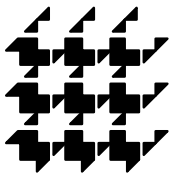
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DIMACS

Center for Discrete Mathematics & Theoretical Computer Science
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DIMACS Special Focus on Computational Information Theory and Coding

Workshop on Complexity and Inference
June 2 - 6, 2003

DIMACS Center, Rutgers University, Piscataway, NJ

Organizers: Mark Hansen, Bell Laboratories; Paul Vitányi, CWI & U of Amsterdam; Bin Yu, UC Berkeley

URL: http://stat.bell-labs.com/complexity

Description: The notion of algorithmic complexity was suggested independently by Kolmogorov, Chaitin, and Solomonoff in the 1960's. Both Kolmogorov and Chaitin introduced the concept as a way to formalize notions of entropy and randomness, building on results from theoretical computer science dealing with partial recursive functions. Independently, Solomonoff defined algorithmic complexity in the pursuit of universal priors for statistical inference. In recent years, Rissanen expanded the applicability of these ideas, employing well-established concepts from information theory to frame his principle of Minimum Description Length (MDL) for statistical inference and model selection.

Each of these lines of research has developed methods for describing data (through coding and compression, or by analogy with some formal computing device); and each of these lines has employed some concept of an efficient representation to guide statistical inference. In this workshop, we will explore both the foundational aspects of complexity-based inference as well as applications of these ideas to challenging modeling problems. Participants will be drawn from the fields of statistics, information and coding theory, machine learning, and complexity theory. Application areas include biology, information technologies, physics and psychology. The following specific topics will be covered by the workshop:

- Kolmogorov complexity and inference
- Lossy compression and complexity theory
- Individual sequence/on-line prediction and predictive complexity
- Complexity and cognitive science
- MDL (MML) theory and applications
- Complexity and Bayesian methods
- Compression methods for clustering
- Machine learning and computational complexity
- Applications

Contributed Presentations: While leading researchers in each of these areas are being invited to participate in the workshop, submissions of contributed papers of original works in these areas are now being solicited. Papers will be reviewed on the basis of an extended abstract (not exceeding 3 pages) to allow for a reasonable review. The deadline for submission is **February 1, 2003**, with notification of decisions by **March 1, 2003**. Authors are required to submit electronic versions of their abstracts in PDF form to complexity@research.bell-labs.com.

Financial Support: A limited amount of funding is available for partial support of people wishing to attend. Students, recent Ph.D.'s, women and minorities are particularly encouraged to apply. To apply for funding, send a letter explaining your interest in the workshop together with a vita or bibliography and a budget for travel/living expenses. If you are a student, also solicit a letter from a faculty adviser.

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