D1	Happy(h)	love happy happy joy smile angry
D2	Happy(h)	cry happy joy love happy
D3	Happy(h)	good happy love cry love
D4	Happy(h)	pain love happy joy love
D5	Unhappy(~h)	love angry pain pain
D6	Unhappy(~h)	love angry pain
D7	Unhappy(~h)	angry angry pain
D8	??	cry love angry pain

21

10

$P(h) = \frac{4}{7}$ $P(\sim h) = \frac{3}{7}$

Conditional   Probabilities

Class h

$P(\text{Love} | h) = \frac{6}{21}$

$P(\text{pain} | h) = \frac{1}{21}$

$P(\text{joy} | h) = \frac{3}{21}$

$P(\text{smile} | h) = \frac{1}{21}$

$P(\text{angry} | h) = \frac{1}{21}$

$P(\text{happy} | h) = \frac{6}{21}$

$P(\text{cry} | h) = \frac{2}{21}$

$P(\text{good} | h) = \frac{1}{21}$

Class ~h

$P(\text{Love} | h) = \frac{2}{10}$

$P(\text{pain} | h) = \frac{4}{10}$

$P(\text{joy} | h) = 0$

$P(\text{smile} | h) = 0$

$P(\text{angry} | h) = \frac{4}{10}$

$P(\text{happy} | h) = 0$

$P(\text{cry} | h) = 0$

$P(\text{good} | h) = 0$

$P(h | d8) = P(h) * \left(P(\text{cry} | h) * P(\text{love} | h) * P(\text{angry} | h) * P(\text{pain} | h) \right)$

$= \frac{4}{7} * \left(\frac{2}{21} * \frac{6}{21} * \frac{1}{21} * \frac{1}{21} \right) \cong 3.53 \times 10^{-5}$

$P(\sim h | d8) = P(\sim h) * \left(P(\text{cry} | \sim h) * P(\text{love} | \sim h) * P(\text{angry} | \sim h) * P(\text{pain} | \sim h) \right)$

$= \frac{3}{7} \times 0 \times \frac{2}{10} \times \frac{4}{10} \times \frac{4}{10}$

⇒ zero condition

設 m = 1

$$P(love|\sim h) = \frac{2+1\times\frac{1}{4}}{10+1} = \frac{\frac{9}{4}}{11} = \frac{9}{44}$$

$$P(cry|\sim h) = \frac{0+1\times\frac{1}{4}}{10+1} = \frac{\frac{1}{4}}{11} = \frac{1}{44}$$

$$P(angry|\sim h) = \frac{4+1\times\frac{1}{4}}{10+1} = \frac{\frac{17}{4}}{11} = \frac{17}{44}$$

$$P(pain|\sim h) = \frac{4+1\times\frac{1}{4}}{10+1} = \frac{\frac{17}{4}}{11} = \frac{17}{44}$$

$$\therefore P(\sim h|d8) = \frac{3}{7}\times\frac{9}{44}\times\frac{1}{44}\times\frac{17}{44}\times\frac{17}{44} = 0.000297$$

Ans: Happy 機率 = 0.0000353

~Happy 機率 = 0.000297 #