# In-Class-4

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1. Give the formula for the posterior numerator for each variety, e.g., posterior numerator (Iris-setosa).

P(Iris-setosa | X) = p(Iris-setosa) \*

p(sepal-length | Iris-setosa) \*

p(sepal-width | Iris-setosa) \*

p(petal-length | Iris-setosa) \*

p(petal-width | Iris-setosa)

P(Iris-versicolor | X) = p(Iris-versicolor) \*

p(sepal-length | Iris-versicolor) \*

p(sepal-width | Iris-versicolor) \*

p(petal-length | Iris-versicolor) \*

p(petal-width | Iris-versicolor)

P(Iris-virginica | X) = p(Iris-virginica) \*

p(sepal-length | Iris-virginica) \*

p(sepal-width | Iris-virginica) \*

p(petal-length | Iris-virginica) \*

p(petal-width | Iris-virginica)

1. Calculate P for each variety, e.g., P(Iris-setosa)

P(Iris-setosa) = 50/150 = 1/3

P(Iris-versicolor) = 50/150 = 1/3

P(Iris-virginica) = 50/150 = 1/3

1. Give the formula for p(sepal-length|Iris-setosa), if the mean value and variance of sepal-length for Iris-setosais 5.0 and 0.12, respectively. Substitute the values for x, μ, and σ2 into the formula.

x = 5.9

m = mu = 5.0

v = variance = 0.12

P(sepal-length | Iris-setosa) = (1/sqrt(2 \* pi \* 0.12)) \* e ^ [ -(5.9 – 5.0)^2/(2 \* 0.12) ]

= 0.04

1. How many conditional probabilities will the Naïve Bayesian Classifier need to calculate to classify the test sample?

Number of features = 4

Number of classes = 3

Total number of conditional probabilities = 4 \* 3 = 12

1. If posterior numerator(Iris-setosa) = 0.005, posterior numerator(Iris-versicolor) = 0.002, and posterior numerator(Iris-virginica) = 0.003, which variety did the Naïve Bayesian Classifier predict the test sample to be?

Iris -setosa, as it has highest posterior probability out of three classes.