

Homework 2

Algorithm: Perceptron – Neural Network

Comparison: Support Vector Machines (SVM)

Languages: Python 3.6.1, HTML

Web framework: Django 1.11.3

Platforms: Windows, Web

IDE: PyCharm community version

Test URL to access remote data over the network:

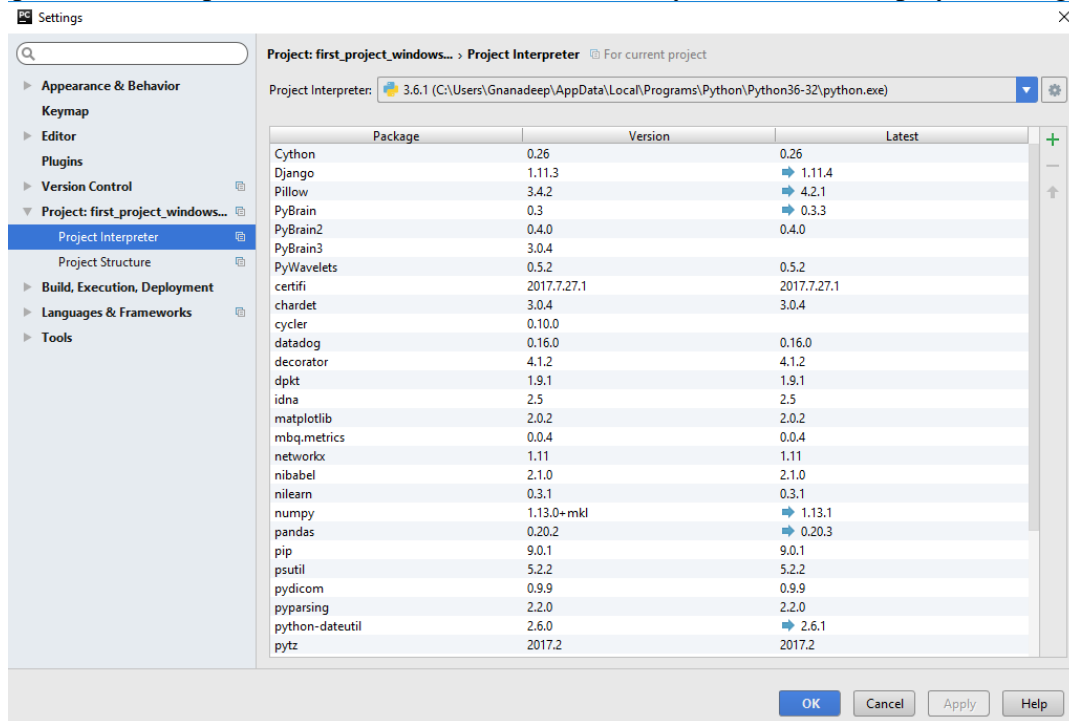
<https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data>

Perceptron:

It is a basic Algorithm in neural network which classifies the data linearly and uses the Heaviside step functions in this process.

