LiveWell RERC: Information and Communication Technology to Promote Safety and Independence

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Mission and Purpose

- To promote information and communication technology (ICT) access for all people regardless of ability
- To develop / validate ICT applications to improve the capacity for independent living and community participation
- Smart Home Stress Assist, Speak Up: An SPL Meter, and the Gaitbox to be presented
- Talk to the authors about collaborations

Smart Home Stress Assist

Background

- Military service members with traumatic brain injury (TBI) and post-traumatic stress disorder (PTSD) use evidence-based grounding strategies as an intervention to post-traumatic stress (PTS)
- Grounding: strategies designed to immediately connect a person with the present moment to avoid re-experiencing past trauma and pain. Often designed to redirect focus to environmental features, i.e. sound, lighting, smells, temp
- Individuals have trouble initiating strategies and setting up complex grounding interventions at time of stress

Solution

- Developed tool to facilitate grounding using Amazon Echo and smart home devices that:
  - Changes physical environment (lights, music, sounds, temperature)
  - Plays personalized recordings (e.g. favorite song or soothing family member)
  - Prompts deep breathing exercises
  - Contacts family/provider by text
  - Future: Log data for future analysis and symptom management

Speak Up: An SPL Meter

Background

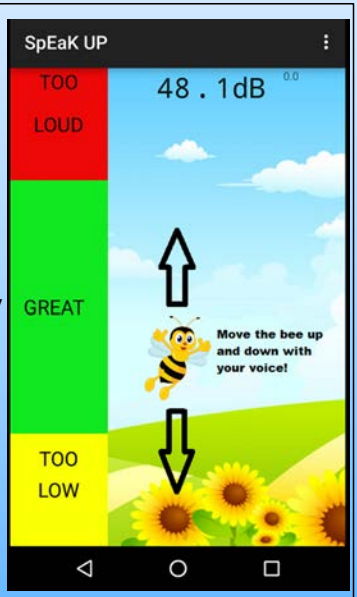
- Some children and adults with cognitive or sensory impairment have a hard time monitoring and moderating their speaking volume
- Speech pathologists use sound pressure level (SPL) meters as a tool to facilitate therapy
- Many children are uninterested in standard SPL meters and other apps are not designed for therapy and offer no 'kid-friendly' features

Solution

- Developed an Android app that monitors sound with device's built-in microphone & converts sounds into decibels to control an interactive image
- Speaking louder moves image upwards and speaking lower moves image down

Goal: to keep the image within the green color zone

- Zones set from configuration screen and are customizable
- App has bouncing ball image to make applicable to both children and adults



Screenshot depicting app's main feature screen

AVAILABLE ON GOOGLE PLAY

Walking Speed Monitor: the Gaitbox

Background

- Gait or walking speed is a strong predictor of functional status and survival amongst older adults
- Current measurement methods require either expensive equipment or a trained technician with a measuring tape
- Manual measurement techniques are prone to error between timers and trials

Gaitbox Device

Solution

- Low cost device that uses LIDAR sensor and a microcontroller to measure and display walking speed
- Speed is automatically displayed on an LCD screen and measuring distances are adjustable

Validation Testing

- 2 prospective validation studies comparing Gaitbox, stopwatch with human timer, and Sprint System (IR break beam) used simultaneously to measure gait speed – subjects completed 4 timed trials and were instructed to walk at a comfortable pace
  1) 30 healthy older adults completing 4 m walk test
  2) 44 SCI, MS, and otherwise healthy population completing 10 m walk test

Results

1) 0.980 & 2) 0.988 correlation between Gaitbox and Sprint system

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