Rigorous computer image analysis in the study of fine art

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4/11/2018 at 02:00 pm
CoRE Auditorium(101)

Abstract

New rigorous computer algorithms have been used to shed light on a number of recent controversies in the study of art. For example, illumination estimation and shape-from-shading methods developed for robot vision and digital photograph forensics can reveal the accuracy and the working methods of masters such as Jan van Eyck and Caravaggio. Computer box-counting methods for estimating fractal dimension have been used in authentication studies of paintings attributed to Jackson Pollock. Computer wavelet analysis has been used for attribution of the contributors in Perugino's Holy Family and works of Vincent van Gogh. Computer methods can dewarp the images depicted in convex mirrors depicted in famous paintings such as Jan van Eyck's Arnolfini portrait to reveal new views into artists' studios and shed light on their working methods. New principled, rigorous methods for estimating perspective transformations outperform traditional and ad hoc methods and yield new insights into the working methods of Renaissance masters. Sophisticated computer graphics recreations of tableaus allow us to explore "what if" scenarios, and reveal the lighting and working methods of masters such as Caravaggio.

How do these computer methods work? What can computers reveal about images that even the best-trained connoisseurs, art historians and artist cannot? How much more powerful and revealing will these methods become? In short, how is the "hard humanities" field of computer image analysis of art changing our understanding of paintings and drawings? This profusely illustrate lecture for scholars interested in computer vision, pattern recognition and image analysis will include works by Jackson Pollock, Vincent van Gogh, Jan van Eyck, Hans Memling, Lorenzo Lotto, and several others. You may never see paintings the same way again. Joint work with Antonio Criminisi, Andrey DelPozo, David Donoho, Marco Duarte, Micah Kimo Johnson, Dave Kale, Ashutosh Kulkarni, M. Dirk Robinson, Silvio Savarese, Morteza Shahram, Ron Spronk, Christopher W. Tyler, Yasuo Furuichi and Gabor

Bio

Dr. David G. Stork is Rambus Fellow at Rambus Labs and leads research in its Computational Sensing and Imaging Group. He is a graduate in Physics from MIT and the University of Maryland and studied art history at Wellesley College. For nearly 20 years he and his colleagues have pioneered the application of rigorous computer image analysis to problems in the history and interpretation of fine art. He has taught courses on the subject in both the Computer Science and Art and Art History Departments at Stanford University and published over 45 technical papers and the world's first three proceedings volumes in this field. He has lectured at in 20 countries on this subject including at major museums such as the Louvre, National Gallery Washington, National Gallery London, Metropolitan Museum of Art, Art Institute of Chicago. He is a Fellow of the International Association for Pattern Recognition (for "...the application of computer vision to the study of art"), of the International Academic, Research and Industry Association, of SPIE, of IEEE ("For contributions to pattern recognition and image analysis"), and of the Optical Society of America. He has published eight books/proceedings volumes, including Seeing the Light: Optics in nature, photography, color, vision and holography (Wiley), the leading textbook on optics in the arts, and Pattern Classification (2nd ed., Wiley), the world's all-time best-selling textbook in the field.

Faculty Host: Ahmed Elgammal