Publication: Vancouver Sun; Date: Nov 6, 2006; Section: Front Page; Page: 1

Virtual worms crawl through 3-D medical images to aid analysis

Simon Fraser University-created technology gives medical researchers a peek inside patients

BY WENCY LEUNG
VANCOUVER SUN

Computer scientists at Simon Fraser University have created virtual worms that crawl through medical images of blood vessels, air passages and spinal cords, offering medical researchers a non-invasive and detailed peek inside their patients.

Assistant professor Ghassan Hamarneh and graduate student Chris McIntosh developed the "3-D crawlers" to help medical researchers analyse three-dimensional images taken using computer-aided tomography, or CAT, scans and magnetic resonance imaging, or MRIs.

On a computer screen, the virtual worms can navigate the images, allowing clinicians to follow their journey through tubular structures like blood vessels and spinal cords.

"The idea is that we wanted to create something that would be intuitive to the doctors," Hamarneh said. "These virtual crawlers, they are put inside these 3-D worlds and you can imagine they are sensing the world around them."

The technology is somewhat similar to that used in interactive games, but Hamarneh and McIntosh are among the first to create artificial life for medical applications.

Chris McIntosh (left) and Ghassan Hamarneh (right) have developed virtual '3-D crawlers.'

Their worms can virtually "feel" different types of tissue in the body, according to the colours or light

See **RESEARCHERS ARE** A2

Publication: Vancouver Sun; Date: Nov 6, 2006; Section: News; Page: 2

Researchers are able to see what crawlers see

From A1

intensity of areas on the image, and they are able to map out complicated networks of vascular structures.

Medical researchers can load an image onto their computer and with the click of a mouse, insert a 3-D crawler to explore the blood vessels.

As it moves, the crawler can allow researchers to see what it sees. It provides information about the radius of the passageway it's in, showing where a vessel narrows or where it branches.

In places where a vessel splits in two, the crawler creates "children" to continue exploring both branches.

Once it's done, researchers can get a detailed view of the entire vasculature.

The ability to virtually explore such structures could be used in the future to help doctors identify cancerous growths, aneurysms and various diseases, McIntosh said.

"A lot of recent research has shown that everything from the common cold to cancer affects blood vessels in your body," he said.

For instance, he said, areas where blood vessels bend frequently can indicate the development of a tumour.

For now, the computer scientists' work focuses on developing the 3D crawlers for research rather than diagnostic applications.

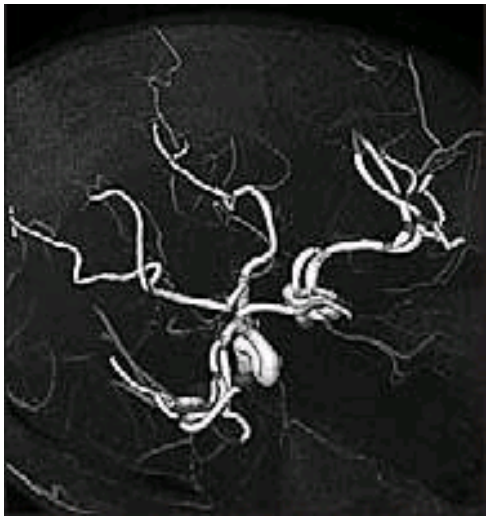
But their vision is to eventually allow doctors to use them in clinical practice.

Among other uses, they could help doctors determine where to place stents, McIntosh said.

Hamarneh and McIntosh are currently testing crawlers that explore spinal cords for use in multiple sclerosis research at Vancouver General Hospital.

So far, the results are positive, Hamarneh said. "It's got many doctors excited."

wleung@png.canwest.com



This image shows a 3-D crawler's journey through blood vessels in a brain.