Activity 6 : Data Classification 2

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name	Birth	Fly	water	legs	class
human	yes	no	no	yes	mamals
whale	yes	no	yes	no	mamals
bat	yes	yes	no	yes	mamals
cat	yes	no	no	yes	mamals
prcupine	yes	no	no	yes	mamals
platypys	no	no	no	yes	mamals
dolphin	yes	no	yes	no	mamals
python	no	no	no	no	non mamals
salmon	no	no	yes	no	non mamals
frog	no	no	sometimes	yes	non mamals
komodo	no	no	no	yes	non mamals
pigeon	no	yes	no	yes	non mamals
lopeard shark	yes	no	yes	no	non mamals
turtle	no	no	sometimes	yes	non mamals
penguin	no	no	sometimes	yes	non mamals
eel	no	no	yes	no	non mamals
salamander	no	no	sometimes	yes	non mamals
gila monster	no	no	no	yes	non mamals
owl	no	yes	no	yes	non mamals
eagle	no	yes	no	yes	non mamals

a. Estimate the conditional probabilities for P(Given Birth=yes | mammals), P(Can Fly=yes |mammals), P(Live in Water=yes |mammals), P(Have Legs=yes | mammals).

a.1. P(Given Birth=yes | mammals) = $\frac{6}{7}$

a.2. P(Can Fly=yes |mammals) = $\frac{1}{7}$

a.3. P(Live in Water=yes |mammals) = $\frac{2}{7}$

a.4. P(Have Legs=yes | mammals) = $\frac{5}{7}$

b. Estimate the conditional probabilities for P(Given Birth=yes | non-mammals), P(Can Fly=yes | non-mammals), P(Live in Water=yes | non-mammals), P(Have Legs=yes | non-mammals)

b.1. P(Given Birth=yes | non-mammals) = $\frac{1}{13}$

b.2. Can Fly=yes | non-mammals) = $\frac{3}{7}$

b.3. P(Live in Water=yes | non-mammals) = $\frac{3}{13}$

b.4. P(Have Legs=yes | non-mammals) = $\frac{9}{13}$

c. Estimate the conditional probabilities for P(mammals), P(non-mammals)

c.1. P(mammals) = $\frac{7}{20}$

c.2. P(non-mammals) = $\frac{13}{20}$

d. Predict the class of the record

Birth	Fly	water	legs	class
yes	no	yes	no	?

d.1. P(mammal | Given Birth=yes, Can Fly=No, Live in water=Yes, Have Legs=No)

name	Birth	Fly	water	legs	class
whale	yes	no	yes	no	mamals
dolphin	yes	no	yes	no	mamals

=P(Given Birth=yes | mammals) * P(Can Fly=No | mammals) * P(Live in water=Yes | mammals) * P(Have Legs=No | mammals) * P(mammals)

= $\frac{6}{7} * \frac{6}{7} * \frac{2}{7} * \frac{2}{7} * \frac{7}{20}$

= 0.02099

d.2. P(non-mammal | Given Birth=yes, Can Fly=No, Live in water=Yes, Have Legs=No)

name	Birth	Fly	water	legs	class
lopeard shark	yes	no	yes	no	non mamals

=P(Given Birth=yes | non-mammals) * P(Can Fly=No | non-mammals) * P(Live in water=Yes | non-mammals) * P(Have Legs=No | non-mammals)

$$= \frac{1}{13} * \frac{10}{13} * \frac{3}{13} * \frac{4}{13} * \frac{13}{20}$$

= 0.00273