

Probabilistic  
Graphical  
Models



Representation

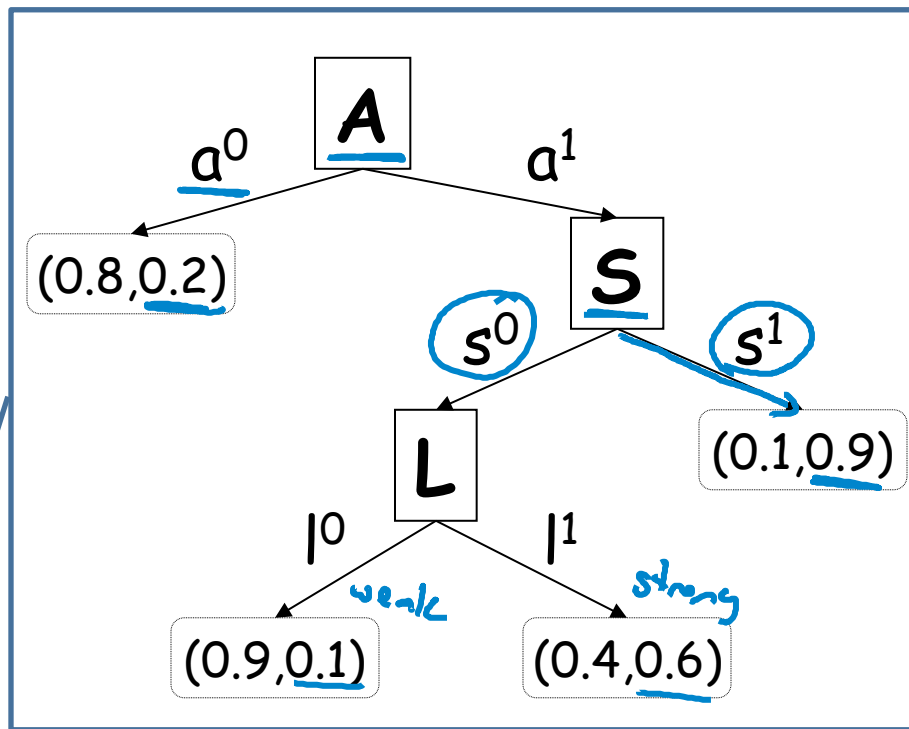
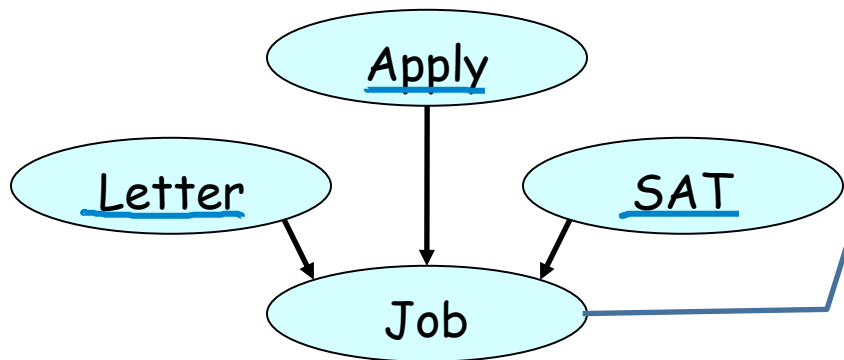
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Local Structure

