Cardiac Rehab Audio Project Project Summary

February 7, 2011

Introduction

This document describes the hardware and software objectives for Arlington Memorial Hospital's Cardiac Rehabilitation Audio Project. It documents a recommended hardware configuration and initial user interface screenshots for the software.

This audio system is intended to improve on the existing Intervent system, which consists of portable audio players, headphones, and a selection of sixty-nine audio tracks that run from approximately six to twenty minutes in length.

In addition to an updated set of audio tracks and players, this system introduces an audio server capable of wirelessly monitoring and controlling the content delivered to the patients during their workouts.

Hardware Configuration

The audio system consists of a Windows PC, a wireless access point, and some number of iPod Touch portable media players. No Internet connectivity is required as the PC and iPods communicate over a private, secure Wi-Fi connection provided by the access point.

If the PC and iPods are in close proximity and the PC supports Wi-Fi, then it is likely no access point would be needed at all; the devices may connect using ad hoc wireless networking. Ad hoc networks allow wireless devices to discover and communicate in peer-to-peer fashion without involving central access points.

In either case, the wireless network is pre-configured by an administrator, and no knowledge of networking is required to use the system. No unauthorized devices are allowed to connect to the network, and no sensitive data is stored or transferred between the PC and the iPods.

Hardware – iPod Touch

Apple's iPod Touch is a portable media player and Wi-Fi mobile platform. It weighs just 3.56 ounces and provides up to 40 hours of audio playback before recharging. The iPod Touch also touts a high-definition 3.5 inch multi-touch display.

The iPod Touch is available in 8 GB, 32 GB, and 64 GB capacities, all of which are larger than what is currently needed for the Cardiac Rehab Center. The MSRP of the 8 GB model is $229.00 per unit and available for purchase from Apple's online store. These devices may be cheaper, however, if purchased from third-party vendors.

Countless accessories are available for the iPod Touch, and some accessories may be necessary for effective use. For example, new devices come with stock ear buds, but headsets may be more appropriate during rigorous workouts. In addition, arm or belt straps may be required to keep the headphone cables from interfering with the exercise machines and monitoring equipment.

Hardware – Windows PC

The hardware requirements for the Windows PC are minimal, and virtually any modern computer should be adequate for monitoring and controlling the audio content delivered through the iPods. The server software runs on systems installed with Windows XP, Windows Vista, and Windows 7.

Typically, notebook computers come with Wi-Fi included, but if the server is in the form of a desktop, then it must have an 802.11b/g Wi-Fi card installed. If this is not possible, then it must able to connect to a wireless router using an Ethernet cable. Furthermore, a desktop configuration must also include a screen, keyboard, and mouse in order to successfully operate the software.

Type	Minimum Requirement
Operating System	**Windows XP**
Processor	**800 MHz**
Memory	**256 MB**
Hard Disk Space	**4 GB**
Display	**1024x768**
Network	**802.11b/g Wi-Fi**

