Persuasive Technology for Suicide Prevention: A Virtual Human mHealth Application

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Abstract

We are demoing Battle Buddy, an mHealth application designed to support access to physical and mental wellness content as well as safety planning for U.S. military veterans. This virtual human interface will collect multimodal data through passive sensors native to popular wearables (e.g., Apple Watch) and deliver adaptive multimedia content specifically tailored to the user in the interdependent domains of physical, cognitive, and emotional health. Battle Buddy can deliver health interventions matched to the individual user via novel adaptive logic-based algorithms while employing various behavior change techniques (e.g., goal-setting, barrier identification, rewards, modeling, etc.). All interactions were specifically designed to engage and motivate by employing the persuasive strategies of (1) personalization, (2) self-monitoring, (3) tunneling, (4) suggestion, and (5) expertise.

Keywords

Virtual Human, Persuasive Technology, mHealth, Suicide.

1. Introduction

Despite accounting for just 7.9% of the population, Veterans account for 13.5% of all suicide deaths in the United States [1]. Emerging mobile health (mHealth) technologies, specifically mHealth applications (apps) designed to support mental health, are considered promising tools for overcoming stigma and engaging service members in their own care [12]. Battle Buddy responds to this call to action by leveraging a Virtual Human concierge that increases engagement through persuasive strategies that drive behavior change and break down barriers to care by successfully working safety plans and ensuring that no user needs to navigate their most difficult moments alone. Early signs indicate that virtual humans can provide benefits over human to human interaction related to impression management and reduced perceived bias [2,9].

2. System Overview

This mHealth application has a primary focus on the iPhone and is an extension of a previous virtual human mHealth application [8,7,10,11]. Given the initial focus on iPhones and the tight iOS integration, the primary wearable target device is the Apple Watch, which offers a rich multimodal set of sensors. Data will be read directly from the iOS HealthKit API and is processed using our custom application software. This allows us to support any hardware device able to write data to HealthKit, including FitBit and Garmin devices. Battle Buddy is a Unity application developed using a custom version of the Virtual Human Toolkit [6, 3,4] and RIDE [5], a rapid prototyping middleware for AI-driven simulations. The VHToolkit incorporates and enables automatic audio-visual sensing, speech recognition, natural language processing, nonverbal behavior generation, nonverbal behavior realization, text-to-speech generation, and rendering,

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features which will be added to Battle Buddy through user-centered design processes. Data is leveraged to enable the decision-making algorithms and intervention manager.
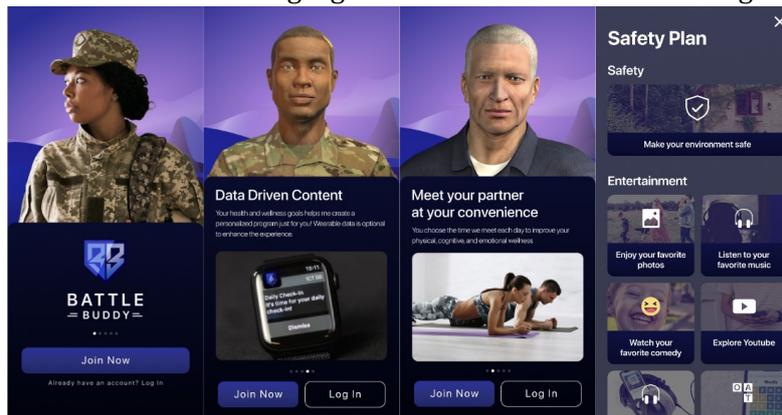

Figure 1: Screenshots of the Battle Buddy App.

A subset of the data will be analyzed and evaluated on the client devices to provide users with real-time and actionable feedback (e.g., daily progress towards personal fitness goals, questionnaire results, etc.); the remainder of the data (e.g., UI interaction data, recorded user voice audio) will be collected and post-processed on the server. A user-centered iterative design process was used in the development of this application, leveraging findings of empirical reviews of effective behavior change techniques employed in mobile health apps [6]. In particular, the persuasive strategies of (1) personalization (e.g., creating a customized safety plan, (2) self-monitoring (e.g., mood tracking), (3) tunneling (e.g., guided breathing exercise), (4) suggestion (e.g., app initiated pushes/prompts), and (5) expertise (e.g., quick connection to suicide hotline).

Acknowledgements

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