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| Surname | Initials | Student number |
| Ngubo | T | 22351156 |
| Mabuyakhulu | M | 22305490 |

**Machine Learning Activity 10**

**Due Date: 21 June 2024**

Analyse the sample dataset given below and answer questions that follow.

**Sample Dataset**

Color Size Texture Weight Apple

Red Small Smooth Light Yes

Green Large Rough Heavy No

Red Large Smooth Heavy Yes

Green Small Rough Light No

Red Small Rough Light Yes

Green Large Smooth Heavy No

Red Large Rough Heavy Yes

Green Small Smooth Light No

Red Small Smooth Heavy Yes

Green Large Rough Light No

* Determine whether a new object with the following features is an apple. Show all the steps that made you to arrive to the final answer:

**Color: Red**

**Size: Small**

**Texture: Rough**

**Weight: Light**

**Step1**

**P(Apple = yes) = number of apple = yes / total number of instances**

**= 5/10**

**=0.5**

**P(Apple = no) = number of no / total number of instances**

**=5/10**

**= 0.5**

**2.1 For Yes**

**P(color = red | apple = yes) = number color = red and apple = yes / number apple = yes**

**=5/5**

**=1**

**P(size = small | apple = yes) = number Size = small and apple = yes / number apple = yes**

**=3/5**

**=0,6**

**P(Texture = rough | apple = yes) = number Texture = roug and apple = yes / number apple = yes**

**=2/5**

**=0,4**

**P(Weight = Light | Apple = yes ) = number weight and apple = yes / number apple = yes**

**=2/5**

**=0,4**

**2.2 For no**

**P(color = red | apple = no) = number color = red and apple = no / number apple = no**

**=0/5**

**=0**

**P(Size = small | apple = no) = number Size and apple = no / number apple = no**

**= 2/5**

**= 0,4**

**P(Texture = rough | apple = no) = number Texture = rough and apple = no / number Apple = no**

**= 3/5**

**=0,6**

**P(Weight = Light | Apple = no) = number weight = light and apple = no / number of apple = no**

**=3/5**

**=0,6**

**Step3**

**Calculate Posterior Probability for Yes and No**

**( 0,5x1x0,4x0,4x0,6) -for Yes**

**= 0,048**

**( 0,5x0x0,4x0,6x0,6 ) - for No**

**= 0**

**Step 4**

**Normalize Posterior Probability**

**3.1/3.1+3.2**

**=0,048/0,048+0**

**= 1 -for Yes**

**3.2/3.1+3.2**

**= 0/0,048+0**

**= no - for No**

Step5

Finding the Final Solution

4x100

=100 - For Yes

4x 100

=0 - For No

! Therefore the new object is an apple.  
  
As we have shown the calculations in steps using the bernoulli naïve bayes  
  
  
Here is the link to our youtube video

https://youtu.be/2CfbqUd9ISE?si=tsLgzJdcQK5gaGw3