

Assignment 05: Support Vector Machines

CSci 574: Machine Learning

Description

In this assignment you will be using support vector machines (SVMs) with various datasets that contain only 2 features to perform binary classification with. Experimenting with these datasets will help you gain an intuition of how SVMs work and how to use a Gaussian kernel with SVMs.

Instructions:

- You need to use the class development environment and make sure that you are pushing your assignments to your GitHub classroom and they are successfully passing the autograder.
- Avoid using for-loops and while loops, unless you are explicitly told to do so in the assignment task functions for this assignment.
- Do not modify the `### TESTED FUNCTION [function name]` cells. These cells call unit tests on the functions you are asked to write for these assignments.
- All functions you need to write should be placed into the `src/assignment_tasks.py` file. Functions that are tested and graded are imported from there into this notebook.
 - You have not been given function documentation and stub functions for this and future assignment. You need to add in the function declarations and uncomment the code to import and test your functions.
 - You are required to give NumPy style formatted Pydoc documentation for your functions.
- After coding your function, run the `### TESTED FUNCTION` cell to determine if it is passing the assignment unit tests and that your result is correct.

Objectives

After this assignment you will:

- Understand how to fit a basic linear SVM classifier using `scikit-learn`.
- Become familiar with what a kernel function is and how it works to define a nonlinear decision boundary for a support vector machine.
- Be able to implement a basic RBF kernel function for a SVM.
- Know how to fit a SVM classifier using a kernel function.

Overview and Setup

Assignment Tasks

Assignment Submission

Additional Information