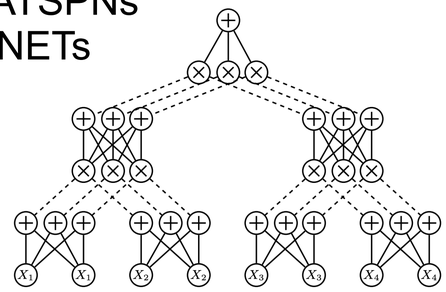
HyperSPNs: Compact and Expressive Probabilistic Circuits

Andy Shih, Dorsa Sadigh, Stefano Ermon {andyshih,dorsa,ermon}@cs.stanford.edu

Paper / Code:

Large SPNs proposed
[Peharz et al. '19, '20]
- RATSPNs
- EiNETs



Regularization Choices

Dropout	Discriminative only
Weight Decay	Many parameters
HyperSPN	Few parameters Memory efficient Better generalization

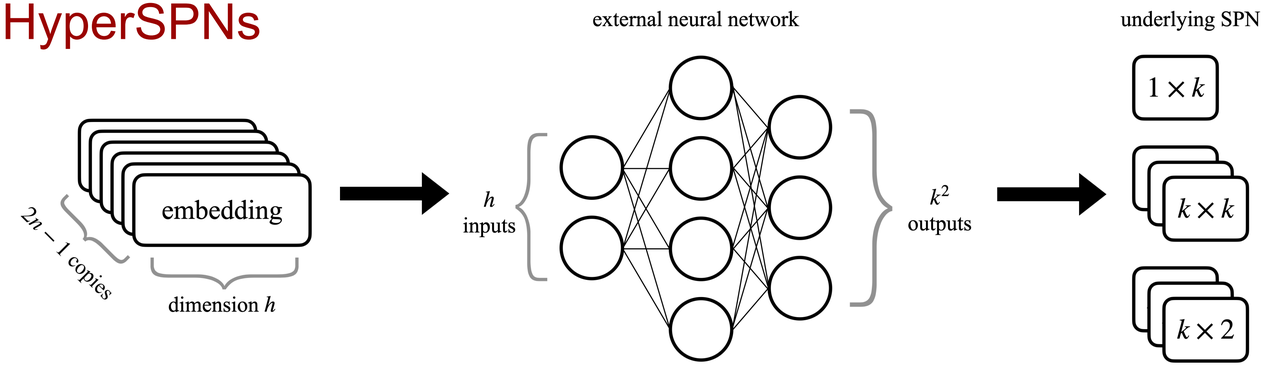
our proposal

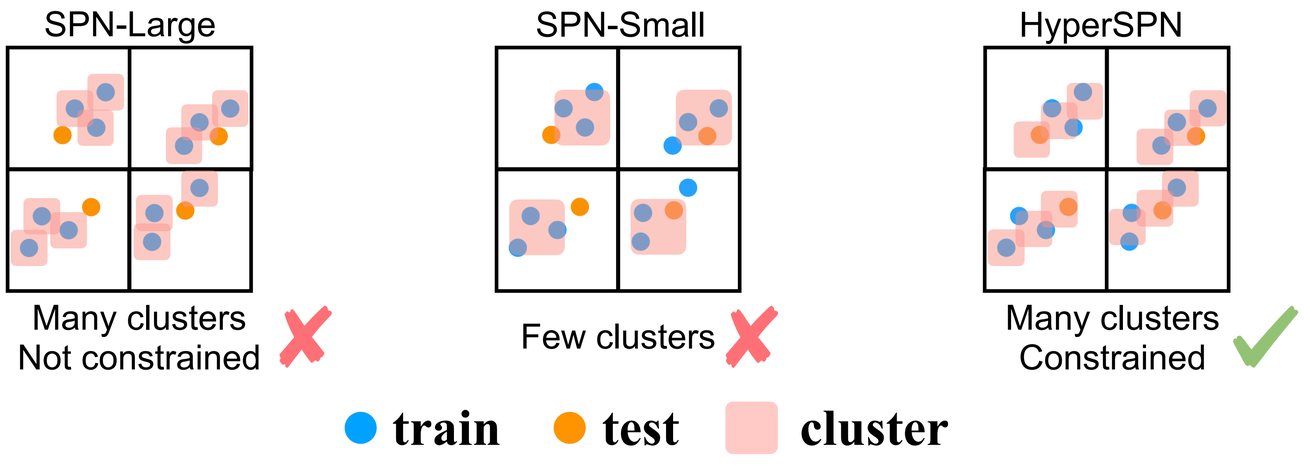
Experiments

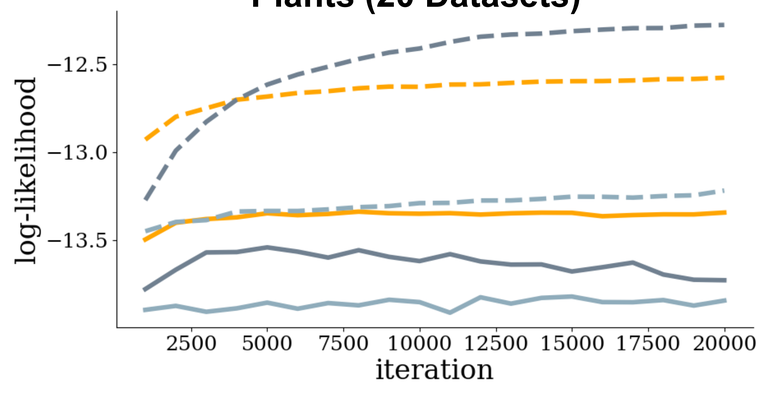
Synthetic (Test Log-LL)

	Log-Likelihood	# Params
SPN-Large	-166.90 $\pm$ 0.03	640050
SPN-Small	-167.00 $\pm$ 0.01	102450
HyperSPN	**-166.32 $\pm$ 0.04**	129115

HyperSPNs







Better than weight decay on
- 16 / 20 of Twenty Datasets
- 14 / 15 of Amazon Baby Reg.