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PROGRAM

Data Compression Conference (DCC 2005)

Sponsored by Brandeis University.
Proceedings published by the IEEE Computer Society Press.

Snowbird, Utah
March 29-31, 2005

COMMITTEE:
A. Apostolico – Purdue U. / U. Padova
M. Cohn – Brandeis U.
M. Effros – California Institute of Technology
R. Gray – Stanford U.
S. Hemami – Cornell U.
J. Kovacevic – Carnegie Mellon U.
R. Ladner – U. Washington
T. Linder – Queen's U.
H. Malvar – Microsoft
M. Marcellin – U. Arizona
A. Moffat – U. Melbourne
M. Rabbani – Eastman Kodak
S. Savari – U. Michigan
K. Sayood – U. Nebraska
G. Seroussi – Hewlett-Packard
D. Sheinwald – IBM
J. Storer – Brandeis U.
K. Zeger – U. California San Diego

SCHEDULE OVERVIEW:

Monday Evening, March 28:
Registration and Reception

Tuesday, March 29:
Morning: Technical Sessions
Mid-Day: Invited Presentation
Afternoon: Technical Sessions

Wednesday, March 30:
Morning: Technical Sessions
Mid-Day: Technical Sessions
Afternoon: Poster Session and Reception

Thursday, March 31:
Morning: Technical Sessions

MONDAY EVENING
Registration / Reception, 7:00-10:00pm (Golden Cliff Room)

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TUESDAY MID-DAY
INVITED PRESENTATION

2:30pm - 3:30pm

"Some Open Problems in Source Coding in Biomedical Engineering"

Dr. Elvir Causevic

Founder and President Everest Biomedical Instruments
and
Ad. Assistant Professor, Yale Applied Mathematics

There are two basic types of measurements of quantities in physiologic systems: those that measure quantities that happen spontanously in the course of normal operation of the system, and those in which we perturb the system with some "friendly" stimulus and record system output as a response, the latter being much more reliable and thus suitable for clinical use. In principle, this is not at all different than what we encounter in communication systems of various types, or target recognition systems, for example. The difference is that instruments in use in clinical practice largely use only the simplest of stimuli (clicks, pulses, sine waves), and rarely employ any of the "advanced" signal design techniques that will maximize signal-to-noise ratio, or otherwise aid in the detection of the response (improving accuracy, reducing acqusition time, covering a wider dynamic range of measurements, etc). Another problem is that complex stimuli, if used, produce an overwhelming amount of response data which needs to be cleverly compressed and mined. Typically measurements of biological systems are highly intercorrelated (in an unknown way) and thus usually low rank and low total information content, which makes them ideal candidates for exploration.

Examples will be drawn from various clinical measurements where known stimuli evoke responses from systems under test - neurologic auditory and visual evoked electrical responses, pulse oximetry for measurement of oxygen saturation of hemoglobin, non-invasive blood analyte detection (glucose, blood gases, electrolytes), and others. Opportunities for application of advanced signal design and signal coding for optimum stimulation and response detection will be presented (without adequate existing solutions), as well as open problems in data mining and compression in biological systems.

The next generation of advanced clinical instruments depends on adequate solutions of these problems.

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