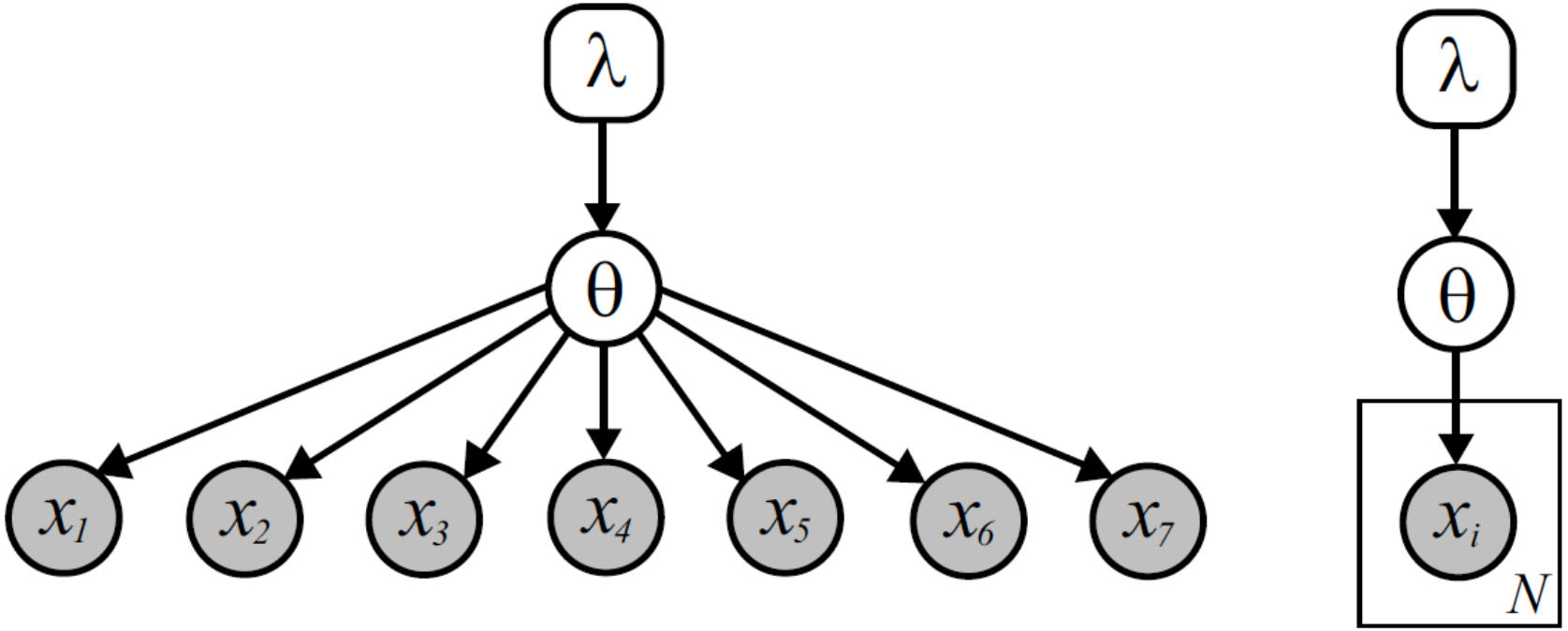
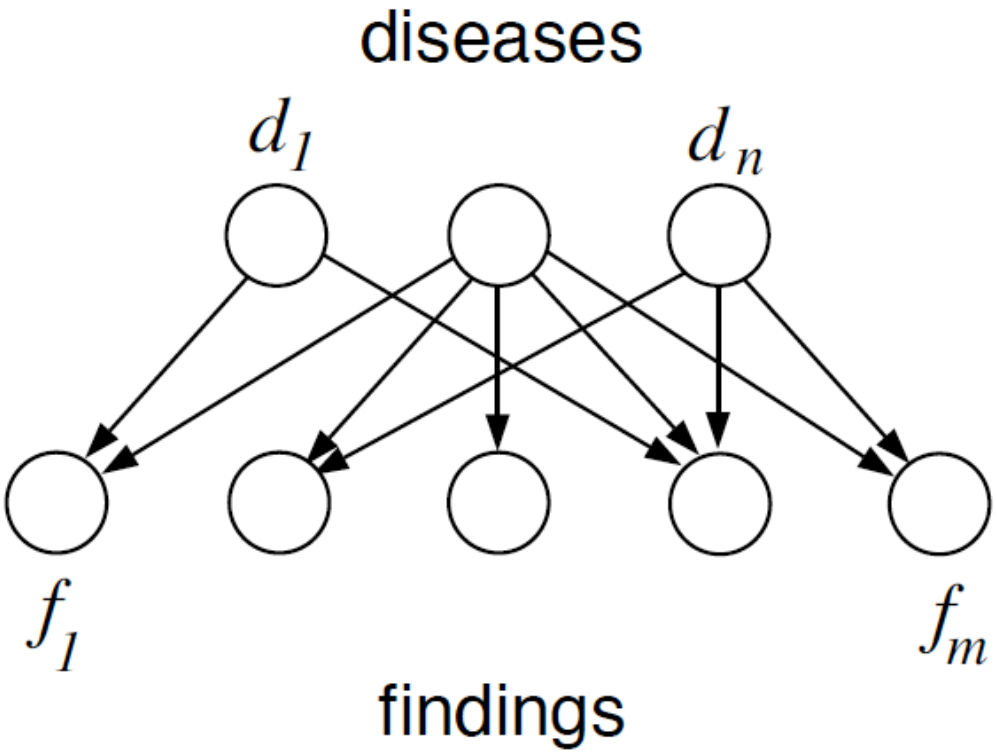
Learning and Inference in Probabilistic Graphical Models

