MAI Coding Project

Didier Quintius and Thao Hoang Phuong

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In this exercise a series of search algorithms are discussed. These search algorithms will be implemented on a partially connected network of nodes, to find a (the best) path from the start to the goal node. Each search algorithm has different properties, advantages and disadvantages, which are reported and then tested on the network. The next paragraph discusses the simulation of the network of nodes.

Some characteristics of the network are; each simulated has N nodes, node 1 is the start node and node N is the goal node, the goal node need not be connected to the start node and the cost of path AB is always equal to that of BA. The function used to simulate the network is `network_of_nodes(amount_of_nodes, [costs], [probabilities], [disconnect_start_goal])`.

- The `amount_of_nodes` variable sets the amount of nodes and is compulsory variable.
- The `costs` variable is a list with costs that each connection could possible take on. Note that the NA costs needs to be added else a fully connected model is produced. The default list is `[NA, 1,2,3,4]`.
- The `probabilities` is a list with the probabilities of each of the costs defined in `costs`. Thus, must be of equal length. Note that the probabilities must be given in integers. The default value is `[5, 2, 1, 1, 1]`.
- The `disconnect_start_goal` removes the direct connection between the start and the goal if set to `True`. The default value is `True`.

Using the functions given above the search algorithms are tested on their speed, completeness and memory. The algorithm that are tested include: Depth-First, Breadth-First, Non-deterministic, Iterative Deepening and Bi-directional.