

On the Relationship between Graphical and Compositional Models for the Dempster-Shafer Theory of Belief Functions

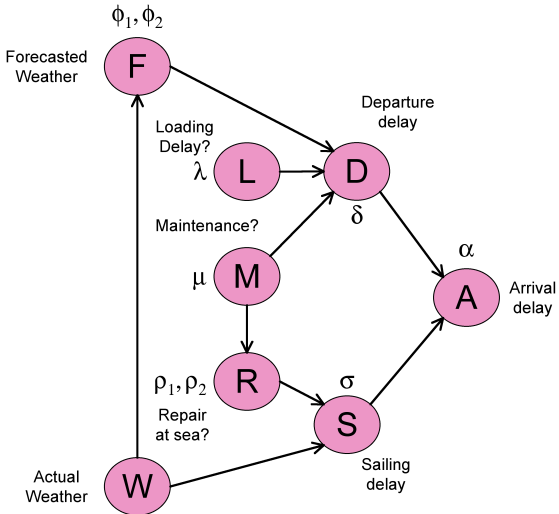
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Almond's 'Captain's problem



Graphical Model

- defined using graph and related BPAs for each node and its parents
- all BPAs have to be distinct (to avoid double counting)
- combined together using \oplus

In our case, we use conditional BPAs - marginals to parents variables are vacuous. This guarantees distinctness.

What to do with graphical models?

- Lauritzen & Spiegelhalter would convert it to a junction tree
- Moralize + Triangulate the graph + find cliques
- Compute marginals using Shenoy & Shafer approach (binary join tree)
- Having marginals, can we reconstruct the original model?
- In probability YES, if we have RIP ordering and compose them using the operator of composition $p_1 \triangleright p_2 \triangleright \dots$ in D-S theory, the result is not always defined

Here the problems start

- We have two operators of composition in D-S theory
- One is compatible with Dempster's rule, the other is not
- How to create a conditional BPA from a BPA?
- Computational issues

Come to our poster to discuss:

- What are the conditionals in D-S theory?
- How to define Dempster's decombination for non-focal elements?
- Do you advocate for pseudo-conditionals?