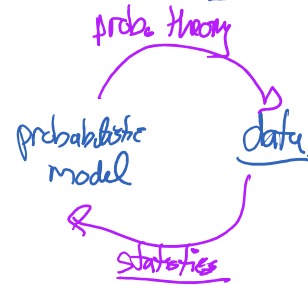
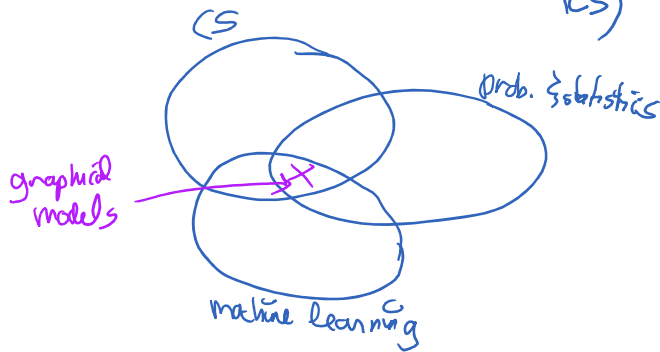


email sign-up by tomorrow: bit.ly/IFT6269-F20

probabilistic graphical models:

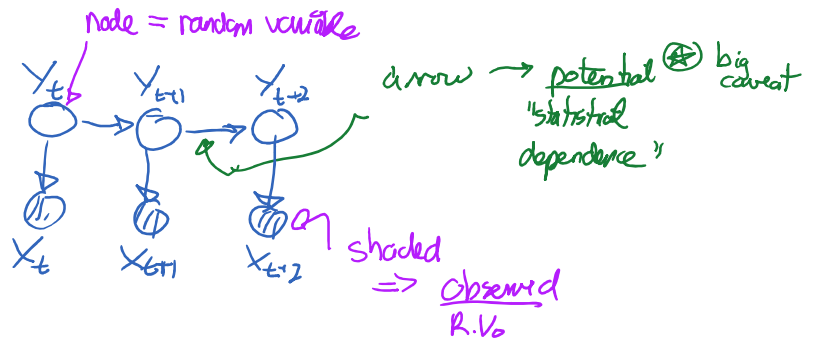
model multivariate data

graphical model \rightarrow mix of graph theory + probability theory (CS)



Applications:

hidden Markov model



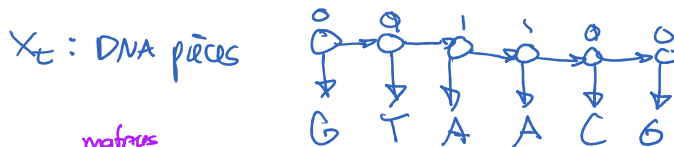
a) speech recognition: $Y_t \rightarrow$ "phonemes"

$X_t \rightarrow$ sound waves

b) part-of-speech tagging: Y_t : part of speech (pos)
 X_t : words

Y_1	Y_2	\dots	Y_n	
DT	V	-	DT	-
↓	↓		↓	↓
This	is	a	red	box
X_1	X_2	\dots		

c) gene finding: Y_t : coding vs. non-coding region $Y_t \in \{0,1\}$



d) control: $Y_{t+1} = AY_t + BV_t + \epsilon_t$ here x_t, y_t are cts. vectors

ϵ_t is noise

$$x_t = C y_t + \varepsilon_t$$

*control
term*

if ε_t & ε_t' are Gaussian

HMM \rightarrow "Kalman filter"