Popular Directed Graphical Models
Feb. 3, 2010

Naïve Bayes Model

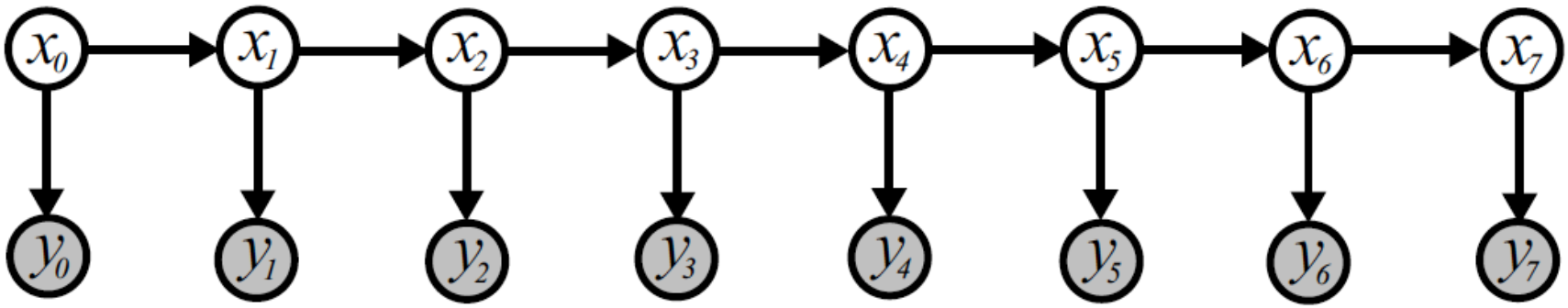


Medical Diagnosis

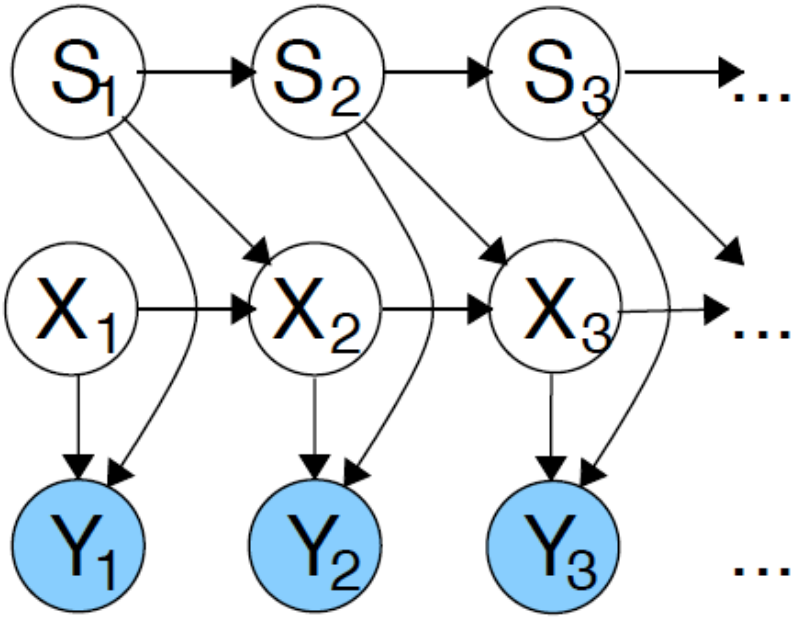


Parameterization: Noisy-OR, logistic regression, generalized linear models…

Hidden Markov Model
(& linear dynamical system)

