Master's degree in Computer Science - A.A. 21/22

OPTIMIZATION FOR MACHINE LEARNING - 6 CFU

Project N. 14

Let **dataset14MIL.mat** be a Multiple Instance Learning (MIL) dataset, where

- X is the matrix whose rows contain the instances of the bags to be classified;
- y is the array of the class labels of the bags;
- $instanceBag$ is the array containing the bags to which the instances belong.

Perform a **linear separation** of the bags on the basis of the following guidelines:

1. Based on the standard MIL assumption, solve the **SVM-MIL problem** by using a Block Coordinate Descent (BCD) method and setting $C = 1$.
2. At each iteration, draw a picture containing the current separating hyperplane and the instances.

   Suggestion: represent the instances of the positive bags by filled circles and the instances of the negative bags by unfilled circles. For each bag, use different colors.
3. Compute the training correctness.