

According to Naive Bayes method, find classes of (K, P, T, 6).

X_1	X_2	X_3	X_4	D
K	P	G	2	H
K	N	G	3	H
B	E	G	1	H
B	P	G	3	S
B	N	T	5	S
K	E	T	4	S

$$\mu_H = 2 \quad \sigma_H = 1$$

$$\mu_S = 4 \quad \sigma_S = 1$$

$$P(X_4=6 | H) = 0.00013$$

$$P(X_4=6 | S) = 0.054$$

For overcome zero divide problem, let be “a = 1e-10”

$$\begin{aligned} P(H | K, P, T, 6) &= P(H) P(X_1=K|H) P(X_2=P|H) P(X_3=T|H) P(X_4=6|H) \\ &= 1/2 * 2/3 * 1/3 * (a+0)/(a+3) * 0.00013 = \frac{a*0.00013}{3*3*(a+3)} \end{aligned}$$

$$\begin{aligned} P(S | K, P, T, 6) &= P(S) P(X_1=K|S) P(X_2=P|S) P(X_3=T|S) P(X_4=6|S) \\ &= 1/2 * 1/3 * 1/3 * (a+2)/(a+3) * 0.054 = \frac{(a+2)*0.054}{2*3*3*(a+3)} \end{aligned}$$

Because $P(S | K, P, T, 6) > P(H | K, P, T, 6)$, as a new record, the class of (K, P, T, 6) is “S”.