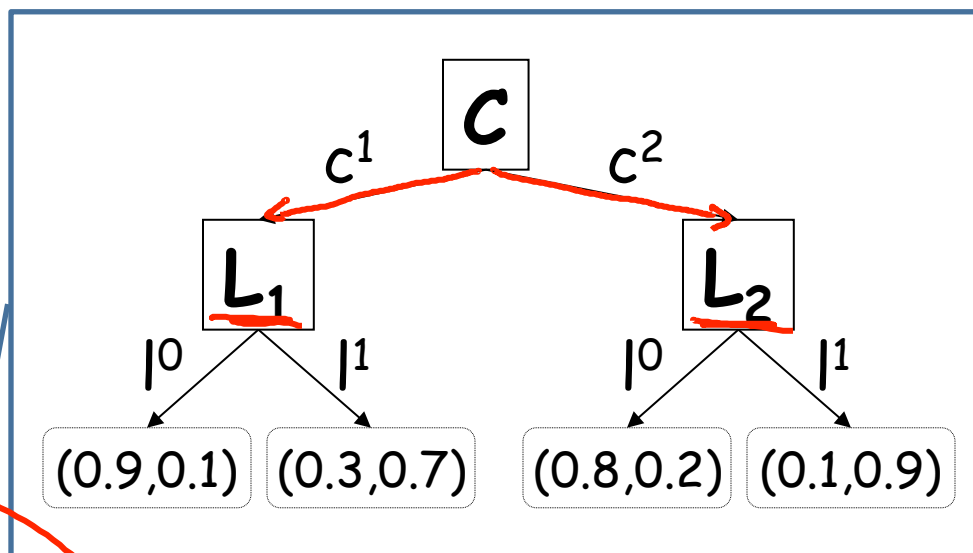
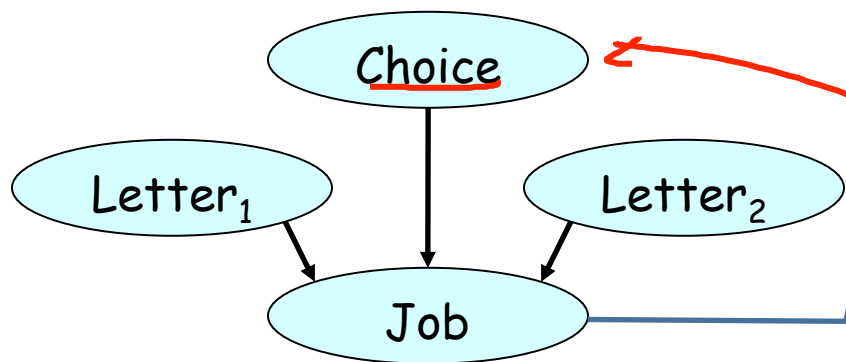
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Tree  
Structured  
CPDs

# Tree CPD



# Tree CPD

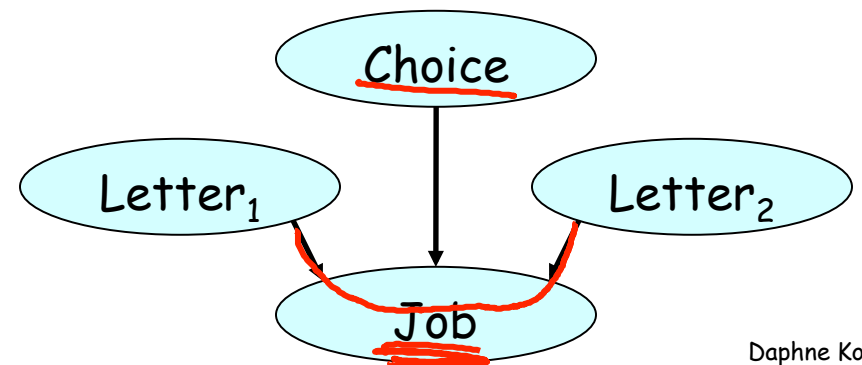
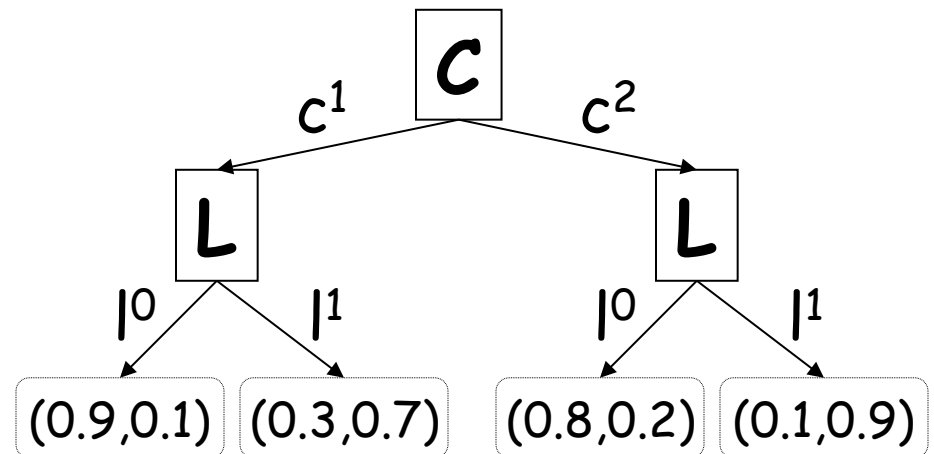


