

# Types of model

Discriminative Model and  
Generative Model

## Discriminative model

modeling the dependence of  
unobserved variables on  
observed ones

also called conditional models.

Deterministic:  $y = f_{\theta}(x)$   
Probabilistic:  $p_{\theta}(y|x)$

## Examples

Linear regression, logistic regression, k nearest neighbor, SVMs,  
(multi-layer) perceptrons, decision trees, random forest etc.

## Generative model

modeling the joint probabilistic  
distribution of data

given some hidden parameters or variables

then do the conditional inference

$$p_{\theta}(y|x) = \frac{p_{\theta}(x,y)}{p_{\theta}(x)} = \frac{p_{\theta}(x,y)}{\sum_{y'} p_{\theta}(x,y')}$$

## Examples

Naive Bayes, Hidden Markov Model, Mixture Gaussian, Markov  
Random Fields, Latent Dirichlet Allocation etc.