

Adaptable software, tools aim to help rheumatoid arthritis patients

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UT Arlington researchers are creating individualized, patient-centered rehabilitation software systems that will promote and support physical therapy for people with rheumatoid arthritis.

Fillia Makedon, Jenkins Garrett distinguished professor and chair of the Computer Science and Engineering Department is leading a cross-disciplinary team that will use [remote monitoring](#) of people with rheumatoid arthritis to increase compliance and proper physical therapy. The work is funded by a National Science Foundation grant.

The rehabilitation system collects and analyzes the person's physiological and cognitive data while engaged in an interactive game-like structured activity that is part of rehabilitation.

The monitoring systems will examine arm and [body motions](#), the patient's range of motions, gestures, [facial expressions](#) and even [brain activity](#) to help the team develop interactive games that adapt to the individual. The system uses a library of game-like interface systems that simulate the doctor's prescribed regimen and can be used for diagnosis, progress assessment and encouragement to follow the doctor's prescribed regimen, while ensuring safety of motion. Heng Huang, associate professor of Computer Science and Engineering, and Vangelis Metsis, a research associate of Computer Science and Engineering, are [co-principal investigators](#) on the project.

"We want to assist [physical therapists](#), not replace them, in determining

more accurately and over time where patients are in their physical therapy," Makedon said. "We know that physical therapy leads to better lives for persons with RA. We just cannot pinpoint all the time where these people with rheumatoid arthritis are in their physical therapy regimen.

"Our system 'learns' with time how to do that and personalizes the [game software](#) to ensure safety during physical therapy."

The system also can be used to train rehabilitation professionals as well as provide direct feedback to the patient. As a patient's [physical ability](#) changes over the course of the disease, the system adapts as well and informs the therapist. It also gives valuable information on the impact of medications prescribed.

"What worked in the past for a person with rheumatoid arthritis might not work now," Makedon said. "You still need a physical therapist. But our software will provide them with better information for the patient."

About 1.3 million people in the United States suffer from rheumatoid arthritis, according to the Arthritis Foundation. It is one of the most common and serious forms of arthritis. It is a chronic disease, mainly characterized by inflammation of the lining, or synovium, of the joints. Arthritis can lead to long-term joint damage, resulting in chronic pain, loss of function and disability.

Jean-Pierre Bardet, dean of the UT Arlington College of Engineering, said using software in this way helps guide healthcare decisions that improve peoples' lives.

"It's the best kind of computer technology, tools and interfaces that can help the [rheumatoid arthritis](#) patient remain motivated and maintain movement, which helps their overall quality of life," Bardet said.

Provided by University of Texas at Arlington

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