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## UC Merced developing avatar care for aging baby boomers

By Heather Somerville / The Fresno Bee

Monday, Oct. 24, 2011 | 10:19 PM

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MERCED -- In a dark room lit only by the razor-thin beams of infrared cameras, University of California at Merced graduate student Carlo Camporesi spends most days -- and many nights -- in the company of avatars.

This isn't the next big sci-fi movie in the making or the latest Nintendo Wii video game. Camporesi is part of a research team working to solve a very real problem -- how to overcome an expected shortage of physical therapists who will work with aging baby boomers.

UC Merced received a \$75,000 grant through the UC system for five graduate students to begin creating a software program this year that uses avatars to provide physical therapy to the elderly.

Professors say the project has the potential to improve the health of thousands of people. It offers a blueprint for future projects that college administrators hope will bolster UC Merced's reputation as a research institution and help it compete better for its share of the dwindling supply of federal research dollars.

There isn't much budget talk in the cramped room where Camporesi works, immersed in a world that teeters between fantasy and reality. Camporesi positions himself in front of a 3-D, floor-to-ceiling projection screen -- researchers call it a "powerwall" -- wearing sensors so the infrared cameras can track his every movement.



CRAIG KOHLRUSS / THE FRESNO BEE

University of California at Merced graduate student Carlo Camporesi is silhouetted on a large 3-D screen as he talks about how he can use it to have animated avatars shadow his own movements. The technology could help reach more patients with medical care at less cost.

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On the screen, an avatar stands in a virtual reality kitchen. Each time Camporesi moves, so does the avatar. He's training the avatars to mimic people so perfectly that, on a computer or TV screen, they could be mistaken as human.

Suddenly, the avatar's right hand bends at a precipitous angle. The sensor strapped to Camporesi's hand had fallen off.

Camporesi and fellow computer graphics and animation doctoral student David Huang chuckle. This is still a work in progress, they say.

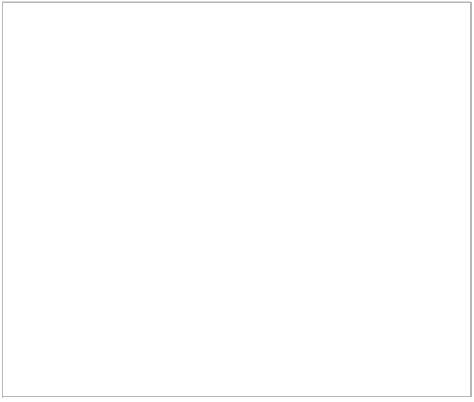
But give them three to five years, and the students say they could have the next breakthrough in delivering health care through wireless technology.

Imagine this: A patient with a shoulder injury stands in front of a computer or TV screen, where an avatar is performing an exercise.

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The patient mimics the exercise, and the avatar lets him know when and how to adjust his shoulder. (That's why the avatars must have natural, humanlike movements.)

The idea germinated with UC Davis associate professor Dr. Jay Han, an expert in physical medicine and rehabilitation, and UC Merced computer science associate professor Marcelo Kallmann.

Han asked Kallmann for help finding a virtual way to deliver health care into the homes of aging baby boomers, whose demand for care is expected to outstrip the supply of doctors and other health-care providers.

In addition, many elderly patients have difficulty getting to the doctor. Transportation may be unavailable or too expensive, Han said, and home visits drain hospital resources. The avatar program would eliminate these challenges for some patients.

Han said there are a couple of possible drawbacks to the avatar program: security concerns about sending patient information over Internet video, and the lack of personal interaction between patient and doctor.

"It's not flesh to flesh," Han said.

UC Davis Medical School is partnering on the program, and doctors there will help develop therapy exercises over the next couple years. Students hope to renew the grant, which is through the Center for Information Technology Research in the Interest of Society, a collaboration between four UC campuses, to pay for a few more years of work on the avatars.

The cross-campus collaboration was key to funding the project -- a challenging feat these days. As the newest UC campus, Merced doesn't have the track record in research that Davis does, which is important when applying for competitive federal grants.

The college also has a lot of young, new faculty with limited experience writing research grants, said Sam Traina, vice chancellor for research and dean of the graduate division at UC Merced.

Traina said the avatar program is an example of how professors are focusing on research that has the potential to help a large number of people. "You have to be able to elaborate on why this is important to society at large to get funding," he said.

So far, the approach has worked. In addition to the UC research grant, UC Merced has received about \$763,000 from the National Science Foundation for the powerwall project. Both grants expire next summer, and UC Merced will need more money to continue its work.

That could be difficult. Federal research funding has declined steadily in recent years -- UC Merced has lost 24% of its funding since 2009, a result of the struggling economy and more competition among colleges. If government funding dries up, Traina said, Merced will find another way to pay for the avatar program.

"The economic state of the country makes it difficult," he said. "You can be concerned, but you also can't be Chicken Little and say the world's going to end. The public expects more out of universities."

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