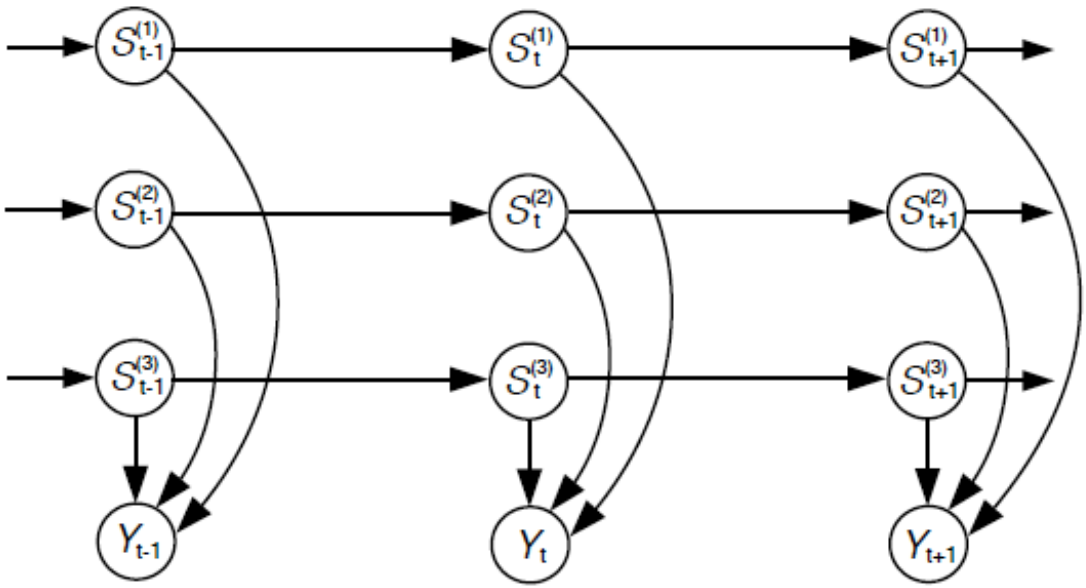


Switching Linear Dynamical System



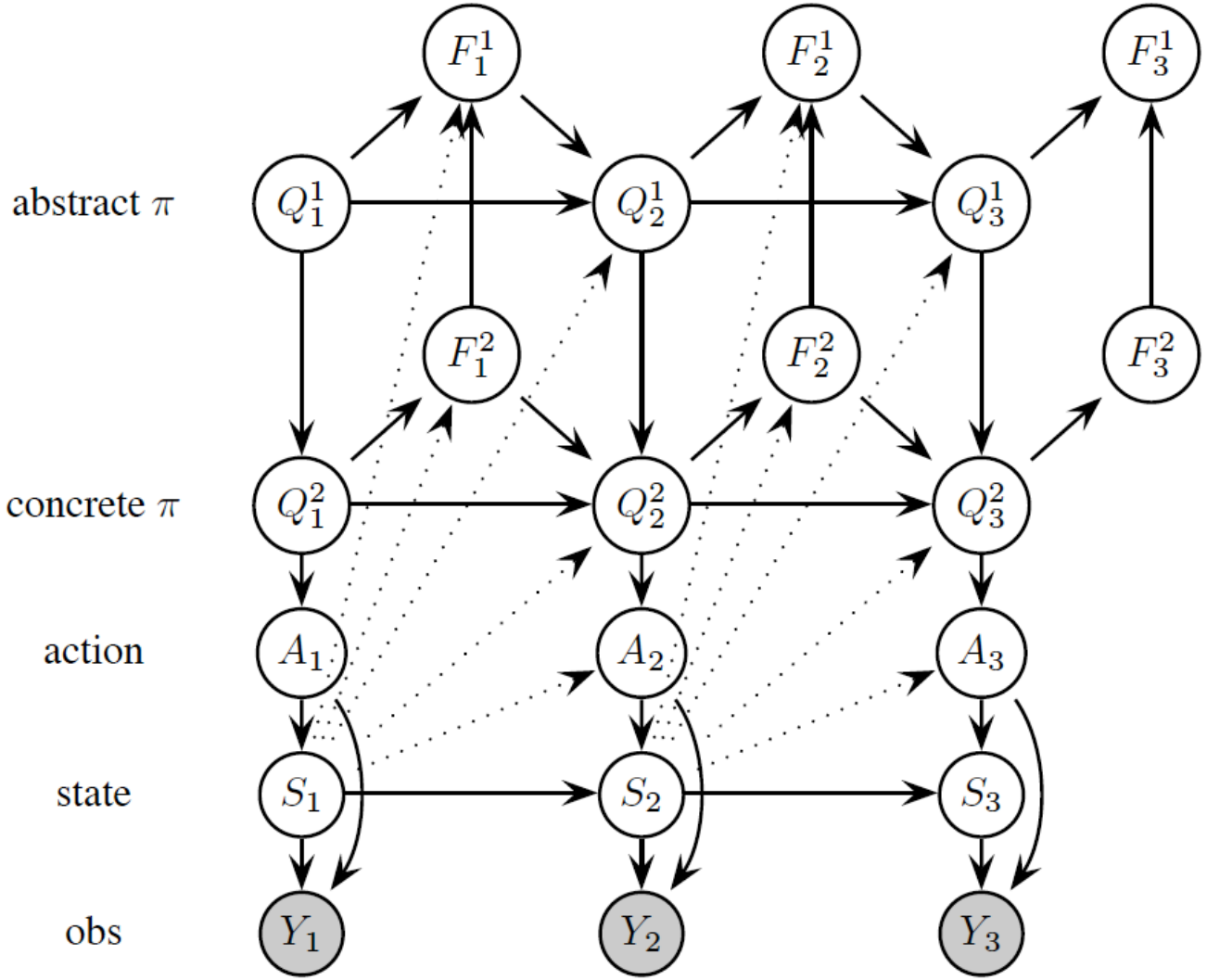
Ghahramani & Hinton, 2000

