

HOMEWORK 7

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Problem 2:

No	Color	Legs	Height	Smelly	Species
1	White	3	Short	Yes	M
2	Green	2	Tall	No	M
3	Green	3	Short	Yes	M
4	White	3	Short	Yes	M
5	Green	2	Short	No	H
6	White	2	Tall	No	H
7	White	2	Tall	No	H
8	White	2	Short	Yes	H

Probability of each species:

$$+ P(H) = \frac{4}{8} = 0.5$$

$$+ P(M) = \frac{4}{8} = 0.5$$

Color:

$$+ P(\text{Color} = \text{Green} \mid H) = \frac{3}{8} = 0.375$$

$$+ P(\text{Color} = \text{White} \mid H) = \frac{5}{8} = 0.625$$

Legs:

$$+ P(\text{Legs} = 2 \mid H) = \frac{3}{8} = 0.375$$

$$+ P(\text{Legs} = 3 \mid H) = \frac{5}{8} = 0.625$$

Height

$$+ P(\text{Height} = \text{Tall} \mid H) = \frac{3}{8} = 0.375$$

$$+ P(\text{Height} = \text{Short} \mid H) = \frac{5}{8} = 0.625$$

Smelly:

$$+ P(\text{Smelly} = \text{Yes} \mid H) = \frac{4}{8} = 0.5$$

$$+ P(\text{Smelly} = \text{No}) = \frac{4}{8} = 0.5$$

Example:

$$X = (Color = c, Legs = l, Height = h, Smelly = s)$$

Calculate the probability of each species given X:

$$P(M|X) = P(M) * P(Color = c|X) * P(Legs = l|X) * P(Height = l|X) * P(Smelly = s|X)$$

$$P(H|X) = P(H) * P(Color = c|H) * P(Legs = l|H) * P(Height = l|H) * P(Smelly = s|H)$$

If $P(M|X) > P(H|X)$ then X is M, else X is H.