Fisher's Linear Discriminant Analysis

Objective

To implement Fisher's Linear Discriminant Analysis from scratch. Fisher's LDA finds the optimal direction *w* along which data, when projected, may be separated optimally. This implementation transforms the data to a single dimension, and the separator here is then the *discriminant point*, which decides the predicted class labels.

The visualization of projected points, the normal distributions of the projected classes and the discriminant point is performed for improving clarity and intuition.

Dataset

The implementation is tested on two datasets, the first one containing 2 features for every data point (2D), and the second containing 3 features for each data example (3D).

2D dataset : `datasets/a1_d1.csv`

3D dataset : `datasets/a1_d2.csv`

Both datasets consist of 1000 data points each. Each row in each dataset corresponds to a single data point, with the last column of each row indicating the class label, which in this case, is either 0 (negative class) or 1 (positive class). The rest of the columns in each row, contain values for the features.

The algorithm is evaluated on each of these datasets independently.

Usage

1. Edit the path of dataset on which to test the implementation in `main.py`.

2. Run

```
$ python main.py
```