

input age 31-40, income = high, stu = yes, fair

$$P(C_i) : P(\text{buys_computer} = \text{"yes"}) = 9/14 = 0.643$$

$$P(\text{buys_computer} = \text{"no"}) = 5/14 = 0.357$$

compute $P(X|C_i)$ for each class

$$P(\text{age} = \text{"31-40"} | \text{buys_computer} = \text{"yes"}) = 4/9 = 0.444$$

$$\begin{array}{l} \text{age} = 31-40 \\ \text{income} = \text{high} \\ \text{stu} = \text{yes} \\ \text{fair} = \text{fair} \end{array} \quad \begin{array}{l} \text{class} = \text{yes, no} \\ \text{total} = 9 \end{array}$$

$$P(\text{age} = \text{"31-40"} | \text{buys_computer} = \text{"no"}) = 0/5 = \frac{0}{5} = 0.0$$

$$P(\text{income} = \text{"high"} | \text{buys_computer} = \text{"yes"}) = 2/9 = 0.222$$

$$P(\text{income} = \text{"high"} | \text{buys_computer} = \text{"no"}) = 2/5 = 0.4$$

$$P(\text{student} = \text{"yes"} | \text{buys_computer} = \text{"yes"}) = 6/9 = 0.666$$

$$P(\text{student} = \text{"yes"} | \text{buys_computer} = \text{"no"}) = 1/5 = 0.2$$

$$P(\text{credit_rating} = \text{"fair"} | \text{buys_computer} = \text{"yes"}) = 5/9 = 0.555$$

$$P(\text{credit_rating} = \text{"fair"} | \text{buys_computer} = \text{"no"}) = 2/5 = 0.222$$

$$P(X|C_i) : P(X | \text{buys_computer} = \text{"yes"}) = 0.444 \times 0.222 \times 0.666 \times 0.555 = 0.037$$

$$P(X | \text{buys_computer} = \text{"no"}) = 0.002$$

$$P(X|C_i) * P(C_i) : P(X | \text{buys_computer} = \text{"yes"}) * P(\text{buys_computer} = \text{"yes"}) = 0.023$$

$$P(X | \text{buys_computer} = \text{"no"}) * P(\text{buys_computer} = \text{"no"}) = 0.0007$$

Therefore, x belongs to class ("buys_computer = yes") #