

MSc thesis defense presentation

Lukas Kavouras defends his MSc thesis

Date:	Tuesday, 08 Nov 2016
Time:	14:00
Location:	Univeristy of Athens, Department of Informatics and Telecommunications, A56
Thesis title:	High dimensional approximate r-nets
Committee:	<ul style="list-style-type: none">• Ioannis Emiris• Dimitris Fotakis• Aristeidis T. Pagourtzis

Thesis abstract

The construction of r -nets offers a powerful tool in computational and metric geometry. We focus on high-dimensional spaces and present a new randomized algorithm which efficiently computes approximate r -nets with respect to Euclidean distance. For any fixed $\epsilon > 0$, the approximation factor is $1 + \epsilon$ and the complexity is polynomial in the dimension and subquadratic in the number of points. The algorithm succeeds with high probability. More specifically, the best previously known LSH-based construction of Eppstein et al. \cite{EHS15} is improved in terms of complexity by reducing the dependence on ϵ , provided that ϵ is sufficiently small. Our method does not require LSH but, instead, follows Valiant's \cite{Val15} approach in designing a sequence of reductions of our problem to other problems in different spaces, under Euclidean distance or inner product, for which r -nets are computed efficiently and the error can be controlled. Our result immediately implies efficient solutions to a number of geometric problems in high dimension, such as finding the $(1 + \epsilon)$ -approximate k th nearest neighbor distance in time subquadratic in the size of the input.

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