Factorial HMM



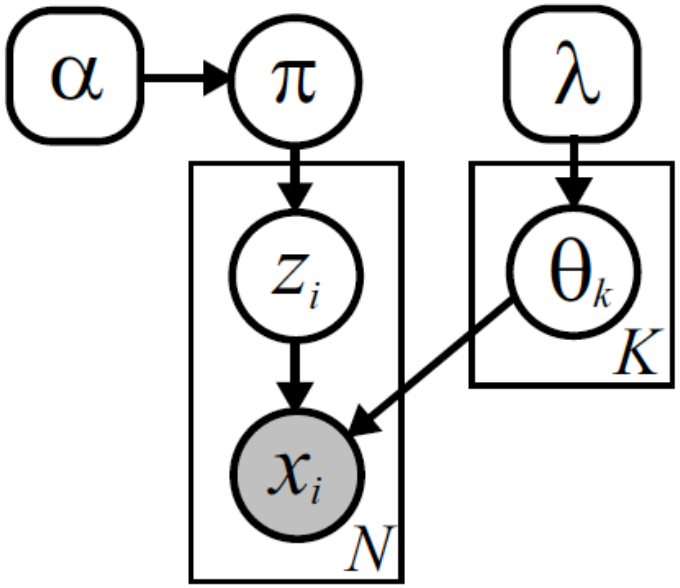
Ghahramani & Jordan, 1997

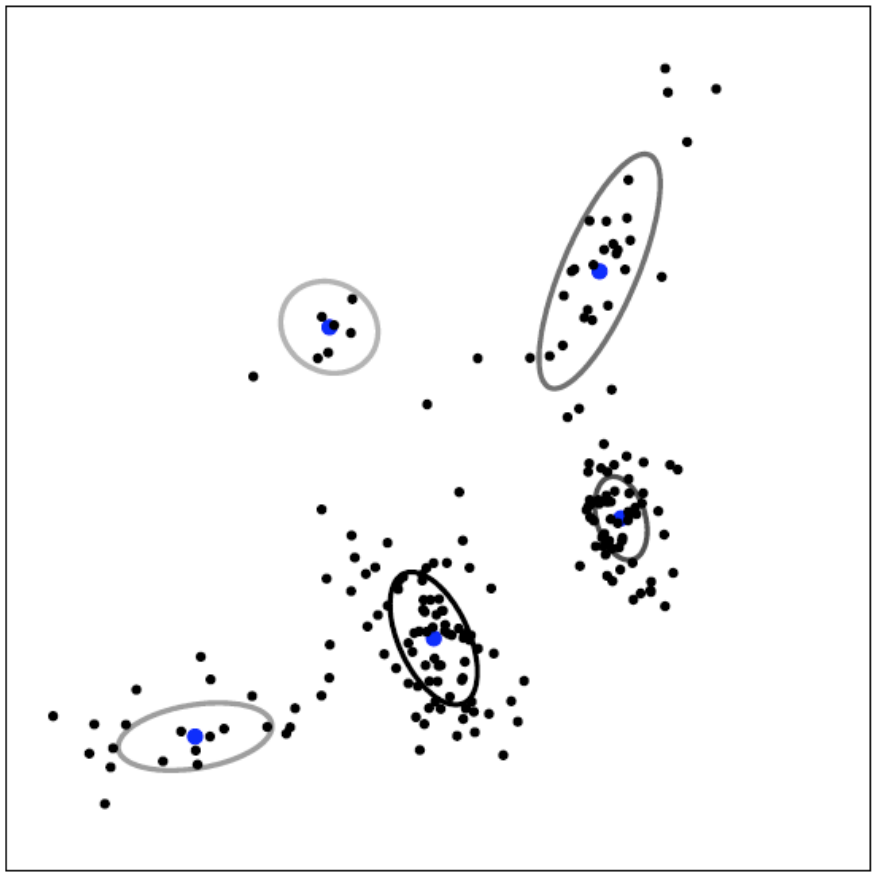
