Thunchanok Chaitongdee

age > 40, income = low

Want to know P(buy? | age >40, income : hight)

age	income	student	credit_rating	buys_computer
<=30	high	no	fair	no
<=30	high	no	excellent	no
31…40	high	no	fair	yes
>40	medium	no	fair	yes
>40	low	yes	fair	yes
>40	low	yes	excellent	no
31…40	low	yes	excellent	yes
<=30	medium	no	fair	no
<=30	low	yes	fair	yes
>40	medium	yes	fair	yes
<=30	medium	yes	excellent	yes
31…40	medium	no	excellent	yes
31…40	high	yes	fair	yes
>40	medium	no	excellent	no

Sol

P(buy : Yes) = 9/14 = 0.643
P(buy : No) = 5/14 = 0.357

P(age >40 | buy : Yes) = 3/9 = 0.33
P(age >40 | buy : No) = 2/5 = 0.4
P(incom = low | buy : Yes) = 2/9 = 0.22
P(incom = low | buy : No) = 1/5 = 0.2
P(age >40, income = low | buy = Yes) = 0.0726
P(age >40, income : low | buy = No = 0.08

P(buy : Yes) · P(age >40, incom = low | buy = Yes) = 0.0476

P(buy : No) · P(age >40, incom = low | buy = No) = 0.028

Laplacian

Sol P(buy | age 31-40, income : hight)

P(buy : Yes) = 9/14
P(buy : No) = 5/14
P(31-40 | buy : Yes) = 4+1/9+3 = 5/12
P(31-40 | buy : No) = 1/5+3 = 1/8
P(incomehight | buy : Yes) = 2/9
P(income hight | buy : N) = 2/5

$P(31-40, \text{incomehight} \mid \text{buy : yes}) = \frac{5}{12} \times \frac{2}{9}$

$P(31-40, \text{incomhight} \mid \text{buy : No}) = \frac{1}{8} \times \frac{2}{5}$

$P(\text{buy : yes}) P(31-40, \text{incomhight} \mid \text{buy : yes}) = \frac{5}{12} \times \frac{2}{9} \times \frac{9}{14} = 0.0595$

$P(\text{buy : No}) P(31-40, \text{incomhight} \mid \text{buy : No}) = \frac{1}{8} \times \frac{2}{5} \times \frac{5}{14} = 0.179$