Distribution Sensitive Geometric Data Structures

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Data structures are integral to computational geometry, in many cases being developed specifically to enable algorithmic techniques such as plane sweep and incremental construction. Traditionally, the performance of data structures is expressed as a function of n, the size of the input. But when the sequence of operations performed on the data structure possess some property, it is sometimes possible to refine the analysis to express how well the structure can exploit that situation, e.g., by expressing the running times as a function of some distributional measure of the operation sequence.

Such *distribution-sensitive* data structures have been widely studied in the one-dimensional case, achieving (near-)optimal bounds as a function of the entropy of the access distribution, working-set bounds, or distances between successive queries (dynamic finger). These concepts have been recently adapted to two-dimensional geometric data structures. This talk will give an overview of the progress made in the past decade and highlight several interesting open problems.

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