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CS Talk by MADALGO visitor Norbert Zeh, Dalhousie University

Dealing with Massive Graphs: Algorithms, Techniques, and Challenges

Abstract:

This talk gives an overview of the state of the art in solving problems on massive graphs beyond the size of main memory and highlights some of the most important challenges in the area.

Massive graphs arise in an increasing number of application areas, including geographic information systems, web modelling, and computational biology. For example, route planning applications represent road networks as graphs and solve shortest-path-type problems on them, search engines analyze the web graph to identify web communities, and a number of sequence analysis tasks in genomics reduce to analyzing graphs that capture the structure of the given sequence.

The main source of problems with processing massive graphs is that the graph exploration strategies at the heart of virtually all traditional graph algorithms are inherently inefficient on large graphs.

The first part of the talk focuses on alternate techniques to solve problems on massive graphs and on methods to speed up graph exploration approaches on a number of input types. The second part discusses current research directions and challenges.