Dynamic Bayesian Networks



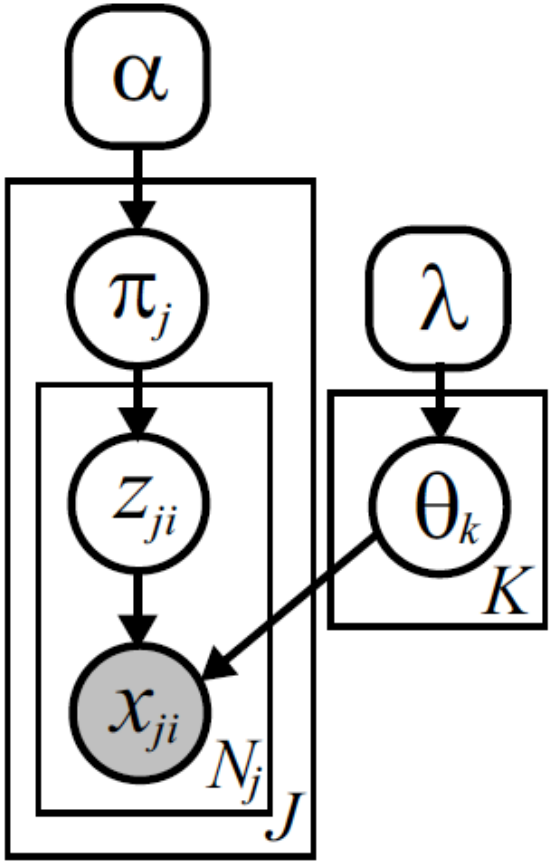
Murphy, 2002

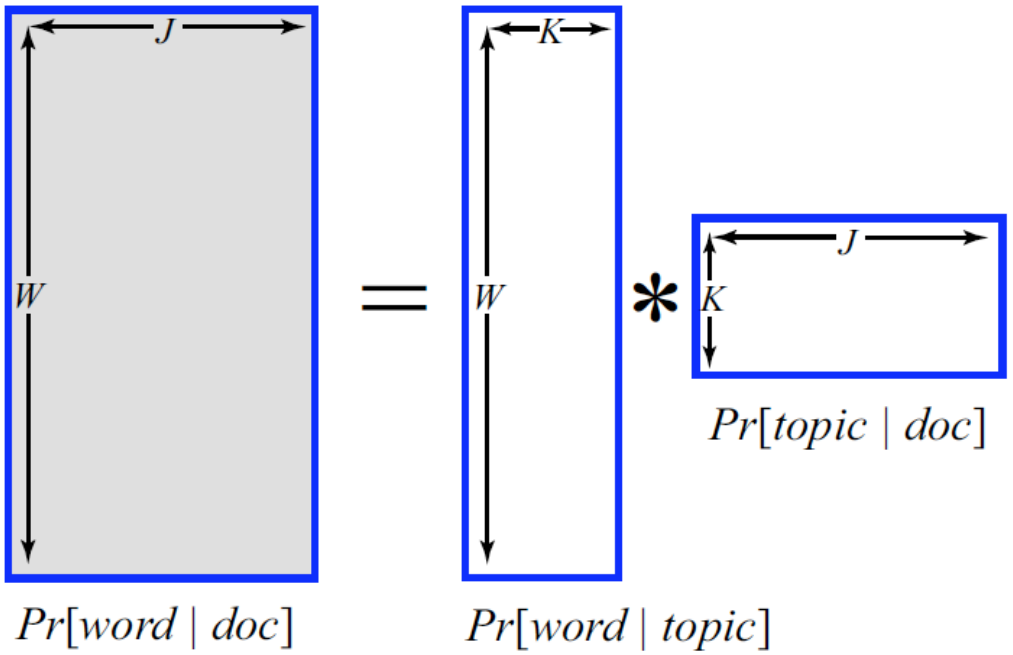
Mixture Models



