Saving virtual lives with nanobots goal of UH-led project

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Building and controlling a team of nanobots to seek and destroy infected tissue within a simulated terminally ill patient, a University of Houston computer science student and his teammate have advanced to the 2005 Microsoft Imagine Cup world semifinals.

With two consecutive wins so far, Jonathan Dowdall, a UH graduate student, and Mike Hall, his collaborator, have advanced to round three of four in the visual gaming category with their Team ContAInment, the "AI" capitalized to represent artificial intelligence. An annual competition, the Microsoft Imagine Cup challenges participants to excel in one of nine IT-related categories and is designed to recognize students who demonstrate excellence in a diverse range of technical and artistic pursuits. According to Microsoft, entries are expected to address the competition theme to "imagine a world where technology dissolves the boundaries between us."

Out of about 2,000 participants in the world qualifying round March 15, Dowdall and Hall tied with eight others for first place, with Team ContAInment being the only U.S. team in that top group. In the national elimination round April 15, they were the top-scoring team in their division. Now, advancing to the third of four rounds, they will compete in the world semifinals May 15. The first two rounds of competition took place online, as will the third, which will narrow the playing field to six teams that will travel to Japan July 27 to compete in the world finals for a grand prize of $8,000.

As visual gaming participants, Team ContAInment had to write an algorithm to build and control a team of nanobots within the simulated human body of a terminally ill patient. The nanobots are injected into the blood stream to locate and collect infected tissue. While attempting to deliver medicine to these sites, the nanobots are attacked by white blood cells in the patient's immune system. For each round of competition, Microsoft adds another challenge, such as a virus that attacks the nanobots.

"The visual gaming challenge is actually a logistics problem that you are solving, and path planning is a big part of it," Dowdall said. "The strategy involves a collaborative multi-agent programming system of nanobots, and you must give them intelligence √ the algorithm √ so they know how to react in their environment."

To put it very simply, a computer program written by Team ContAInment tells the nanobots to move up, down, left or right or to follow any other variety of instructions in reaction to what they encounter in the simulated environment.

As head software developer for Associate Professor Ioannis Pavlidis' Computational Physiology Laboratory at UH, Dowdall is well prepared for this challenge. Pavlidis has gained a reputation for his work in medical imaging, bioinformatics, robotics, computational biomedicine and biometrics that have various medical applications. Being part of this research group has given Dowdall a solid background in applying computer science to medicine.

"Projects like this where students are given an opportunity to harness their imaginations often provide the type of forum where ideas are born," said John Bear, dean of the UH College of Natural Sciences and Mathematics. "It's great to see ingenuity of this caliber receiving worldwide recognition."

Source: University of Houston