case we have a feature vector **x**. So, finally, we get

$$P(c_i|\mathbf{x}) = \frac{p(\mathbf{x}|c_i)P(c_i)}{\sum_{j=1}^{g} p(\mathbf{x}|c_j)P(c_j)} \tag{7.7}$$

where $P(c_i)$ or P_i, the prior probability, is the unconditional probability that the class is i independently of the information provided by **x** and $p(\mathbf{x}|c_i)$ is the density of **x** when the class is c_i. $P(c_i|\mathbf{x})$ is referred to as the "posterior probability for class i."