Comparative Analysis Report

In this report we compare the results obtained using a Gaussian Discriminant Analysis model and then using the same model with the Bux - Muller transformation.

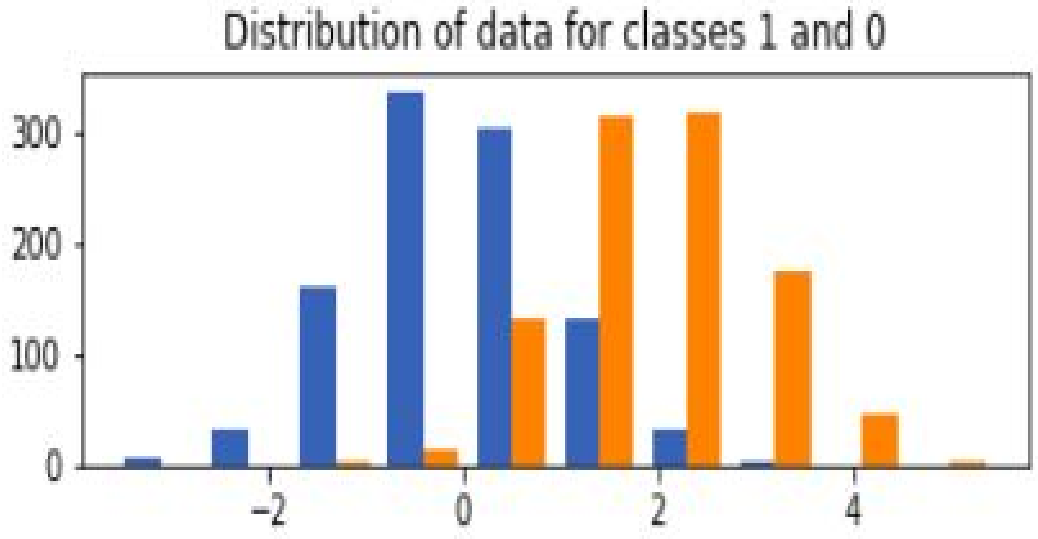
The Bux-Muller transformation is a method for generating uniformly distributed random numbers. Here, we initially take u1 and u2 as independent samples chosen from the uniform distribution on the unit interval between 0 and 1, then

$$Z_0 = R\cos(\Theta) = \sqrt{-2\ln U_1}\cos(2\pi U_2)$$

$$Z_1 = R\sin(\Theta) = \sqrt{-2\ln U_1}\sin(2\pi U_2).$$

Z0 and z1 are independent random variables with a standard normal distribution.

The data obtained using the above Bux - Muller transformation follows the gaussian distribution. The data obtained for the classes 0 and 1 can be shown in this figure-



Now, as we know that the GDA model is best for the data which follows gaussian distribution. So, the accuracy obtained earlier when we used the GDA without the Bux - Muller transformation is less, i,e, 50%. This is because the given microchip data do not follow gaussian distribution.

When we use Bux - Muller transformation, the dataset obtained follows the Gaussian distribution and we obtain an accuracy as high as 91.42%.

So, we can conclude that the GDA model is best suited for data following Gaussian distribution.