**Department of Software Engineering**

**CS471: Machine Learning**

**Class: BESE-12AB**

**L** **ab 07: Support Vector Machine**

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# Lab 07: Support Vector Machine

**Introduction:**

Support Vector Machines (SVMs) are powerful supervised learning models used for classification and regression tasks. They work by finding the hyperplane that best separates different classes in the feature space while maximizing the margin, which is the distance between the hyperplane and the nearest data points from each class.

Multi-class SVM is an extension of SVMs that can handle more than two classes. It achieves this by combining multiple binary classifiers, each trained to distinguish between one class and the rest, using strategies like one-vs-one or one-vs-rest.

**Objective:**

* Understand and implement SVC classifier using traditional/off-the-shelf libraries.
* Find the predictions on the given data using K-fold cross validation and predict accuracy.

**Tools:**

Google colab or equivalent environment

**Lab Task:**

In this lab, you are supposed to perform multi-class classification through Support Vector Machines. Data in excel files (both the training and test sets) are uploaded on LMS (same dataset used in previous lab). In the said training and test data files, each row contains data about one instance of a plant category where four predictors/attributes are recorded for each plant (namely, leaf length, leaf width, flower length, and flower width), while “plant” is the target class which could be any one of the following at a time: “Arctica” or “Harlequin” or “Caroliniana”.

You are supposed to perform multi-class classification using SVMs. Use the training data to train your SVM Classifier. Then use the test data to check the accuracy of your classifier. Please submit your results in the form of an excel file which should contain the prediction for each example in test data.

Note: You are expected to perform the above-mentioned task using traditional SVMs. Off the shelf libraries like Scikit-learn and LIBSVM might be a useful resource during implementation. Feel free to use these-or any other suitable library you prefer.

**Deliverable:**

Jupyter notebook with code and excel file with test predictions.

**References**

1. LIBSVM : <http://www.csie.ntu.edu.tw/~cjlin/libsvm>