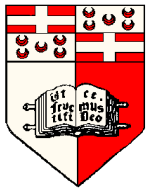
University of Malta



Machine Learning
MORNING & EVENING
Course Project 2016-2017

Kristian Guillaumier
kristian.guillaumier@um.edu.mt
Department of ICS
University of Malta

Details:	PROJECT DESCRIPTION

1. This project is about classification using Support Vector Machines (SVMs).
2. You need to create, train, and evaluate an SVM classifier (more on this later) on the following three datasets:

Dataset 1: Occupancy Detection Data Set
Experimental data used for binary classification (room occupancy) from Temperature, Humidity, Light and CO2. Ground-truth occupancy was obtained from time stamped pictures that were taken every minute.

Details:
http://archive.ics.uci.edu/ml/datasets/Occupancy+Detection+

Data set:
https://github.com/LuisM78/Occupancy-detection-data

Dataset 2: SPECT Heart Data Set
The dataset describes diagnosing of cardiac Single Proton Emission Computed Tomography (SPECT) images. Each of the patients is classified into two categories: normal and abnormal. The database of 267 SPECT image sets (patients) was processed to extract features that summarize the original SPECT images. As a result, 44 continuous feature pattern was created for each patient. The pattern was further processed to obtain 22 binary feature patterns.

Details:
http://archive.ics.uci.edu/ml/datasets/SPECT+Heart

Data set:
http://archive.ics.uci.edu/ml/machine-learning-databases/spect/

Dataset 3: Human Activity Recognition Using Smartphones Data Set
Human Activity Recognition database built from the recordings of 30 subjects performing activities of daily living (ADL) while carrying a waist-mounted smartphone with embedded inertial sensors.

Details:
http://archive.ics.uci.edu/ml/datasets/Human+Activity+Recognition+Using+Smartphones

Data set:
http://archive.ics.uci.edu/ml/machine-learning-databases/00240/

3. A good introduction to can be found at MIT's OpenCourseWare:

   https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-16-learning-support-vector-machines/

4. In your evaluation make sure to include your experimental setup, the SVM configuration and parameters, expected results, results actually obtained, your observations, conclusions, and interpretation.
5. You'll need to deal with issues such as overfitting, choosing appropriate kernels, and tuning parameters to get the best possible results.
6. Your submission should include a report. The quality of this report, and especially the evaluation, is expected to be of a high standard.
7. In your report, you are expected to include an introductory section describing how SVMs work.
8. You may use any programming language, as well as any SVM library or implementation such as Matlab (i.e. you are not required to implement your own SVM classifier).
9. Writing a command line program(s) is OK. You don't need to create a complete GUI application.

MARKING METHODOLOGY:

1. Report quality: 15%
2. SVM implementation: 30%
3. Evaluation: 40%
4. Conclusions: 15%

GENERAL NOTES:

1. This is not a group project.
2. You will be expected to submit your source code, executables (when applicable), and report on VLE.

	3. Unless absolutely necessary, do not build an installer. In general, the program(s) must run by simply "double-clicking the executable". Assume that the machine your artifact will be evaluated on is a clean installation of Microsoft Windows 10 or Mac OS 10.11 with the latest versions of Matlab, the .NET Framework, and Java Runtime Environment. If you want to use something else, please contact me. 4. Make sure to cite other people's work properly. 5. Remember that you should include the plagiarism declaration form with your submission. 6. Plagiarism will not be tolerated and is considered to be a serious offence. 7. Do not use Wikipedia as an exclusive source of information. **The deadline for submitting this project is Friday 13th January 2017**