$A^c \quad \overline{A} \quad A'$

$A^c = \Omega - A$

$\Omega \setminus A$

$\dot{A} \quad a$

$$\Omega = \{\omega_1, \omega_2, \omega_3\}$$

$$\mathcal{A}_1 = \{\Omega, \phi\} \qquad P(\Omega) = 1$$
$$P(\phi) = 0$$

$$\Omega - \Omega = \phi$$

$$\mathcal{A}_2 = \{\Omega, \phi, \{\omega_1\}, \{\omega_2, \omega_3\}\}$$

$$\Omega - \{\omega_1\}$$

$$\mathcal{A}_3 = \{\Omega, \phi, \{\omega_2\}, \{\omega_1, \omega_3\}\}$$

$$\mathcal{A}_4 = \{\Omega, \phi, \{\omega_3\}, \{\omega_2, \omega_1\}\}$$

$$\mathcal{A}_5 = \{\Omega, \phi, \{\omega_1\}, \{\omega_2\}, \{\omega_2, \omega_3\},$$
$$\{\omega_1, \omega_3\}, \{\omega_1, \omega_2\}, \{\omega_3\}\}$$

$A_1 \rightarrow m(A_1) = 1 \quad p(A_1) = \frac{1}{6^6} \doteq$

$m(\Omega) = 6^6$

$6\,6\,6\,6\,6\,6 \rightarrow 6^6 \quad \doteq 0{,}000024$

$A_2 \rightarrow m(A_2) = 6! \Rightarrow p(A_2) = \frac{6!}{6^6}$

$\doteq 0{,}0154$

$A_3 \Rightarrow m(A_3) = 1 \rightarrow p(A_3) = \frac{1}{6^6}$

$A_4 \rightarrow 1\,1\,1\,1\,1\,5 \Rightarrow m(A_4) = 5 \cdot 6$

$p(A_4) = \frac{5 \cdot 6}{6^6} \doteq 0{,}000643$

$A_5 \rightarrow \binom{6}{4} \cdot 5 \cdot 5 \Rightarrow p(A_5) = \frac{5 \cdot 5 \cdot \binom{6}{4}}{6^6} \doteq$

$\doteq 0{,}008037$

$A_6 \Rightarrow m(A_6) = m(A_3) + m(A_4) + m(A_5)$

$p(A_6) = p(A_3) + p(A_4) + p(A_5) \doteq 0{,}087$

$A_7 \rightarrow m(A_7) = 6 \Rightarrow p(A_7) = \frac{6}{6^6} \doteq$

$\doteq 0{,}000128$

$A_8 \rightarrow 6\,5 \quad m(A_8) = 6 \cdot 5 \cdot \frac{1}{2} \binom{6}{3} \Rightarrow p(A_8) \doteq 0{,}0064$

$\frac{6!}{3!3!} = \binom{6}{3}$

$A_9 \rightarrow 6\,5\,4 \quad m(A_9) = \frac{6 \cdot 5 \cdot 4}{3 \cdot 2} \cdot \frac{6!}{2!2!2!} \rightarrow$

$\binom{6}{3} = \frac{6!}{3!3!}$

$\frac{6!}{2!2!2!} \qquad p(A_9) = 0{,}03858$

$A_{10} \rightarrow 3\,3\,3\,3\,3\,3 \rightarrow m(A_6) = 3^6$

$p(A_{10}) = \frac{3^6}{6^6} \doteq 0{,}015625$

n – počet

$|\Omega| = 2^n$

2 2 2 . . . .

L L R R R L R . . .

n

A – líc k-krát

L L R L R R L L R . . . L

$$\frac{n!}{k!(n-k)!} = \binom{n}{k}$$

$$P(A) = \frac{\binom{n}{k}}{2^n}$$

$$P(A|H) = \frac{P(A \cap H)}{P(H)}$$

5. 5 % diabetiků → H

2 % DTK = $A \cap H$

A – kuřák

$$P(A|H) = \frac{0{,}02}{0{,}05} = 0{,}4$$

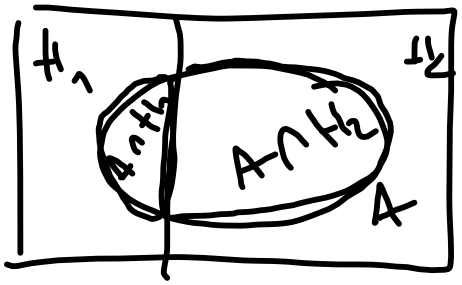
$H_i \quad \sum_{i \in I} P(H_i) = 1$

$$P(A) = \sum_{i \in I} P(H_i) \cdot P(A \mid H_i)$$

$$P(A \mid H) = \frac{P(A \cap H)}{P(H)}$$

$$P(A \cap H) = P(H) \cdot P(A \mid H)$$

$$P(A) \quad P(A)$$



$$P(A) = P(A \cap H_1) + P(A \cap H_2)$$

b – bílých c – černých

1. klasicky

I. bílá $\Rightarrow \frac{b}{b+c} \cdot \frac{b-1}{b+c-1}$

II. černé $\Rightarrow \frac{c}{b+c} \cdot \frac{b}{b+c-1}$

1. tah 2. tah

$$P(A) = \frac{b}{b+c} \cdot \frac{b-1}{b+c-1} + \frac{c}{b+c} \cdot \frac{b}{b+c-1} =$$

