

Q1-1: Are these statements true or false?

(A) Generative methods model joint probability distribution while discriminative methods model posterior probabilities of  $Y$  given  $X$ .

(B) We usually train a discriminative model by maximizing the posteriors for true labels for supervised tasks.

1. True, True
2. True, False
3. False, True
4. False, False

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(A) The aim of a generative model is to learn the generative story, i.e. the joint distribution  $P(X, Y)$ . On the other hand, a discriminative model aims to directly learn the posterior probability  $P(Y | X)$ .  
(B) We usually train a discriminative model by minimizing the corresponding loss function. MLE is also ok, but it often requires us to specify the distribution first, which makes the learning problem more complicated, thus limiting its application area.

Q2-1: Are these statements true or false?

(A) Naïve Bayes assumes conditional independence of features to decompose the joint probability into the conditional probabilities.

(B) We use the Bayes' rule to calculate the posterior probability.

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(A) Just as we learnt in the lecture.

(B) We use Bayes rule to decompose posterior probability into prior probability and conditional probability given each class, so that we can compute it using the estimated parameters.