

From stick figures to artificial intelligence

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Like a lot of guys his age, Brian Tanner used to be glued to a computer while he was junior-high student in Winnipeg. He especially liked to tinker around with some software that allowed him to manipulate little stick figures and create crude animations.

Today, Tanner, 27, is a computer scientist working toward his PhD at the University of Alberta in the area of artificial intelligence and, more specifically, in the area of reinforcement learning.

You might say that one small step by a crude, computer-generated stick figure was the inspiration that set Tanner on a quest to make one giant leap for mankind.

Much of the work being done in artificial intelligence is fragmented, focusing on practical applications for a specific use, says Tanner. For example, when a customer orders an item on an e-commerce site, an AI component that has been designed for the purpose generates an instant list of other, similar items that the customer might be interested in purchasing.

Tanner is taking a different approach. He is working at a highly abstract, theoretical level to come up with a mathematical model that will enable a computer to learn how to make its own decisions. His goal is to make such a model a template for all AI applications.

"I want to make computers smarter," he said. "The more a computer can make its own decisions, the more it 'learns.' The more it learns, the more

powerful a tool it becomes and the more it can be used for real-life problems."

In addition to being recognized as a 2007 Honorary Izaak Walton Killam Memorial Scholar for his work, Tanner has also been awarded the Dorothy J. Killam Memorial Graduate Prize as the most outstanding Killam recipient in the areas of Engineering, Mathematics and Physical Sciences.

Killam prizes are awarded to outstanding graduate and post-graduate students. In all, 19 U of A students were recognized as honorary Killam scholars at a gala Wednesday night and nine received Izaak Walton Killam Memorial Scholarships. The Honorary Scholarships are awarded to extraordinary scholars who receive significant income from another major award. Killam Memorial Scholarships are awarded for two years and include a stipend of \$27,000 per year.

Electrical engineering student Meghna Singh was among the latter group to win the prestigious Killam prize.

Singh is working to create a new diagnostic tool for doctors - a four-dimensional MRI, with the fourth dimension being time.

First, X-rays allowed doctors to find fractures in their patients' bones. Then MRIs allowed diagnosticians to look at a three-dimensional image of body structures. Singh has come up with a way to make MRIs capture how a body structure is functioning or moving.

In the application Singh has been working on, the MRI image she is developing shows how the tongue, soft palate, muscles and bony structures are working together while a person swallows. She creates this live-action image by superimposing several MRI images. She has already proven it can be done and is now perfecting the process.

"Someday I'd like to give doctors a diagnostic or teaching tool where in a virtual world they could do a procedure ahead of time and see what happens, with real patient data."

Singh came to the U of A as an international student from India. She has since become a permanent resident and has decided to stay in Edmonton.

Prizes such as the U of A Killam awards program both attract and reward such scholars who are doing important work for the betterment of all.

Source: University of Alberta

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