KEYNOTE TALK Tuesday, November 27, 2007 9AM-10AM

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Attention and Visual Search: Active Robotic Systems that Visually Search

John K. Tsotsos Dept. of Computer Science & Engineering, and Centre for Vision Research York University

Abstract

Visual attention is a multi-faceted phenomenon, playing different roles in different situations and for different processing mechanisms. Regardless, attention is a mechanism that optimizes the search processes inherent in vision. This perspective leads to a sound theoretical foundation for studies of attention in both machine and in the brain. The development of this foundation and the many ways in which attentive processes manifest themselves will be overviewed. One particular example of a practical robotic vision system that employs some of these attentive processes will be described. A difficult problem for robotic vision systems is visual search for a given target in an arbitrary 3D space. A solution to this problem will be described that optimizes the probability of finding the target given a fixed cost limit in terms of total number of robotic actions the robot requires to find its visual target. A robotic realization will be shown.



Speaker Bio-Sketch: Tsotsos is currently Professor in the Department of Computer Science and Engineering at York University, Toronto, Canada. He holds the NSERC Tier I Canada Research Chair in Computational Vision and is an Adjunct Professor in Ophthalmology at the University of Toronto. He served as Director for York's Centre for Vision Research from January 2000 until November 2006. He received an undergraduate degree in Engineering Science in 1974 from the University of Toronto and continued at the University of Toronto to complete a Master's degree in 1976 and a Ph.D. in 1980 both in Computer Science. Among his awards are a 1981 Canadian Heart Foundation Research Scholarship, two consecutive Fellowships in the Artificial Intelligence and Robotics Program of the Canadian Institute for Advanced Research in 1985 and 1990, the 1997 CITO

Innovation Award for Leadership in Product Development, the 2006 Research Excellence Award from the Canadian Image Processing and Pattern Recognition Society and several best paper citations. He has served on numerous conference committees and on the editorial boards of Image & Vision Computing Journal, Computer Vision and Image Understanding, Computational Intelligence and Artificial Intelligence in Medicine. He served as the General Chair for the IEEE International Conference on Computer Vision 1999. His current research focuses on a theory of visual attention in humans and primates and the practical application of this work in the development of PLAYBOT, a visually-guided robot to assist physically disabled children in play.