomed to doing the exact same workout all the time. Many physical trainers believe that muscle confusion is good way of maximizing the benefits of working out (Marx et al, 2001.). The EMURCT system relies heavily on wearable computing and wireless technology to achieve user mobility which is greatly needed. The original EMURCT system was initially reported on by Graves (2007). This paper reports on a refinement of the original system and an evaluation of its performance and robustness.

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