Linear Discrimination Analysis

Purpose

At the most basic level, Linear Discrimination Analysis is used as a dimension reduction tool.

It is also a reliable classification tool.

It is frequently implemented in facial recognition technology.

How it works

It focuses on maximising separability between established classes.

There are two important fundamental statistics required – category means and category variance.

When the distance between means is as far away as possible and the variance is as small as possible, the separation of categories is best.

To classify data LDA finds the highest probability for each category.

Bayes Theory estimates the probability of an output class (k) of an input (x) using the probability of each class and the data to which each class belongs.

Example: If the probability of having a fracture with a bone density of 0.54 is greater than the probability of not having a fracture with a bone density of 0.54, a new observation Y is more likely to fall into the category of having a fracture.

Limitations

The main limitation (and benefit) of LDA is its simplicity.

There are variations of LDA that can allow for more flexible decision boundaries.