Spectral Signature Analysis of Real Scenes

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The spectral reflectance of objects provides innate information about material properties that have proven useful in applications such as classification, synthetic relighting, and medical imaging to name a few. In recent years, fluorescence analysis of scenes has received attention. What makes fluorescence different from ordinary reflection is the transfer of energy from one wavelength to another. it is well-known that the fluorescence excitation-emission characteristics of many organic objects can serve as a kind of "fingerprint" for detecting the presence of specific substances in classification tasks. In this talk, I will present a coded illumination approach whereby light spectra are learned such that key visual fluorescent features can be easily seen for material classification. I will also introduce scene analysis based on hyperspectral reflectance such as deriving analytical spectral appearance model of wet surfaces for recovering the original surface color and the degree of wetness from a single observation and a novel approach for hyperspectral reconstruction from RGB. Our approach simultaneously learns optimized camera spectral response functions (to be implemented in hardware) and a mapping for spectral reconstruction by using an end-to-end network.

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Biography:

Imari Sato received the BS degree in policy management from Keio University in 1994. After studying at Robotics Institute of Carnegie Mellon University as a visiting scholar, she received the MS and Ph.D. degrees in interdisciplinary Information Studies from the University of Tokyo in 2002 and 2005, respectively. In 2005, she joined the National Institute of Informatics, where she is currently a professor. Concurrently, she serves a visiting professor at Tokyo Institute of Technology and a professor at the University of Tokyo. Her primary research interests are in the fields of computer vision (physics-based vision, spectral analysis, image-based modeling). She has received various research awards, including The Young Scientists' Prize from The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (2009), and Microsoft Research Japan New Faculty award (2011).