Celestini Project 2019

Machine Learning Problem

(Section-B)

<u>Problem Statement</u>: To design a machine learning algorithm for finding the zoo for every animal, given the set of features of the animal.

Models to be used:

- 1. Multiclass SVM with the following kernels-
 - Linear Kernel
 - RBF Kernel
 - Polynomial Kernel
 - Sigmoid Kernel
- 2. Back Propagation Neural Network

Task 1:

Performing k-cross (k=5) validation on the dataset

Solution: Python code snippet and its output

```
# INPUT
scores = []
clf = OneVsRestClassifier(SVC(kernel='linear'))
# Using KFold for cross validation with n_folds = 5
cv = KFold(n_splits=5, random_state=None, shuffle=False)
for train_index, test_index in cv.split(X):
    print("Train Index: ", train_index, "\n")
    print("Test Index: ", test_index)
```

```
X_train, X_test, y_train, y_test = X[train_index], X[test_index], Y[train_index],
Y[test_index]
  clf.fit(X_train, y_train)
  scores.append(clf.score(X_test, y_test))
  y score = clf.decision function(X_test)
```

#OUTPUT

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Test Index: [81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100]

Explanation: K-Fold is a cross validation technique in which a holdout set from the dataset is ignored and training is done on the rest part. This is done so that each part of data gets to be trained k-1 times. For this problem 'k' is taken to be 5 which is why we get 5 different sets for training and test data. Accuracy and precision is computed over these and the average of each is then provided as evaluation metrics.