Graphical Models in Tikz

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July 21, 2015

TikZ examples for graphical models (Bayesian networks) and directed factor graphs [1].

Table 1: Node types

Type	Syntax	Output
Latent variable	\node[latent]	x
Observed variable	\node[obs]	y
Deterministic	\node[det]	dot
Constant	\node[const]	a
Factor	\node[factor]	$\mathcal{N}$ ■

Table 2: Edge types
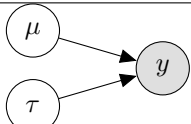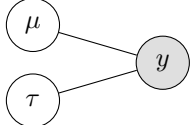
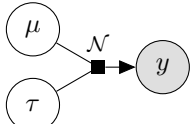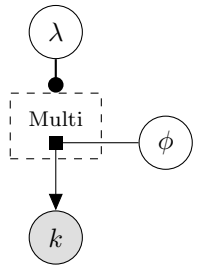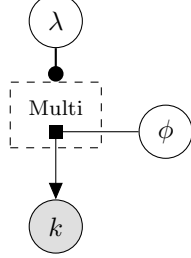| Type	Syntax	Output
Directed edges	\edge[opts]{inputs}{outputs}	
Undirected edges	\edge[-,opts]{inputs}{outputs}	
Factor graph edges	\factoredge[opts]{inputs}{via}{outputs}	

Table 3: Utilities

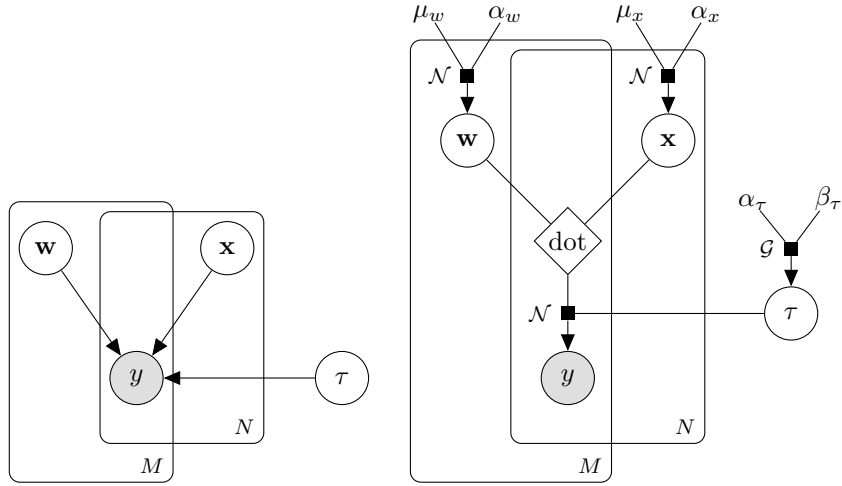| Type	Syntax	Output
Plate	\plate	$\boxed{\begin{array}{c} \boxed{x_m} \\ m \in \mathcal{M} \end{array}}$
Gate		$\lambda \to \blacksquare \text{Multi} - \phi \to k$

Figure 1: PCA model as a Bayesian network and a directed factor graph.
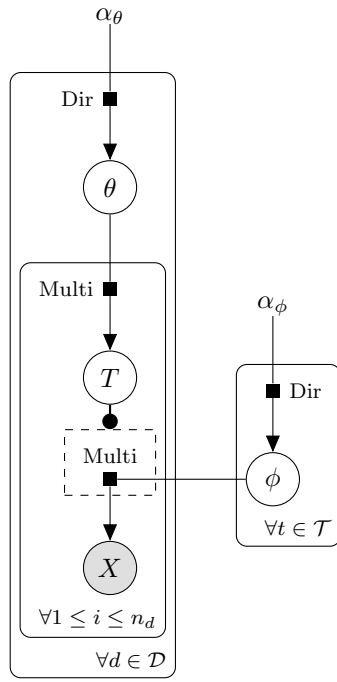
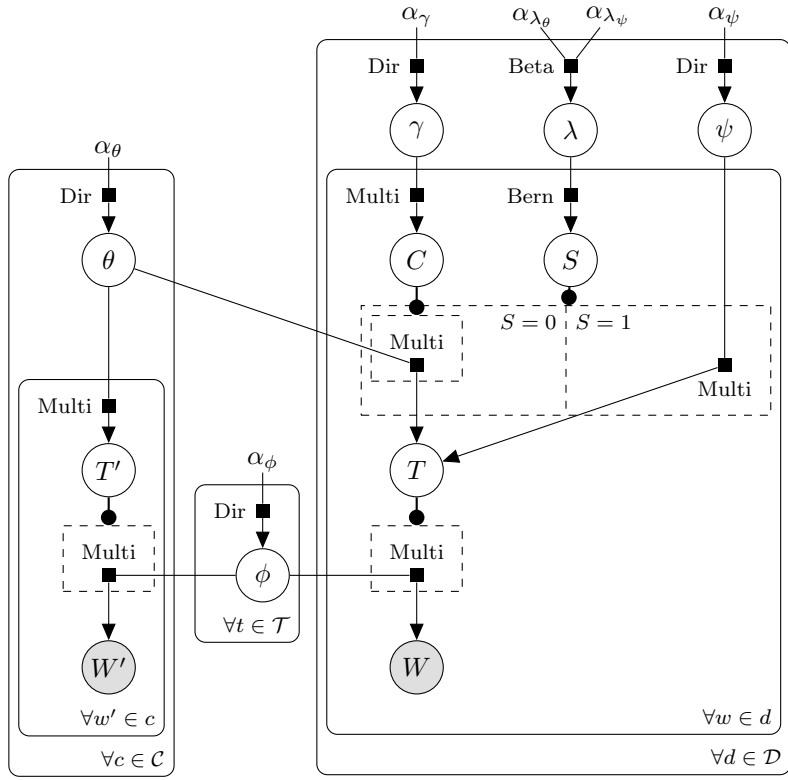Figure 2: Latent Dirichlet allocation as directed factor graph.

Figure 3: Citation influence model with own topics [2] as directed factor graph.

References

[1] Laura Dietz, *Directed Factor Graph Notation for Generative Models.* Technical Report. 2010

[2] Laura Dietz, Steffen Bickel, Tobias Scheffer, *Unsupervised Prediction of Citation Influences.* In: Proceedings of International Conference on Machine Learning. 2007