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IQB Assignment 2

README

Along with predicting, this code also finds the Train & Test accuracy with K-Fold method and 5 folds.

Syntax Format:

```
python3 final.py -o <output File> -type {aminoacid | dipepeptide | tripeptide} -model {SVC | RFC} { {-gamma | -n_estimators} <positive value> | -optimalParameters }
```

Understanding of Syntax:

- Type can only be ‘aminoacid’, 'dipeptide' or ‘tripeptide’. These are the different ways of parsing the input peptide.
- Models:
  - SVC: Support Vector Classifier
  - RFC: Random Forest Classifier
- -gamma and -n_estimators are the parameters we pass into these models.
- -optimalParameters is a mode where it runs the model multiple times and plots the accuracy for the parameters. This way, we can find out the optimal gamma/n_estimators for a particular model.

Please Note:

- gamma can only be used if model is SVC.
- n_estimators can only be used if model is RFC.
- gamma & -n_estimators have to be positive values
- outputFile is preferred with .csv format
- In -optimalParameters, 3 inputs will be asked: start, end, step indexes for the parameters.
- If -optimalParameters mode is used, -gamma <val> cannot be used for obvious reasons.

Example Syntax & Respective Outputs:

1. python3 final.py -o a.csv -type dipeptide -model SVC -gamma 91

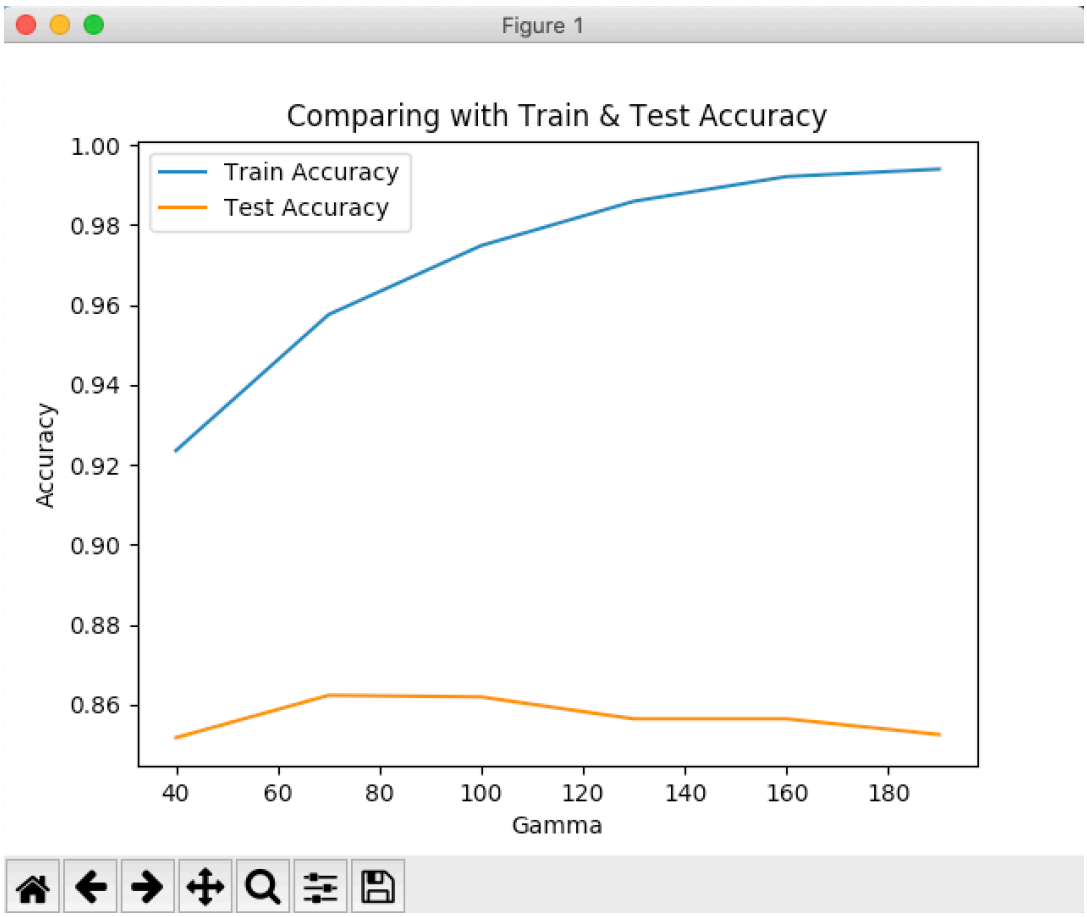
```
Output exported in  a.csv
Avg Train Accuracy:  0.9981372549019607
Avg Test Accuracy:  0.8631372549019607
```

2. python3 final.py -o b.csv -type tripeptide -model RFC -n_estimators 700

```
Output exported in  b.csv
Avg Train Accuracy:  1.0
Avg Test Accuracy:  0.8874509803921569
```

3. python3 final.py -o a.csv -type aminoacid -model SVC -optimalParameters

```
Enter start parameter: 40
Enter end parameter: 200
Enter step parameter: 30
Gamma : 40
Avg Train Accuracy:  0.9235294117647058
Avg Test Accuracy:  0.851764705882353
Gamma : 70
Avg Train Accuracy:  0.9575490196078432
Avg Test Accuracy:  0.8623529411764705
Gamma : 100
Avg Train Accuracy:  0.9748039215686275
Avg Test Accuracy:  0.8619607843137255
Gamma : 130
Avg Train Accuracy:  0.9858823529411765
Avg Test Accuracy:  0.8564705882352941
Gamma : 160
Avg Train Accuracy:  0.9920588235294119
Avg Test Accuracy:  0.8564705882352941
Gamma : 190
Avg Train Accuracy:  0.993921568627451
Avg Test Accuracy:  0.8525490196078431
```



4. `python3 final.py -o c.csv -type tripeptide -model SVC -n_estimators 700`

   `Invalid set of arguments. Please see README`

5. `python3 final.py -o c.csv -type tripeptide -model SVC`

   `Invalid length of arguments. Please see README`