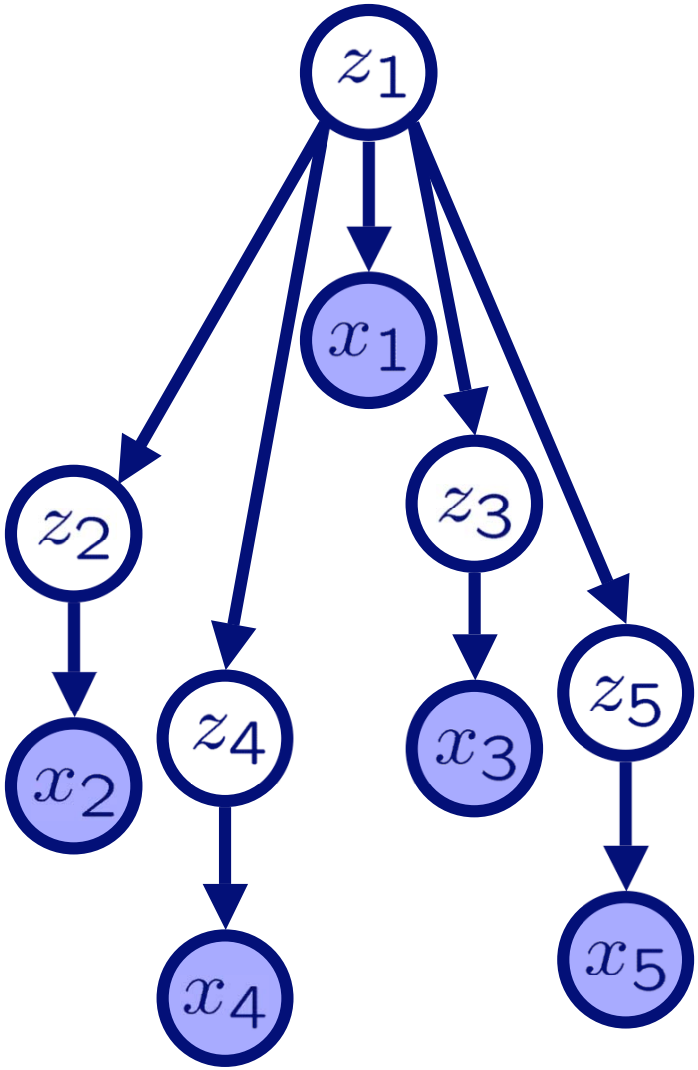


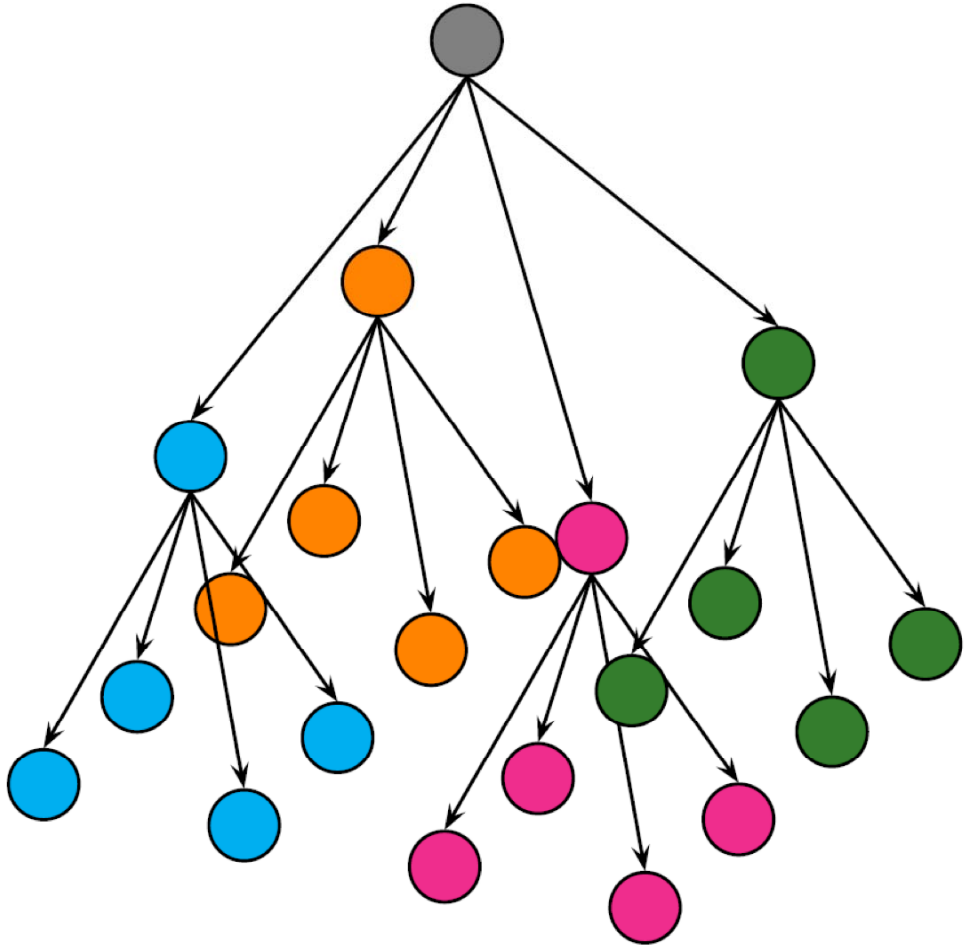
Admixture or Topic Models (Latent Dirichlet Allocation)



