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MADALGO seminar by Srinivasa Rao Satti

Succinct representations of trees

Trees are one of the most fundamental structures in computing. They are used in almost every aspect of modeling and representation for explicit computations. Standard representations of trees using pointers are quite wasteful of space, and could account for the dominant space cost in applications such as storing a suffix tree. For example, a standard representation of a binary tree on n nodes uses 2n pointers or 2n log n bits. This is a factor of log n more than the minimum number of bits necessary, as there are less than 4^n distinct binary trees on n nodes. Also, this only supports finding the left/right child of a node efficiently.

In this talk, starting with a brief introduction to succinct or highly space efficient data structures, I will present some tree representations that take only 2n + o(n) bits and support various useful queries efficiently. I will also briefly mention some applications where these can be used.