$$= \underline{\underline{\frac{b}{c+b}}}$$

2. Podmíněná pravděp.

H_1 – 1. tah bílá

H_2 – 1. tah černá

$$P(H_1)\cdot P(A|H_1) + P(H_2)\cdot P(A|H_2)$$

$P(H_1)$: $\frac{b}{b+c}$ ↙ $P(A|H_1)$: $\frac{b-1}{b+c-1}$

$P(H_2)$: $\frac{c}{b+c}$ ↓ $P(A|H_2)$: $\frac{b}{b+c-1}$

$$= \frac{b}{c+b}$$

Jev A → vytáhli jsme stříbrnou

$$P(H_2|A) = \frac{P(H_2)\cdot P(A|H_2)}{\sum_{i=1}^{3} P(H_i)\cdot P(A|H_i)}$$

$P(H_1) = \frac{1}{3}$ $P(H_2) = \frac{1}{3}$ $P(H_3) = \frac{1}{3}$

$P(A|H_1) = 0$ $P(A|H_2) = \frac{1}{2}$ $P(A|H_3) = 1$

$$P(H_2|A) = \frac{\frac{1}{3}\cdot\frac{1}{2}}{\frac{1}{3}\cdot 0 + \frac{1}{3}\cdot\frac{1}{2} + \frac{1}{3}\cdot 1} = \frac{\frac{1}{6}}{\frac{1}{2}} = \frac{1}{3}$$

H_1 – zná odpověď

H_2 – hádá

A – student odpověděl správně

$$P(H_2|A) = \frac{P(H_2)\cdot P(A|H_2)}{P(H_1)P(A|H_1)+P(H_2)P(A|H_2)}$$

$P(H_1) = 0{,}9 \quad P(A|H_1) = 1$

$P(H_2) = 0{,}1 \quad P(A|H_2) = \frac{1}{4}$

$$P(H_k|A) = \frac{0{,}1 \cdot 0{,}25}{0{,}9 \cdot 1 + 0{,}1 \cdot 0{,}25} = \frac{1}{37} = 0{,}0\overline{27}$$

B -> slabší student

$P(H_1) = 0{,}5 \quad P(A|H_1) = 1$

$P(H_2) = 0{,}5 \quad P(A|H_2) = \frac{1}{4}$

$$P(H_2|A) = \frac{0{,}5 \cdot \frac{1}{4}}{0{,}5 \cdot 1 + 0{,}5 \cdot \frac{1}{4}} = \frac{1}{5} = 0{,}2$$

$20 \rightarrow 4n + 10d + 6p$

0.9 0.7 0.5

$H_1 - 2v \rightarrow P(H_1) = \frac{\binom{4}{2}}{\binom{20}{2}}$

$H_2 - 2d \rightarrow P(H_2) = \frac{\binom{10}{2}}{\binom{20}{2}}$

$H_3 - 2p \rightarrow P(H_3) = \frac{\binom{6}{2}}{\binom{20}{2}}$

$H_4 = n + d \rightarrow P(H_4) = \frac{4 \cdot 10}{\binom{20}{2}}$

$H_5 = n + p \rightarrow P(H_5) = \frac{4 \cdot 6}{\binom{20}{2}}$

$H_6 - d + p \rightarrow P(H_6) = \frac{10 \cdot 6}{\binom{20}{2}}$

$P(A|H_1) = 0,9 \cdot 0,9$; $P(A|H_4) = 0,9 \cdot 0,7$

$P(A|H_2) = 0,7 \cdot 0,7$; $P(A|H_5) = 0,9 \cdot 0,5$

$P(A|H_3) = 0,5 \cdot 0,5$; $P(A|H_6) = 0,7 \cdot 0,5$

$P(H_1) \cdot P(A|H_1) + P(H_2) \cdot P(A|H_2) + \dots +$

$+ P(H_6) \cdot P(A|H_6) = 0,46$

A – nastane porucha

H_1 – výrobek má vadu

H_2 – výrobek nemá vadu

$P(H_1) = 0.1 \quad P(H_2) = 0.9$

$P(A) = P(H_1) \cdot P(A|H_1) + P(H_2) \cdot P(A|H_2)$

$P(A|H_1) = 0.5 \quad P(A|H_2) = 0,01$

$P(A) = 0,5 \cdot 0,1 + 0,01 \cdot 0,9 = 0,059$