I/O-Efficient Map Overlay and Point Location in Low-Density Subdivisions

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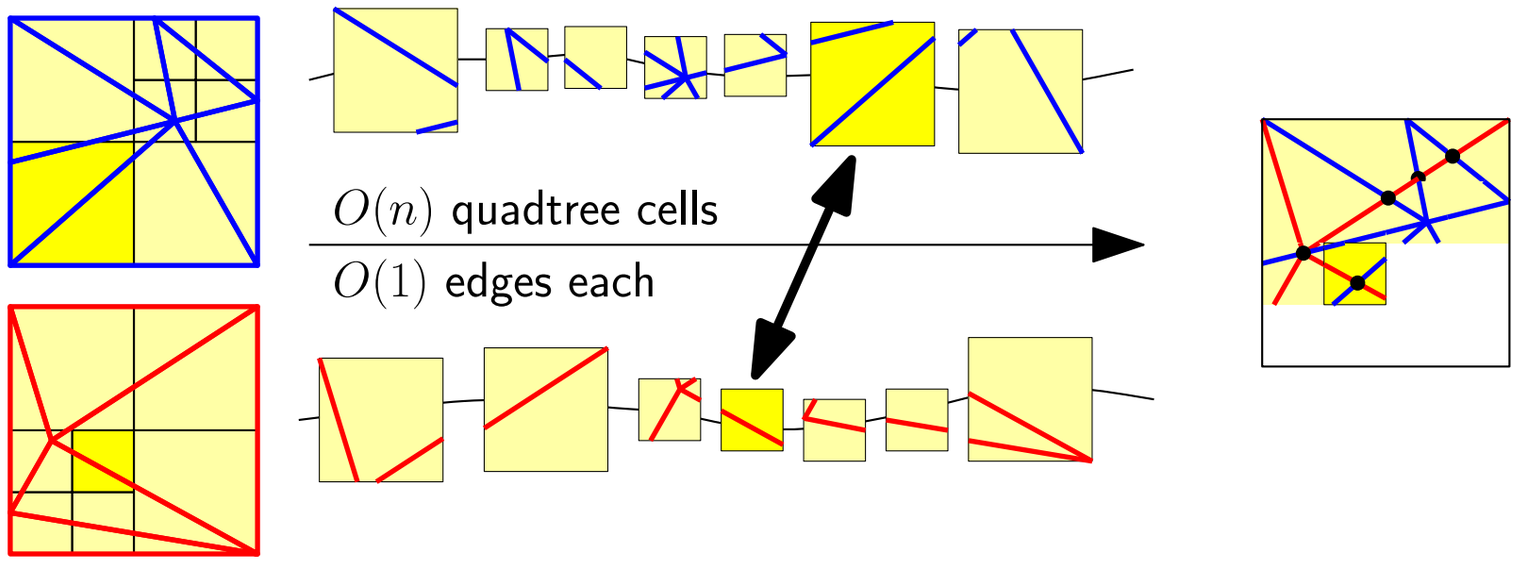

$n =$ input size; $M =$ main memory size; $B =$ disk block size; $scan(n) < sort(n) << n$

For low-density triangulations / sets of line segments*, there is a data structure that supports:

- map overlay in $O(scan(n))$ I/O's;
- point location in $O(\log_B n)$ I/O's;
- range queries in $O(\frac{1}{\varepsilon}(\log_B n) + scan(k_\varepsilon))$ I/O's.
- (triangulations only) updates in $O(\log_B n)$ I/O's;

The data structures are built with $O(sort(n))$ I/Os.

*) for any circle C, number of intersecting segments bigger than $\mathrm{diam}(C)$ is at most a constant