GMDL212, HW #4

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Abstract

This assignment focuses on Belief Propagation in a Bayesian network.

Contents

Version Log

- 1.01, 2/5/2021. Fixed some typos.

- 1.00, 27/4/2021. Initial release.

In one of our practical sessions, we learned a variant of the Belief Propagation algorithm that uses a factor graph. While we showed it in the context of MRFs (with an undirected tree structure), the exact same algorithm is applicable to Bayesian networks as long as their structure is a directed tree (not necessarily a directed rooted tree). That it, such a directed graphical model may be converted to an undirected factor graph and the latter will be a tree.
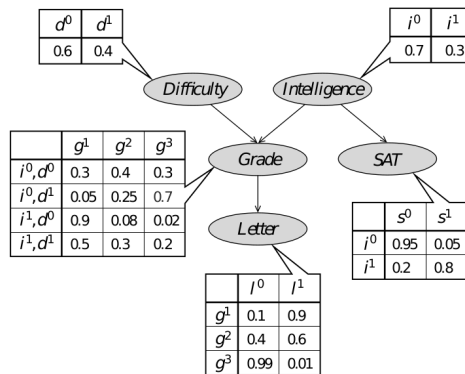
Computer Exercise 1 *In the Student example we saw from Koller and Friedman (which also appears in the figure above), draw the associated undirected factor graph, implement the aforementioned Belief Propagation algorithm for that particular example (*i.e.*, your code doesn't have to be able to handle other*

cases – though you can make it more general if you choose to), and report the results you obtain, using that implementation of yours, for each of the marginals: $p(i)$; $p(d)$; $p(g)$; $p(s)$; $p(l)$. ◇