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Exercise sheet 7

Submission deadline: 10:00, **January 15, 2021**
Note: Deadline for Exercise sheet 8 will also be January 15, 2021!

Task 1: Separating planes...ah, come on...(20 points)

Once again, it's time to find a maximum margin seperating plane. This time with the Simplified SMO algorithm from the script.

Download the given MATLAB code snippets from the Moodle course.

- `smoTrain.m`

  ```
  function [alphas, idx, d] = smoTrain( X, y, K, C, eps, maxIter )
  ```

  For a given data point matrix **X**, a given vector of class labels **y** with $y_i \in \{-1, +1\}$, a given kernel $K(\mathbf{x}, \mathbf{y})$, and the SVM parameters C, ε, and maximum number of iterations, this function uses the Simplified SMO algorithm for finding a separating plane between the data points of the two classes and returns the vector of the Lagrange multipliers α_i, the indices of the non-zero α_i, and the distance d. Implement the needed functionality.

- `smoTest.m`

  This script tests your implementation. From your obtained $\hat{\alpha}_i$, the classification function $\hat{G}(\mathbf{x})$ is calculated for a given grid of two-dimensional input data. The script generates one figure which will automatically be saved as a PNG file. Do not edit this script.

Implement the missing functionality in `smoTrain.m`. Zip your implementation and the generated PNG file from the `smoTest.m` script and upload your archive to the Moodle course. (20 points)

Merry Christmas and a Happy New Year!

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