Proposal

Title: Linear Discriminant Analysis

Dimensionality reduction technique is important in many applications related to machine learning. Lecture 4.2 covered Principal Component Analysis (PCA), a popular dimensionality reduction technique. This activity will introduce another common dimensionality reduction technique known as Linear Discriminant Analysis (LDA). Both techniques project a high-dimensional dataset onto a lower-dimensional space. However, while PCA preserves the low-dimensional component with the most variance of the data, LDA preserves that with the best class-separability.

The main learning objectives are :

* Introduction to the concepts of IDA:

This activity will cover the fundamentals of LDA such as the criteria LDA uses to find its components and assumptions on the data sets. Knowledge of normal distribution will also be covered as a prerequisite.

* Dimensionality reduction of a dataset by LDA.

A provided script will demonstrate how LDA works to teach students how to conduct LDA on a given dataset.

* Comparison between LDA and PCA.

Given the data, students will compare the performance of LDA and PCA on classification. Students will be able to understand under what condition that one method outperforms the other and vice versa and thus choose an optimal dimensionality reduction approach under various condition.