Assignment 5 Software Design Document

CS2300 Section 4 Fall 2021

Brett Ford

Project Description

This assignment has two parts.The first part involves reading a matrix, calculating its eigenvectors, and then ranking the entries by the eigenvectors. This is only possible if the matrix is stochastic, so a method tests for this also.

Part B involves finding weights to classify vectors. It begins by reading a training matrix, the matrix is separated into the vectors and the labels. The program then trains the weights and iterating until they settle into a regular pattern. A second matrix is read to be analyzed. The weights are then used to find values for the new vectors.

Approach

I used two large classes to write this program. One holds methods for the matrix used in the first part of the program. The second class holds methods to be used in the second part of the program. Because the training matrix needed to be read in a specific way, I didn't make a methods to read them in the second part. I did write a method to return one vector from a matrix, and one to add two matrices after scaling one of them.

Detailed Design

I wrote this language in java.

It has two important classes in addition to the main method. The first holds methods for part A, and the second holds methods for part B.
THe most important for part A is the method powerAlgorithim() which calls the other methods to preform the iteration. The most important for the second part is perceptronTrainer, which does the training. The method perceptronAnalysis takes in the weights, and produces new labels.