*multiple levels*

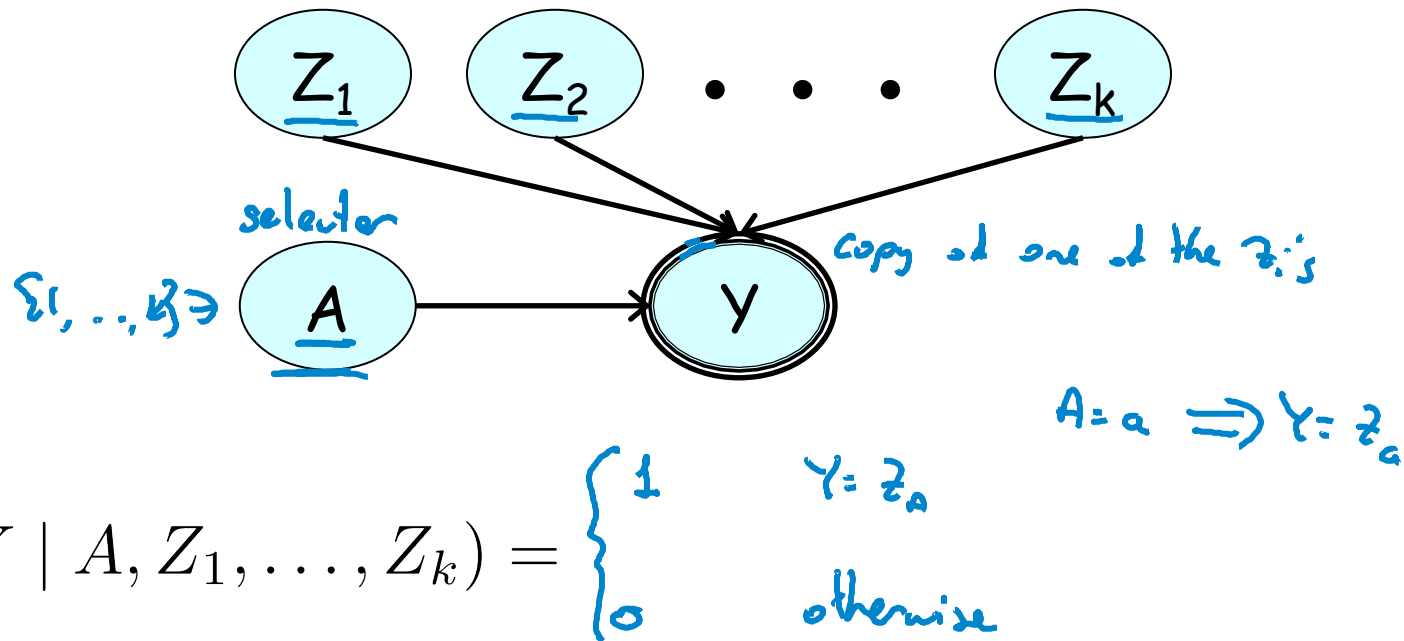
$$(L_1 \perp L_2 \mid J, C)$$

$$(L_1 \perp_c L_2 \mid J, c_1)$$

$$(L_1 \perp_c L_2 \mid J, c_2)$$

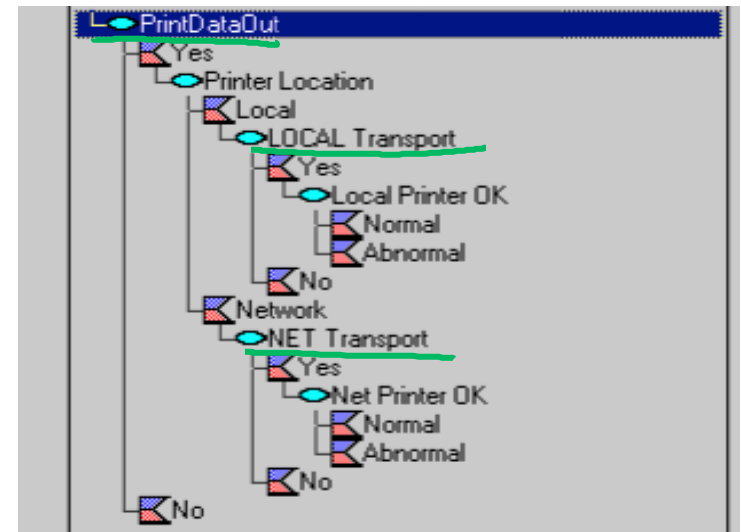
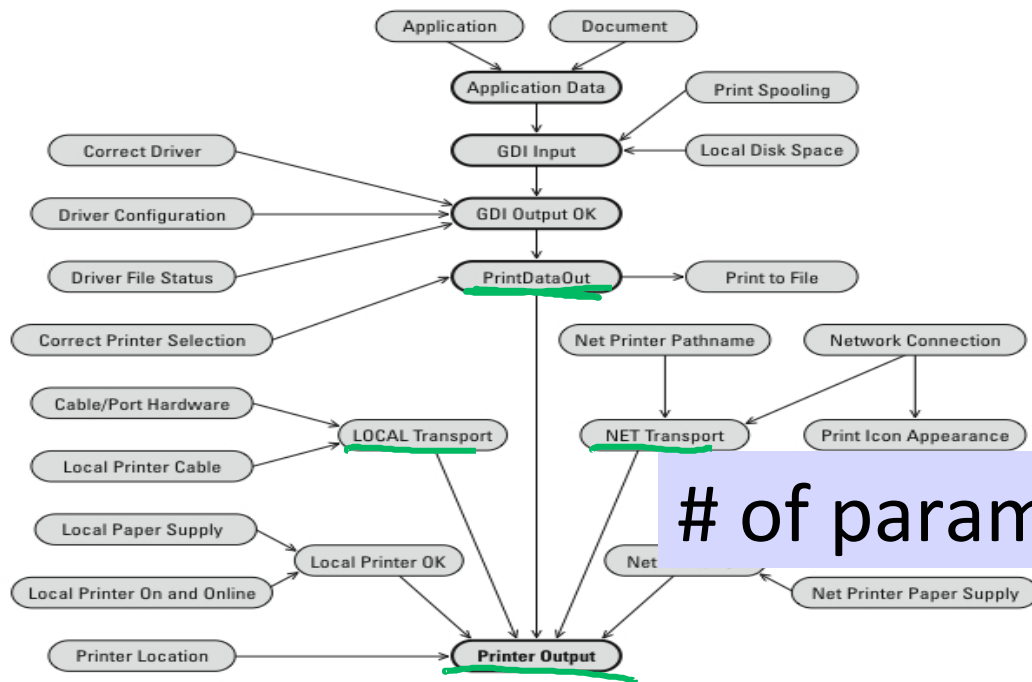


# Multiplexer CPD



Thanks to: Eric Horvitz, Microsoft Research

# Microsoft Troubleshooters



# of parameters: 145 to 55

# Summary

- Compact CPD representation that captures context-specific dependencies
- Relevant in multiple applications:
  - Hardware configuration variables
  - Medical settings
  - Dependence on agent's action
  - Perceptual ambiguity