iPod ⬡ ❄   1:15 PM   🔋

Texas Health
Arlington Memorial Hospital

Device 501

Cardiac Rehab #1
Adding Strength Training

00:33   05:02

* All user interface screenshots are preliminary and may change in future revisions based on user feedback.
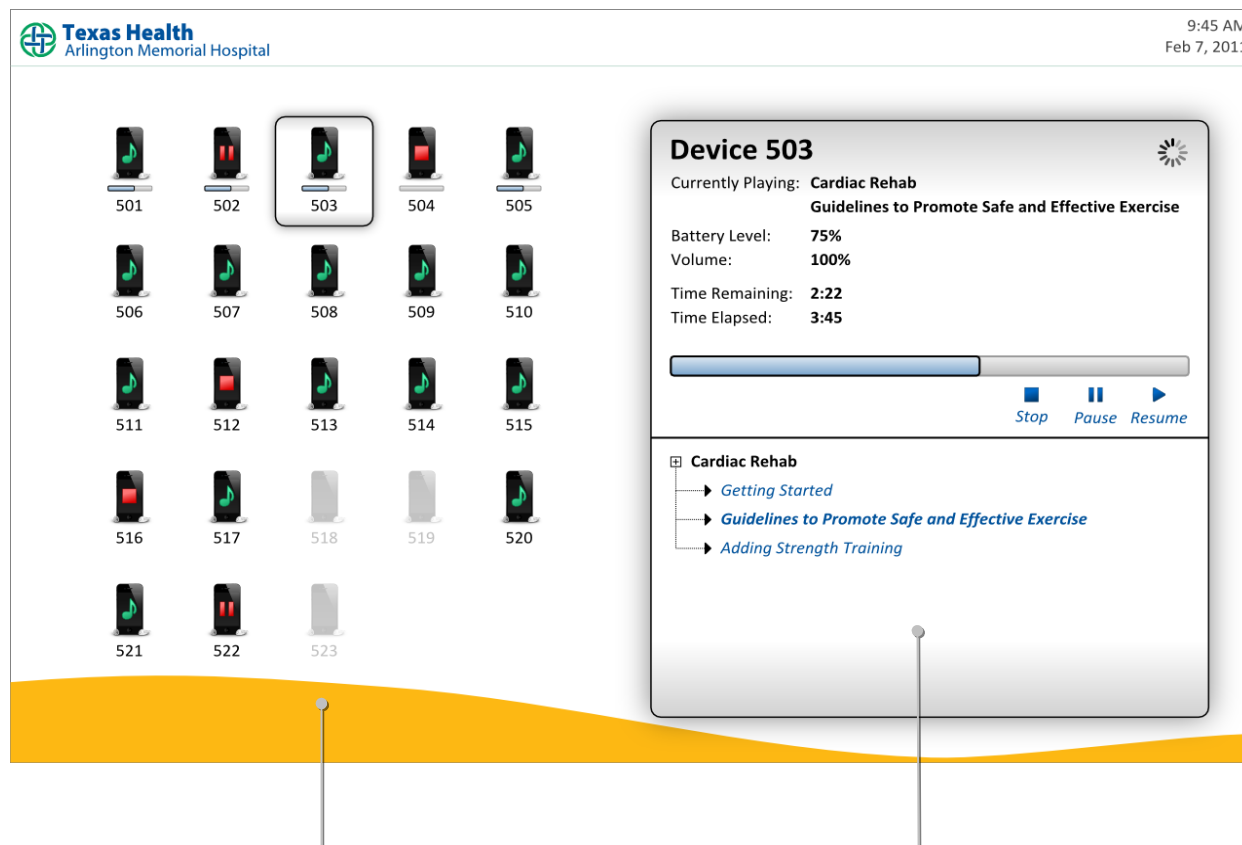
Software – iPod Touch

A custom application has been written for the iPod Touch. When it is launched, it connects to the Windows PC and then waits for the server to send commands such as *Play*, *Stop*, and *Pause*. It also responds to *Status* commands with indication of its current track, the length of that track, the current position in that track, and its current volume level.

The iPod application does not respond to any input from the user, and for the majority of the time, it displays nothing but a dark, blank screen. When the screen is activated, however, it displays read-only fields that describe the status of the device.*

If the wireless connection between the iPod and the Windows PC is dropped, the iPod does not stop playing but instead attempts to reconnect in a background process. In other words, the iPod continues to deliver content to the patient even in the event of a network failure.

Apple provides a software development kit that allows engineers to design and sell applications for iOS devices through their online store. Organizations may also choose an ad hoc distribution method that allows them to install proprietary application onto, at most, 100 devices. This ad hoc method is appropriate for the Cardiac Rehab Center. Apple charges $299 for this type of distribution.

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9:45 AM
Feb 7, 2011

501 502 503 504 505
506 507 508 509 510
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Device 503

Currently Playing: **Cardiac Rehab**
Guidelines to Promote Safe and Effective Exercise

Battery Level: **75%**
Volume: **100%**

Time Remaining: **2:22**
Time Elapsed: **3:45**

Stop   Pause   Resume

⊞ **Cardiac Rehab**
    ▶ *Getting Started*
    ▶ *Guidelines to Promote Safe and Effective Exercise*
    ▶ *Adding Strength Training*

DEVICE GRID

The **Device Grid** displays icons indicating the connection and playback state of the iPods. Clicking an icon shows details about that iPod in the Device Panel.

DEVICE PANEL

The **Device Panel** displays detailed information about the selected iPod such as the currently playing track, the remaining and elapsed time, and the battery and volume levels. Clicking a track name from the scrollable list will start playing audio.

Software – Windows PC

A custom application has been written for the Windows PC. When it is launched, it listens for incoming connections from iPod Touch devices. When an iPod establishes a connection, the server displays status for the device in its main window.

The software allows the user to select track lists or individual tracks to play on the iPod. The software also provides the ability to stop and pause playback. All operations execute immediately on the iPod.

The application provides the ability to install new audio tracks and configure track lists. When iPods connect to the server, this information, along with the audio data, is preloaded onto the iPod if it is not already present. This allows the iPod to play content for the patient even in the event of a network failure.

Project Volunteers

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Software Development