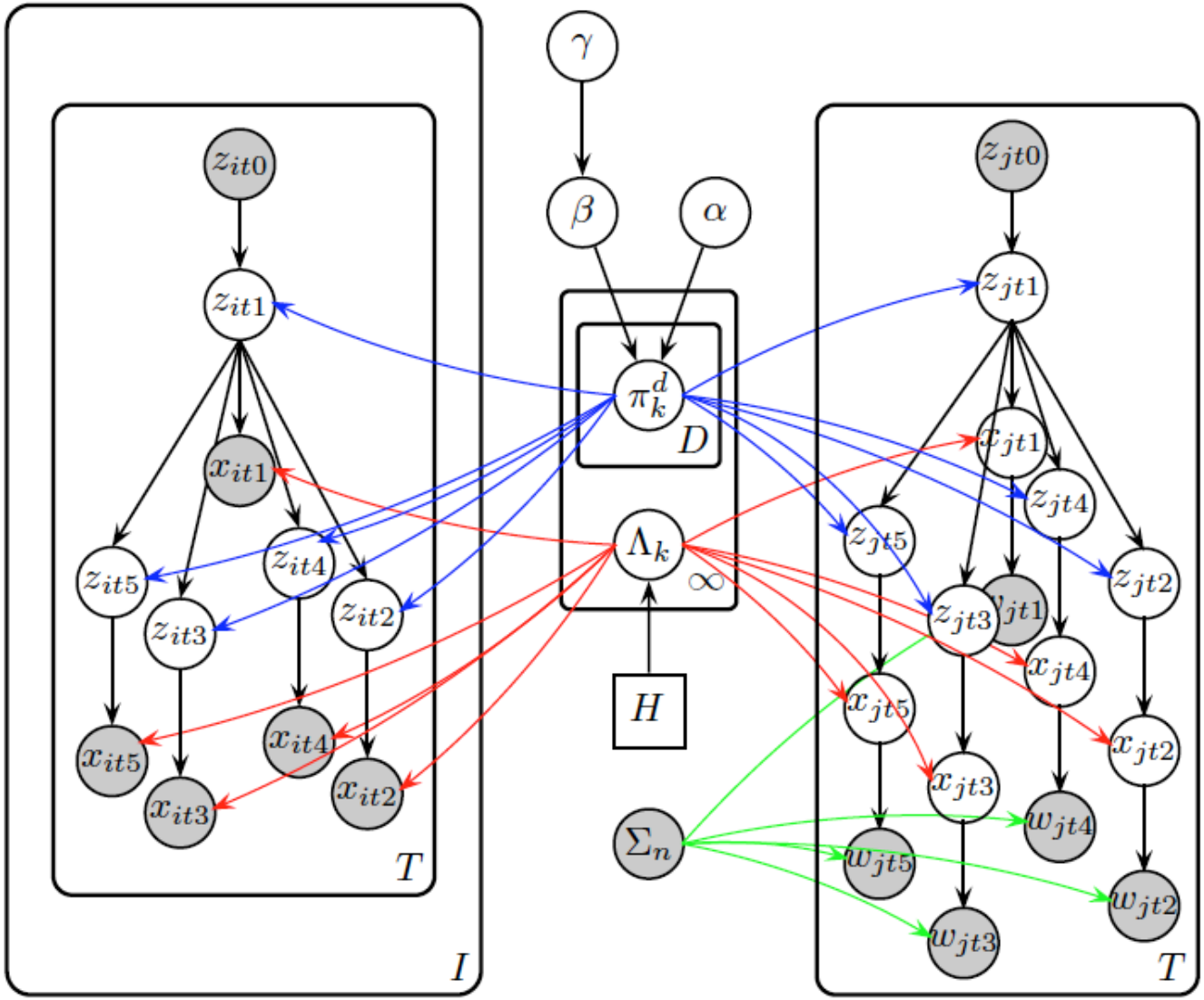


Multiscale Modeling





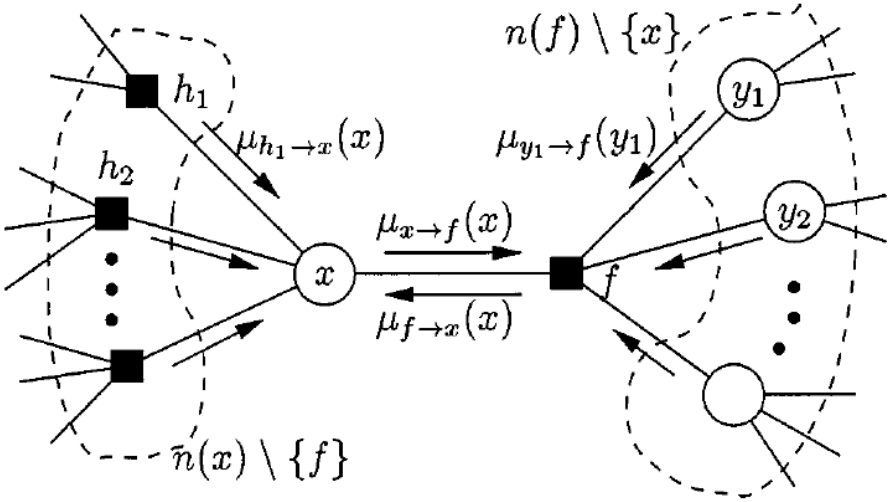
Multiscale Transfer Denoising

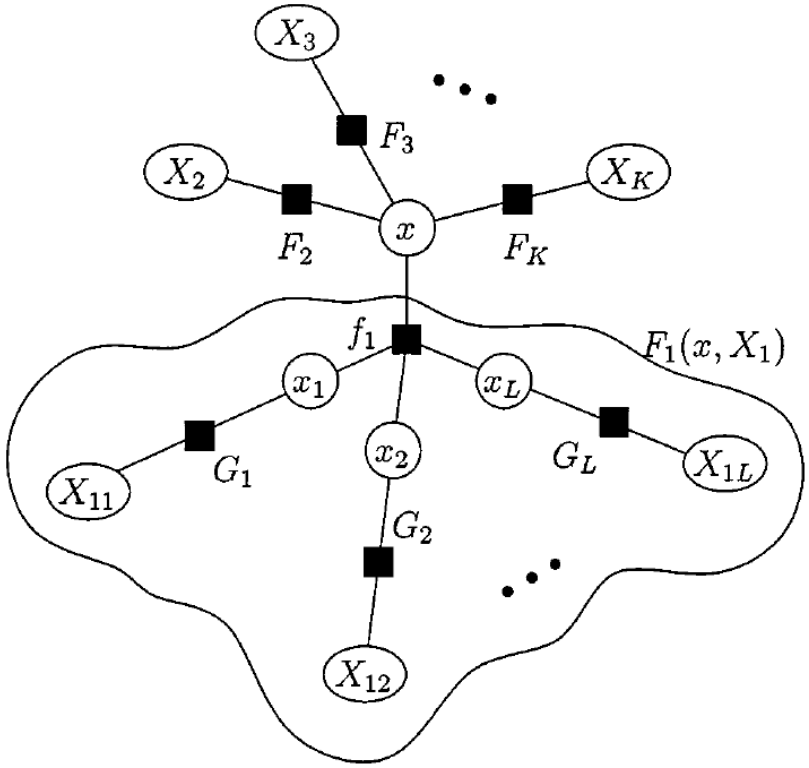


2/10: First Reading

Factor Graphs and the Sum-Product Algorithm

Frank R. Kschischang, *Senior Member, IEEE*, Brendan J. Frey, *Member, IEEE*, and
Hans-Andrea Loeliger, *Member, IEEE*



