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PROGRAM

Data Compression Conference (DCC 2017)

Sponsored by U. Arizona, Brandeis U., Microsoft Research, IEEE Signal Processing Society
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Snowbird, Utah, April 4 - April 7, 2017

PROGRAM COMMITTEE

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En-Hui Yang, *University of Waterloo*
Yan Ye, *Interdigital, Inc.*

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Wednesday, April 5:

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Mid-Day:	Keynote Speaker	(2:00pm - 3:30pm)
Afternoon:	Technical Sessions 4,5	(4:00pm - 7:00pm)

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Mid-Day:	Keynote Speaker	(2:00pm - 3:30pm)
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Morning & Mid-Day:	Technical Sessions 9,10,11,12	(8:00am - 1:20pm)

TUESDAY EVENING
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WEDNESDAY MORNING

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WEDNESDAY MID-DAY

Kenote Speaker

2:00pm - 3:30pm

Visual Quality Metrics

Scott Daly

Senior Member Technical Staff, Dolby Laboratories

Abstract:

In a recent paper*, over 30 visual quality metrics were assessed against a subjective dataset. Why so many? While complexity criteria and the creativity of the metric designers is an obvious answer, there are also important business-dependent factors. For example, mature businesses offering high quality products/services are more interested in carefully quantifying performance around a visually lossless goal, while nascent businesses offering a new imaging convenience to the market are generally more interested in describing quality over a wider range of distortions. Currently, it is difficult to have accuracy at the threshold as well as the ability to describe the entire range of appearance. Such difficulty has roots in the threshold vs. suprathreshold performance of the visual system, where one example is that the luminance nonlinearity that results in uniform detection is different from the one that describes lightness appearance*. Another is that the CSF (Contrast Sensitivity Function, ~ an MTF) changes shape as distortions become visibly larger. These fundamental aspects of human vision manifest into not only different types of metric algorithms, but also different methodologies required for subjective testing. In addition to the distinction between visually lossless vs. visual lossy, there is a key distinction between metrics that are signal-dependent, such as commonly used for codec assessment, and those that are traditionally signal-independent, such as those used to characterize displays. While these arenas have been largely disjoint for many decades, the proliferation of widely varying display capabilities means that codec or other image processing quality assessment is substantially linked to the actual display. Some businesses are able to take advantage of such linking, while others are not. The recent development of HDR displays and signal ecosystems enabling metadata means that OTT (internet delivery of content) businesses are able to take advantage of such linking while traditional businesses such as broadcasting are hesitant. This recency is exemplified in that only two of the metrics studied above were capable of being calibrated to the display. The concept of Signal Known Exactly (SKE) affects whether perceptually transparent or merely structural similarity is needed for specific businesses, and thus effect whether reference-based or no-reference metrics are most applicable. For example, user-generated content puts specific demands on certain features that doesn't occur with professionally produced content. However, professional content having narrative intentions brings up the related concept of Signal Expressed Exactly. In addition to the physics of the display and the psychophysics of human viewer, the statistics of the imagery must also be considered. Further philosophical issues include non-ergodic imagery, entropy vs. sensation, and technological acclimatization which requires consideration of "better than excellent".

[1] Hanhart EURASIP 2016

[2] Hillis and Brainard JOSA 2007

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[1]Universitat Autònoma de Barcelona, [2]Univ. of Arizona

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University of Stuttgart

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Kenote Speaker

2:00pm - 3:30pm

Advances and Challenges in Imaging from Space

M. Dirk Robinson

Engineering Manager, Terra Bella @ Google

Abstract:

Traveling at speeds over 7 kilometers per second, a satellite provides a unique opportunity to observe the patterns of change on our planet. At Terra Bella, we build and operate a constellation of earth imaging satellites to collect imagery about our physical world and provide unique data services to our users. After a brief introduction to the basics of earth imaging satellites, we will describe several of the unique challenges of imaging from space including collecting, transporting, and processing large quantities of data. We will describe the innovative Terra Bella imaging architecture we use to collect and process high quality imagery and video at very low cost. We will conclude with several of the open challenges for the research community.

POSTER SESSION AND RECEPTION

4:00pm - 7:00pm
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[1]Inst. for Infocomm Research, Singapore, [2]Univ. Pierre et Marie Curie, [3]Massachusetts Inst. of Tech., [4]Nanyang Technological Univ., [5] Peking Univ.

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