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## Viewpoint and Illumination-Independent Digital Archiving of Art Paintings

### Abstract

I propose a technique for viewpoint and illumination-independent digital archiving of art paintings. The painting surface is regarded as a 2D rough surface with gloss and shading. Surface materials like oil paints are inhomogeneously dielectric with the dichromatic reflection property. The procedure for total digital archiving is divided into three main steps: acquisition, analysis, and rendering. In the first stage, images of a painting are acquired using a multi-band imaging system with six spectral channels at different illumination directions. In the second stage, we estimate the surface properties of surface-spectral reflectance functions, surface normal vectors, and 3D reflection model parameters. The principal component analysis suggests that the estimated spectral reflectances have the potential for high data compression. In the third stage, all the estimates are combined for rendering the painting under arbitrary illumination and viewing conditions. The feasibility of the proposed technique is confirmed in experiments using oil paintings.

### Biography

*Shoji Tominaga received the B.E., M.S., and Ph.D. degrees in electrical engineering from Osaka University, Japan, in 1970, 1972, and 1975, respectively. From 1976 to 2006, he was at Osaka Electro-Communication University, Osaka. In 2006, he joined Chiba University, Japan, where he is currently a professor of Department of Information Science, Graduate School of Advanced Integration Science. His research interests include color image synthesis/analysis and multi-spectral imaging. He is a Fellow of IEEE and IS&T, and a member of SPIE, ACM, and OSA. He is Former President of Color Science Association of Japan. Hosted by Jack Tumblin*

Thursday, December 11<sup>th</sup>, 4:00 p.m.  
Ford ITW Auditorium, 1<sup>st</sup> Floor