

Informative Labeling Schemes

Speaker:

Amos Korman, CNRS, Paris

Abstract

Informative labeling schemes consist in labeling the nodes of graphs in such a way so that queries regarding any two nodes (e.g., are the two nodes adjacent?) can be answered by inspecting merely the labels of the corresponding nodes (and no other source of information). Common types of queries include, for example: adjacency (are the two nodes adjacent?), distance (what is the distance between the two nodes?), routing (which of my neighbors is the closest to the other node?), connectivity (what is the vertex connectivity between the two nodes?). Typically, the main goal of such schemes is to minimize the label size, that is, the maximum number of bits stored in a label.

Informally, the goal of a labeling scheme is to encode global information using small distributed spaces, so that information concerning a few nodes can be inferred only by using the corresponding local data structures. This relation between global and local knowledge places the field of informative labeling schemes between the very well studied centralized environment and the less studied distributed environment. In the future, this field may help to build a bridge for a better understanding of the relations between these two important environments.

Keywords: Labeling schemes, distance, adjacency, routing schemes, vertex connectivity.

Objectives

The objective of the tutorial is to give an introduction to the field of labeling schemes which has attracted a lot of attention in the last decade. In this tutorial we will review results in this field ranging from some basic schemes for trees (for answering adjacency, ancestry, distance and routing queries) to more sophisticated schemes such as the one for answering k -connectivity queries in general graphs.

Audience

This tutorial is intended for researchers and students in computer science and mathematics. The tutorial will be extremely useful for research students looking for open

problems in a clean and relatively new theoretical area that combines concepts in graph theory, combinatorics and networks.

References

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About the Speaker

Amos Korman is currently working as a permanent researcher in CNRS & Paris 7. Amos received his Ph.D in computer science from the Weizmann Institute of Science, Rehovot, Israel in 2006 under Prof. David Peleg. His thesis on informative labeling schemes received the Dean's Prize for Ph.D. students.

Amos is regularly publishing papers in leading conferences for theory of computer science such as ICALP, SODA, PODC, DISC, SPAA etc. In addition to his scientific experience, Amos is also interested in north Indian classical music and plays tabla under the guidance of Pandit Nayan Ghosh.