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UCF researcher developing computer program to detect, measure brain tumors

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The same techniques used to detect suspicious activity in airports, stadiums and other public places are now being used by the UCF researcher who invented them to find and measure potentially life-threatening brain tumors.

Mubarak Shah, UCF's Agere Chair professor of Computer Science and one of the world's most eminent researchers in the rapidly developing field of computer imaging, has received $400,000 from the National Institutes of Health to develop a computer program to analyze brain scans produced by magnetic resonance imaging (MRI.)

The two-year grant is the first UCF has received from money allocated by the American Recovery and Reinvestment Act stimulus program. The funding will enable Shah and his collaborators -- Dr. Nicholas Avgeropoulos, a neuro-oncologist with Orlando Health System, and Dr. David Rippe, a neuroradiologist with Sunshine Radiology at Florida Hospital Zephyrhills -- to work together on the complex task of automatically measuring and comparing the size of a tumor in 3D from MRI scans.

Nearly a decade ago, Shah approached Rippe, who at that time was chairman of the radiology department at Florida Hospital Orlando, looking for ways to use computer technology to help those in the medical profession.

The alliance was "a natural fit," Rippe said.

"Radiologists use computers to look at scans, but this is taking the next step -- allowing computers to help radiologists analyze the pictures and enabling an automated method to calculate the size of tumors," he said.

Radiologists are typically hindered in their analyses by a variety of factors, such as tumors that are irregular in shape or have jagged edges, tumors with liquefied centers, or surrounding tissue that is deformed or changing shape.

"Not only are the changes visually hard to see, we also want numbers to quantify the types of changes we are talking about," Rippe said. Those numbers help determine whether a particular treatment plan such as radiation or chemotherapy is working.

Automated analysis of a small data set using Shah's preliminary method has been shown to be up to 90 percent accurate compared to the analyses provided by the radiologists.

Shah said some of the challenges include making sure the typically low-resolution scans can be converted to the high-resolution images needed for computers to precisely measure tumors. He also must perform extensive experiments with a large data set to validate his method. He has partnered with a UCF biostatistician, Xiaogang Su, to ensure that the measurements are statistically correct.

Shah's work has typically focused on analyzing images for signs of suspicious or dangerous behaviors or threats. While at UCF, he has received more than $7.5 million in funding for projects ranging from visual monitoring of railroad grade crossings for the Department of Transportation to automatic classification and analysis of reconnaissance videos for the Department of the Interior.

Source: University of Central Florida