**FISCHER’S LINEAR DISCRIMINANT**

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Amongst infinitely many unit vectors, we are looking for that unit vector, when all

the data points are projected onto it gives good number of +ve points on one side and good number of -ve points on the other side.

m1=

m2=

Here, m1 and m2 are averages of all +ve and -ve points after they have been projected onto a unit vector w respectively.

In order to find our required w, our main objective is to maximize(m1-m2) along with minimizing

Where s1 is variance of +ve points after projection onto w and s2 is variance of -ve points after projection onto w.

Therefore, our job is to solve the following optimization problem:

**Max**

Upon solving we get, **w α**

Where M1 and M2 are average of +ve points and -ve points in the original space respectively.

By using the above equation of w, let’s say we have figured out w, which maximizes(m1-m2) along with minimizing. Now our objective is to figure out threshold/discriminant point on w.

After projecting points on w, we fit two normal distributions corresponding to +ve points and -ve points using Maximum Likelihood Estimator and intersection point of these pdfs(b) acts as discriminant point.

Alternatively, we can say acts as Decision boundary

Output screenshots:

 



