September 2010

MADALGO seminar by Yakov Nekrich, University of Bonn

Dynamic External Memory Range Reporting in 3-D

Abstract:

In this talk we describe a dynamic external memory data structure that supports three-dimensional orthogonal range reporting queries in $O\left((\log_B N)^2 + \frac{k}{B}\right)$ I/O operations, where k is the number of points in the answer and B is the block size. Our data structure uses $O\left(\frac{N}{B}(\log_2 N)^2 * (\log_2 B)^2\right)$ blocks of space and supports updates in $O\left((\log_2 N)^3\right)$ amortized I/Os.

This is the first dynamic data structure that answers three-dimensional range reporting queries in $(\log_B N)^{O(1)} + O\left(\frac{k}{B}\right)$ I/Os.