For simplicity, set equal to

Since = for all ,

Looking at the decision column,

Looking at the decision column,

Looking at the decision column,

When minimizing against

When minimizing against

For the final probability range, choose the higher range.

So, declare to belong to Class 1 when



From the equation given in the text,

After setting equations equal to each other and moving terms,

After factoring out coefficients,

After completing the squares,

After simplification,

The decision boundary is the circular equation above with

(a, b) = (, ), and r =



Class-conditional likelihood is a probability function where the distribution of a random variable depends on the state of nature and expressed by . Class priors, also known as an a priori probability, are probability functions that express the probability of a certain class being the true state of nature in a given scenario, expressed by . The posterior probability of a class given an input , is the likelihood that a class is the true state of nature given that a feature value has been measured. They are related to each other through the rearrangement of terms leading to Bayes’ formula where

( ). The posterior is found by the multiplication of the class-conditional likelihood and the class prior divided by the evidence (the summation of all possible likelihoods and priors).

