THE UNIVERSITY OF MEMPHIS
Department of Computer Science

Colloquium

Dunn Hall 351 Fridays 12:30-1:30pm

Efficient Algorithms for k-regret minimizing Sets

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Abstract:

A regret minimizing set Q is a small size representation of a much larger database P so that user queries executed on Q return answers whose scores are not much worse than those on the full dataset. In particular, a k-regret minimizing set has the property that the regret ratio between the score of the top-1 item in Q and the score of the top-k item in P is minimized, where the score of an item is the inner product of the item's attributes with a user's weight (preference) vector. The problem is challenging because we want to find a single representative set Q whose regret ratio is small with respect to all possible user weight vectors. We show that k-regret minimization is NP-Complete for all dimensions d >= 3. This settles an open problem from Chester et al. [VLDB 2014], and resolves the complexity status of the problem for all d: the problem is known to have polynomial-time solution for d <= 2. In addition, we propose two new approximation schemes for regret minimization, both with provable guarantees, one based on coresets and another based on hitting sets. We also carry out extensive experimental evaluation, and show that our schemes compute regret-minimizing sets comparable in size to the greedy algorithm proposed in [VLDB 14] but our schemes are significantly faster and scalable to large data sets.

About the Speaker:

Nirman Kumar is an assistant Professor in the CS department. He completed his Phd. from the University of Illinois at Urbana-Champaign, and a postdoc from the University of California at Santa-Barbara. He is interested in Theoretical Computer Science and has worked on algorithmic problems in Computational Geometry, Approximation algorithms and databases.

Reception in Dunn Hall 336 - 1:30pm