Northwestern University Computer Science Department Presents:

EFFICIENT ALGORITHMS FOR COMBINING LEARNERS

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Abstract:
In the online decision problem, one makes a sequence of decisions without knowledge of future events. This is in contrast to the offline optimization problem, where the entire sequence of events is known in advance. We show that the online decision problem can be solved using an offline optimization as a black box. Thus offline efficiency gives online efficiency, i.e. knowing the future does not help significantly (in this model).

Our efficient algorithms apply to diverse problems such as binary search trees, online shortest paths, online linear optimization, adaptive Huffman coding, and selecting experts. The underlying principle behind our algorithms is intuitive and goes as far back as Hannan's seminal work in 1957.

We also discuss the problem of boosting, a general method of improving "weak" learners. We extend the model of boosting to the important practical case of noisy data. In both online learning and boosting, we combine several algorithms into one that works at least as well or better than any of the constituents.

Biography:
Adam Kalai graduated Magna Cum Laude from Harvard University with a BA in Computer Science in 1996. In 2001 he received his PhD in Computer Science from Carnegie Mellon University under the supervision of Avrim Blum. He is now completing an N.S.F. postdoc in the department of Computer Science and Mathematics at M.I.T. Dr. Kalai's research interests include: algorithms for machine learning and on-line adaptation; on-line and randomized algorithms,; noise-tolerant learning, boosting, and data mining; and game theory and 3D autostrereoscopic displays.