Above: StepKinnection trial participant Doreen Garrick

Right: UTS researchers Karla Felix Navarro and Jaime Garcia

New technologies and applications in the works

Stepping up to FALLS PREVENTION

Technology researchers and developers are testing a clinically-based interactive video game for seniors to reduce risk of falls, reports **Natasha Egan**.

Sydneysider Constance Mary Willson, 83, is on a worldwide quest. It is akin to a *Raiders of the Lost Ark*-style crusade in appearance, sound and style. But unlike Indiana Jones and his search for ancient artefacts, Willson is collecting fruit. However, her real goal is to play her way back to the dance floor.

Wilson, who lives at Anglican Retirement Village's Goodwin Village in Woollahra, wants to improve her fitness following double-knee surgery. "I am hoping to achieve good balance and the ability to go ballroom dancing again," she tells *AAA Technology Review*.

She is playing StepKinnection, an interactive video game designed by University of Technology Sydney (UTS) PhD student Jaime Garcia. The game is part of his PhD project and is undergoing home-based trials with volunteers such as Wilson.

The objective of the game is to reduce the risk of falls among seniors, says Dr Karla Felix Navarro, an IT lecturer and researcher at UTS and Garcia's PhD supervisor. She and her team are from UTS's mHealth lab, which focuses on using technology to solve health problems.

While falls are a major cause of death and hospitalisations among over-65s, Garcia says the evidence shows they can be prevented or reduced through exercise. "A problem with a lot of exercises is they involve repeating tasks over and over again and that's boring. So motivation levels are really low."

StepKinnection aims to increase motivation via the fun factor of a game designed specifically for over-65s, he says.

The researchers held focus groups with experts in ageing and followed user-centred design practices to make the game suitable for the target audience. They then ran trials with participants from Mirrabooka Village, a Benevolent Society operated retirement village in Little Bay, testing the game and making changes based on feedback.

A CLINICAL BASE

The current version combines a clinical test to assess a player's risk of falls with prescribed stepping exercises that reduce their risk. Game and clinical aspects are measured throughout play.

The player is guided through a series of stepping exercises that increase in length and difficulty in line with their progress.

Felix Navarro says the clinical assessment aspect of the game is an important, and, as far as they know, unique feature.

"Gaming can be perceived as something fun but a waste of time. This is about improving the lives of the seniors community by bringing them newer technologies and, in this case, we are hooking them with the entertainment side of it," she says.

The UTS team has been collaborating with the falls prevention team at Neuroscience Australia (NeuRA) and the University of New South Wales to incorporate the clinical aspects. "We are IT researchers. We are more on the technology side and we thought we needed expertise in the clinical and medical sides and have been working with them from the start of the study. They have been great, we complement each other very well," Felix Navarro says.

TECH SPECS

The main tool is Kinect, an off-the-shelf device from Microsoft, which is connected to a TV and controlled by a computer.

"The Kinect has an infra-red sensor that can retrieve spatial information of the player's joints. That means we can track the person's movements and translate them into the game to animate the game objects," says Garcia. "We like Kinect because you don't have to wear any sensors, attach anything to the person or press any buttons. It is just pointing and stepping. It is really intuitive."

This also removes tripping hazards associated with game accessories such as dance mats or balance boards.

Data is collected, transmitted over the internet and stored in the cloud. The tool also includes an interface for a clinician to see a player's progress.

Felix Navarro adds that the off-the-shelf device is cheap and readily available, which plays a big role in how many people can benefit from it.

Eighty-year-old Doreen Garrick, who is also from Goodwin Village, says she is taking part in the research to benefit other older people as much as herself. Garrick says her balance is already fairly good but hopes playing the game will improve it further. "It would mean not having the worry of falling or the fear of falling." TR