

# Machine Learning

## Assignment 7 – Naive Bayes Classifier

### Dataset:

Color	Legs	Height	Smelly	Species
White	3	Short	Yes	M
Green	2	Tall	No	M
Green	3	Short	Yes	M
White	3	Short	Yes	M
Green	2	Short	No	H
White	2	Tall	No	H
White	2	Tall	No	H
White	2	Short	Yes	H

### Code:

```
NaiveBayesClassifier.java
1  import java.util.*;
2
3  public class NaiveBayesClassifier {
4
5  public static void main(String[] args) {
6      // Define the data
7      String[] color = {"White", "Green", "Green", "White", "Green", "White", "White", "White"};
8      int[] legs = {3, 2, 3, 3, 2, 2, 2, 2};
9      String[] height = {"Short", "Tall", "Short", "Short", "Short", "Tall", "Tall", "Short"};
10     String[] smelly = {"Yes", "No", "Yes", "Yes", "No", "No", "No", "Yes"};
11     String[] species = {"M", "M", "M", "M", "H", "H", "H", "H"};
12
13     // Take input values for the animal to predict
14     Scanner sc = new Scanner(System.in);
15     System.out.print("Enter color: ");
16     String inputColor = sc.nextLine();
17     System.out.print("Enter number of legs: ");
18     int inputLegs = sc.nextInt();
19     System.out.print("Enter height (Short/Tall): ");
20     String inputHeight = sc.nextLine();
21     sc.nextLine();
22     System.out.print("Is it smelly? (Yes/No): ");
23     String inputSmelly = sc.nextLine();
24
25     // Calculate the prior probabilities
26     double priorM = (double) Arrays.stream(species).filter(s -> s.equals("M")).count() / species.length;
27     double priorH = (double) Arrays.stream(species).filter(s -> s.equals("H")).count() / species.length;
```

```

29 // Calculate the likelihoods
30 double likelihoodM = 0;
31 double likelihoodH = 0;
32
33 for (int i = 0; i < color.length; i++) {
34     if (color[i].equals(inputColor) && legs[i] == inputLegs && height[i].equals(inputHeight) && smelly[i].equals(
35         if (species[i].equals("M")) {
36             likelihoodM++;
37         } else {
38             likelihoodH++;
39         }
40     }
41 }
42
43 // Divide by the number of occurrences of each species
44 likelihoodM /= Arrays.stream(species).filter(s -> s.equals("M")).count();
45 likelihoodH /= Arrays.stream(species).filter(s -> s.equals("H")).count();
46
47 // Calculate the posterior probabilities using Bayes' theorem
48 double posteriorM = (likelihoodM * priorM) / ((likelihoodM * priorM) + (likelihoodH * priorH));
49 double posteriorH = (likelihoodH * priorH) / ((likelihoodM * priorM) + (likelihoodH * priorH));
50
51 // Output the results
52 if (posteriorM > posteriorH) {
53     System.out.println("The animal will be M.");
54 } else {
55     System.out.println("The animal will be H.");
56 }
57 }
58 }

```

## Output:

```

"C:\Program Files\Java\jdk-19\bin\java
Enter color: Green
Enter number of legs: 2
Enter height (Short/Tall): tall
Is it smelly? (Yes/No): No
The animal will be H.

```

## Submitted By:

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