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COMPUTATIONAL SPECTRAL VIDEO IMAGING

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Spectral capture technique collects information with more color channels than traditional trichromatic sensing. Therefore, it provides more detailed properties of the light source and the scene. Possible applications span across lots of fields such as remote sensing, materials science, bio-photonics, environmental monitoring, and so on. Spectral capture technique needs to record massive data in spatial, temporal and spectral domains, traditional spectral capture systems suffer from temporal and spatial scanning, thus is not suitable for video capture. Nowadays, with rapid development in sampling theory and electronic techniques, spectral video acquisition is becoming tractable. In this talk, we present recent progresses on the high resolution spectral video acquisition. Prism-Mask Image Spectrometer (PMIS) is proposed which accomplishes high quality video capture in three domains: spectral (1nm), spatial (one mega-pixels) and temporal (real-time) resolution. Both the optical principle and the prototype setup of the PMIS are introduced. In the end, a bunch of machine vision applications (object tracking, skin detection, automatic white balance, etc) based on PMIS are also discussed. In addition, we will also introduce the emerging field of computational photography and other representative researches.

Xun Cao received his Ph.D. degree from Tsinghua University, Beijing, China and he is now a Professor of the Electronic Science & Engineering School, Nanjing University. He has been a visiting researcher at Philips Research, Aachen, Germany in 2008 and Microsoft Research Asia, in 2009 and 2010, and a visiting scholar at The University of Texas at Austin, U.S.A from 2010 to 2011.

Prof. Cao's research interests include Image Based Modeling and Computational Photography, he has published 30+ papers on premier journals (IEEE Signal Processing Magazine, IEEE T-PAMI, IEEE T-IP, Optica, Optics Letters, Optics Express, etc.) and leading conferences (CVPR, ICCV), and holds 30+ U.S. and China patents. His 3D reconstruction system has been successfully applied in the commercial software Roxio Creator, which share a major market in North America. The system has also been used in the first real-character CG movie <L.O.R.D> in China. Prof. Cao directs the Laboratory of Computational Imaging Technology & Engineering (CITE Lab) in Nanjing University, in recent ten years, CITE lab focuses on spectral video imaging and its applications, for more information, please refer to: <http://cite.nju.edu.cn>

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