Gaussian discriminal analysis
& Naive Bayes

Generative Learning algorithms

⇒ So far we've mainly been talking about learning algorithms that models

$$P(y \mid x; \theta)$$

↳ Such algorithms are called ==discriminative learning algorithm.==

⇒ Here, we'll talk about algorithms that instead try to model $P(x \mid y)$ (and $P(y)$)

↳ These algorithms are called ==generative learning algorithms.==

⇒ After modeling $P(y)$ (called the class priors) and $P(x \mid y)$, our algorithm can then use Bayes rule to derive the posterior distribution on y given x

$$P(y \mid x) = \frac{P(x \mid y) P(y)}{P(x)}$$

$$\longrightarrow \sum P(x \mid y) P(y)$$

$$\underset{y}{\arg\max} \, P(y \mid x) = \underset{y}{\arg\max} \, \frac{P(x \mid y) P(y)}{P(x)}$$

$$= \underset{y}{\arg\max} \, P(x \mid y) P(y)$$