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Research Statement

Computer Graphics, 3D Games, Virtual Environments, HCI, Wearable Computing, and Complex Systems research has always been highly stimulating, satisfying and motivating for me. My overall experience has been extremely rewarding. Crossover-applications have been the focus of my efforts, as this research area provides an opportunity for developing new applications for the Blind and the Visually Impaired, and the motor-disabled. In addition, my goal is to continue to concentrate in the area of 3D Games, animation, movie making, wearable computing and its diverse applications for all aspects of human computer interaction, medical applications, disability applications, and embedded wearable systems. I would like to continue expanding my efforts in the area of generative virtual environments, the study of dynamic patterns and their relationship to complex systems, applications of wearable and augmented reality for disability, aging and personal computing such as iPhones.   Writing grant proposals will also remain my focus, and I would continue to seek funding through proposal writing to national agencies, and industry.   I also plan to continue submitting research papers with my students to National and International refereed conferences and journals. I have generated, and continue to maintain contacts with local industry. I believe that one of the major problems in the area of interactive medical visualization is visualizing large amount of visible human data in real-time, thus providing new opportunities in the area of wearable Computing, social computing, and *Complexity* systems applications as GPU Computing continues to mature. This area will continue to be a focus of my research in future.

Overall, I have published about 89 papers in refereed journals, and conferences in my area of expertise.

Crossover Applications

This research started in 2009 with my demonstration paper in IEEE VR 2009 conference. Since then I have created several 3D games for the Blind and Visually Impaired, and motor disabled. Recently I have guided research in creating specific crossover applications interfaces for managing cloud environment. One of my recent results has shown that there is no statistically significant difference between the B/VI group and the non-disabled group using our interfaces to manage clouds. Our new model of accommodating specific APIs is called crossover user interface model [4-6, 15, 16].   In my work, we showed that haptic device would be useful for building novel cognitive maps and interaction for the B/VI Community [51]. I have guided development of several 3D games [3, 7, 12-14], mobile applications [8], and multi-sensory virtual environments [9], for both the sighted and the B/VI Community, hence the name crossover applications.

Large Virtual Environment Research using Game platforms

As a program coordinator for MS Computer Science GMI program (Games and Media Integration) MS program, I am very interested in long-term effects on retention and learning in collaborative large virtual and augmented environments. My work was supported by the Denver Museum of Nature and Science (DMNS) and remains an attractive venue for us to explore research.

PRESS/INTERNET/NEWSPAPER COVERAGE

Research on Mobility Maps training for the Visually Impaired and the Blind, Gazette, Colorado Springs, May 18, 2000, http://www.highbeam.com/doc/1P2-5950104.html

Crossover Applications Conference, May 15, 2010 Coverage: Communique UCCS, June 16, 2010, http://communique.uccs.edu/?p=1193

CoView Data Labs UCCS Initiative aims to Engineer Funds: November 19, 2011: http://www.gazette.com/articles/initiative-128785-jobs-colorado.html

CoView Data Lab mentioned in Tech News: http://www.technologytransfertactics.com/content/2011/11/23/uccs-initiative-aims-to-engineer-funds-businesses-jobs/

Free/donation based game download for the B/VI Community designed by my GMI student Li Ping. (http://www.cs.uccs.edu/~ssemwal/poker_game_description.pdf).