UTD Establishes Motion Capture And Virtual Reality Laboratory

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An interdisciplinary Motion Capture and Virtual Reality Laboratory for the digital recording of motion in 3-D spaces and creating virtual-reality environments has been established at The University of Texas at Dallas (UTD). Expected to open late next month, it will be one of only a handful of facilities in the country to employ cutting-edge technologies to facilitate the study of human movement, which could spur advances in many disparate fields, including entertainment, education, military, medicine and numerous other research areas.

A collaboration of UTD's School of Arts and Humanities and the Erik Jonsson School of Engineering and Computer Science, the state-of-the-art lab was funded by monies made available to UTD through a much-publicized economic-development agreement involving Texas Instruments, the State of Texas and the University of Texas System. Under the agreement, code-named "Project Emmitt," the university is scheduled to receive an infusion of as much as $300 million in public and private funds to beef up its engineering and computer science programs.

The lab will be housed in UTD's Institute for Interactive Arts and Technology and will be co-directed by Dr. Thomas Linehan, head of the institute and a professor of aesthetic studies, and Dr. Balakrishnan Prabhakaran, an associate professor of computer science in the Jonsson School. The lab will be devoted to research in such areas as:

-- Animated gaming

-- Military — including technical training scenarios and homeland defense
-- Motion pictures — special effects and animation
-- Medical — including biomedical research, prostheses, spinal cord injuries, bio mechanisms , mathematical models of human movement and perception and mathematical models of four-legged animal and human gaits
-- Education — human facial recognition technologies

Motion capture technology typically is carried out by multiple cameras positioned throughout a lab that track so-called “markers” or reflectors placed on the bodies of live subjects. Data derived from tracking the movement of the markers are used to help create more realistic computer images of humans and even animals. Animators, and particularly video game developers, rely on motion capture research because it can produce highly accurate and realistic movement results in a short amount of time.

UTD’s facility will feature 16 cameras, including the VICON MX40, and its system will capture the movement of up to five actors interacting in a blue-walled performance area. The multiple cameras allow for simultaneous recording and video, which will match data frame-by-frame. The cameras will be able:

-- To capture a subject from three sides (and full rotations in most cases)
-- To capture facial and hand markers for front or side view animations
-- To provide complete angular coverage of a subject
-- To handle multiple actors and track props

According to Linehan, the system will use the fastest active-optical, real-time 3-D technology currently available and will offer a high accuracy, wide-angle operation, scalability and ease-of-use. The system’s software package has a friendly graphic user interface, the operation of which

should be understandable to anyone familiar with Windows.

“The technology and equipment that make up this new facility are some of the best available in the world,” Linehan said. “I look forward to the opportunities the lab will bring to UTD, particularly for the students who will learn here and who will move on to become the great filmmakers, researchers, educators and military leaders of their generations. The possibility of creating a world-class arts and technology program from the ground up has been an exciting endeavor for me, and it is amazing to see it finally come to fruition.”

“This facility provides a unique opportunity for collaboration — the perfect marriage of engineering and computer science with the arts,” said Dr. Robert Helms, dean of the Jonsson School. “The applications of the lab are endless, and its very creation is another giant leap for UTD toward its goal of becoming a top-tier research university.”

Linehan, who joined UTD in 2002, has a background in corporate management and educational administration and has extensive experience in computer game design and animation. He served as creator and director of the Research Partners program at The Ohio State University and established and directed graduate programs in computer animation at Ohio State’s Advanced Computing Center for Arts and Design. He was president of The Ringling School of Art and Design in Sarasota, Fla., where he helped create an undergraduate curriculum in computer animation, and he also worked with Texas A&M University to establish the College of Architecture’s Visualization Laboratory. He served as a consultant in the development of similar programs in The Netherlands, Germany, New Zealand and Canada.

Source: University of Texas at Dallas