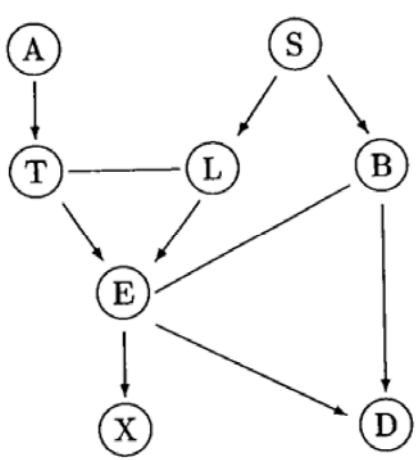


2/10: Second Reading

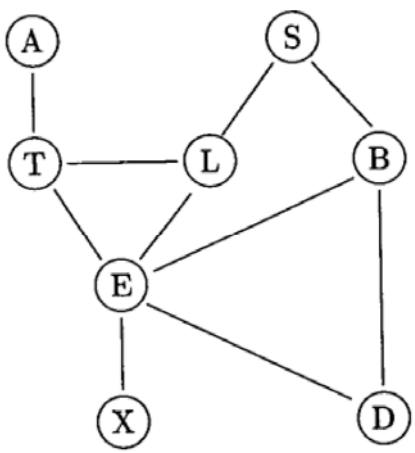
INTRODUCTION TO INFERENCE FOR BAYESIAN NETWORKS

ADVANCED INFERENCE IN BAYESIAN NETWORKS

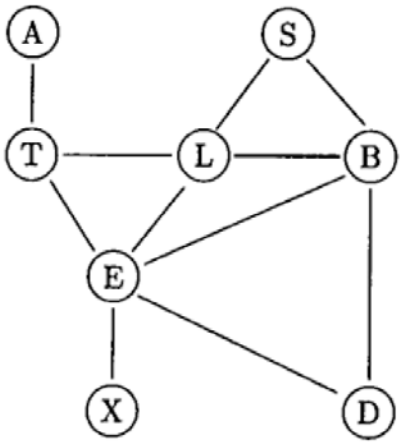
ROBERT COWELL
City University, London.



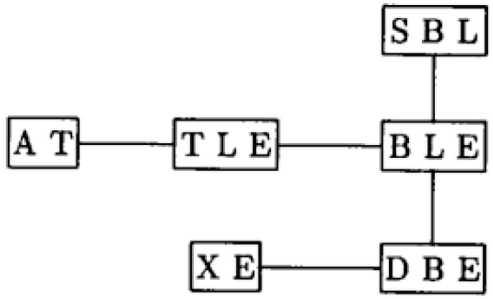
Directed Graphical Model



Undirected Graphical Model



Triangulated Graph



Junction Tree