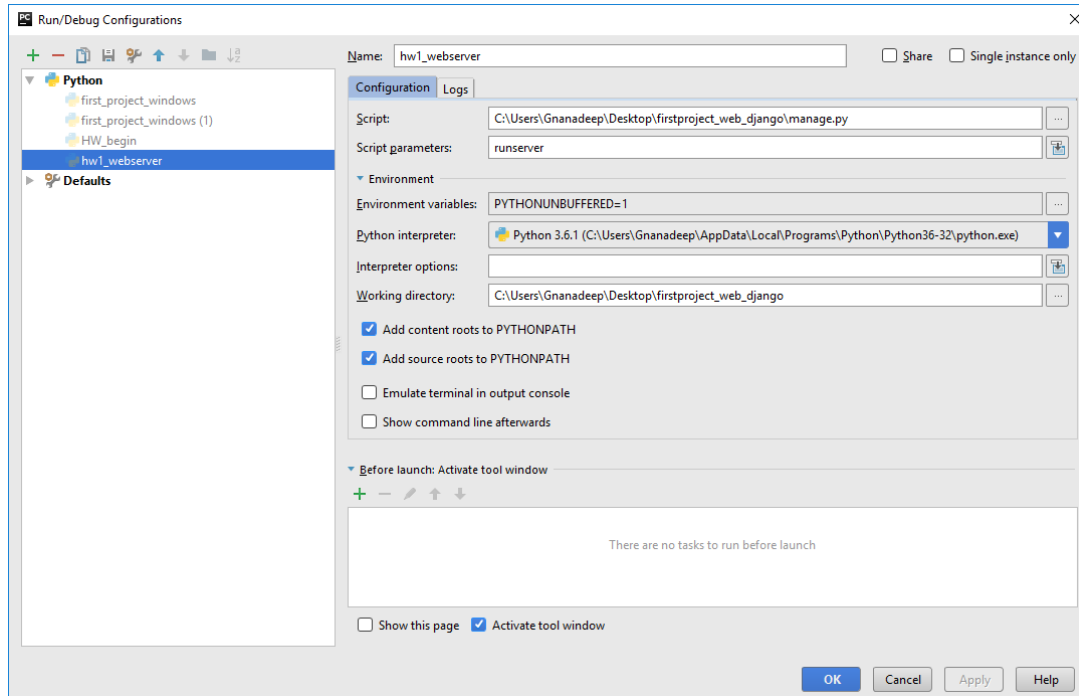
Dependencies:

The figure below shows the list of packages to build this application. And, the program also imports the Perceptron class and its methods to classify the data and display the image.



Run a webserver on PyCharm:

1. Browse 'manage.py' script from the folder.
2. Enter the parameter as runserver and click on apply.



Accuracy:

1. SVM Algorithm:

Score: 1.0 (i.e. perfect prediction)

Percentage of the validation data: 66.67%

```
PS C:\Users\Gnanadeep> cd Desktop\
PS C:\Users\Gnanadeep\Desktop> python first_project_windows.py
*
optimization finished, #iter = 7
obj = -1.448705, rho = -3.823200
nSV = 4, nBSV = 2
Total nSV = 4
[LibSVM]1.0
CPU Utilization:
24.3
Memory Utilization for this process:
0.6161220526761279
Running time:
0.2800883375218314
```

2. Perceptron algorithm:

Score: 1.0 (i.e. perfect prediction)

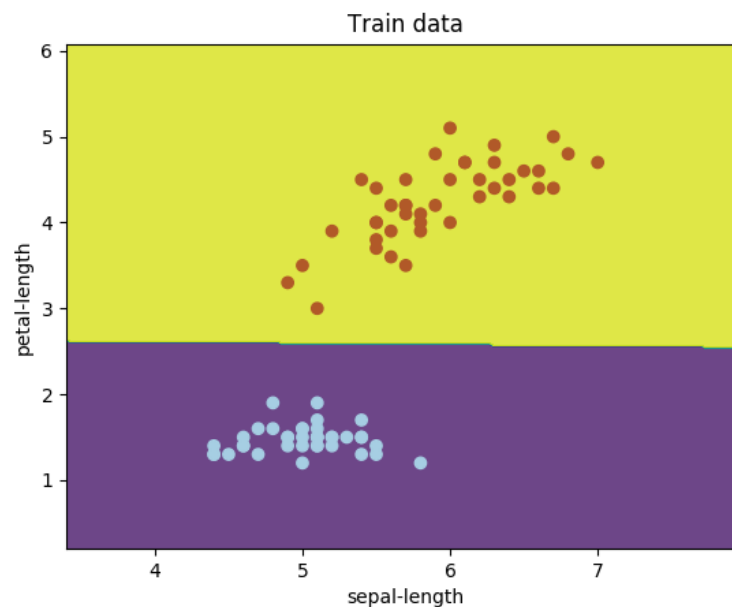
Percentage of the validation data: 96.77%

```
PS C:\Users\Gnanadeep> cd .\Desktop\  
PS C:\Users\Gnanadeep\Desktop> python hw2_percep_test.py  
1.0  
CPU Utilization:  
50.6  
Memory Utilization for this process:  
0.6400310753195108  
Running time:  
0.3672706872251574  
PS C:\Users\Gnanadeep\Desktop>
```

Result: Windows

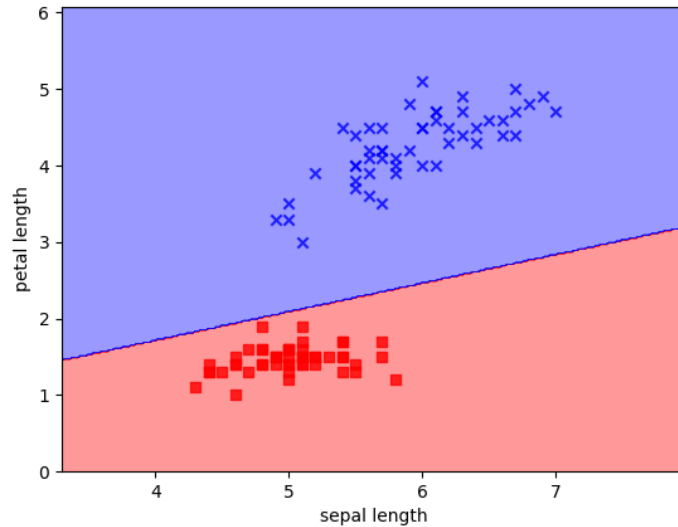
To implement the algorithm on the windows platform, the PyCharm editor is used to write and execute the program. And, the Windows PowerShell can also be used to compile the program. And, the data is accessed from the local disk and the remote network respectively

1. `location = r'C:\gnanadeep\iris.csv'`



SVM Algorithm

2. `pd.read_csv('https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data', header=None)`



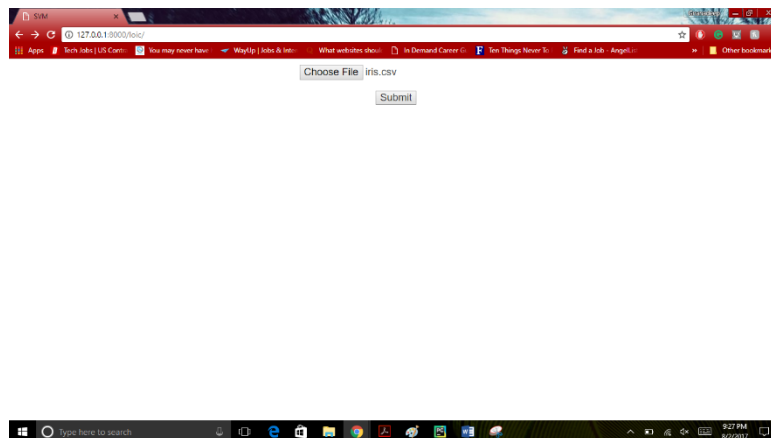
Perceptron Algorithm

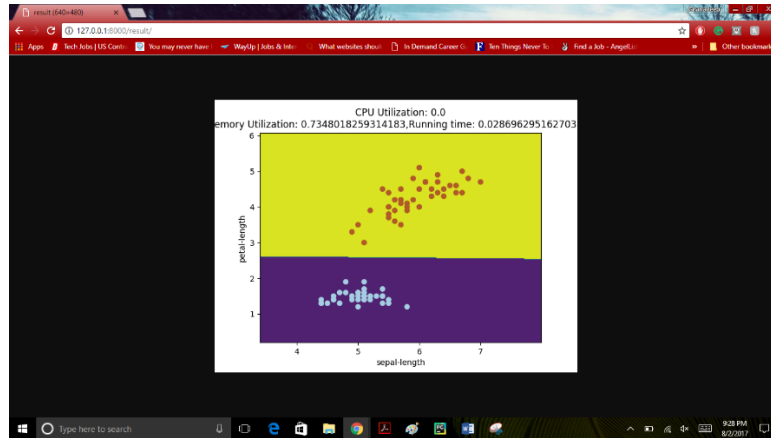
Results: Web using Django framework

Django is a high-level python web framework that encourages rapid development with ease and clean design. This web framework is best suitable for professionals with well-organized design.

1. SVM algorithm

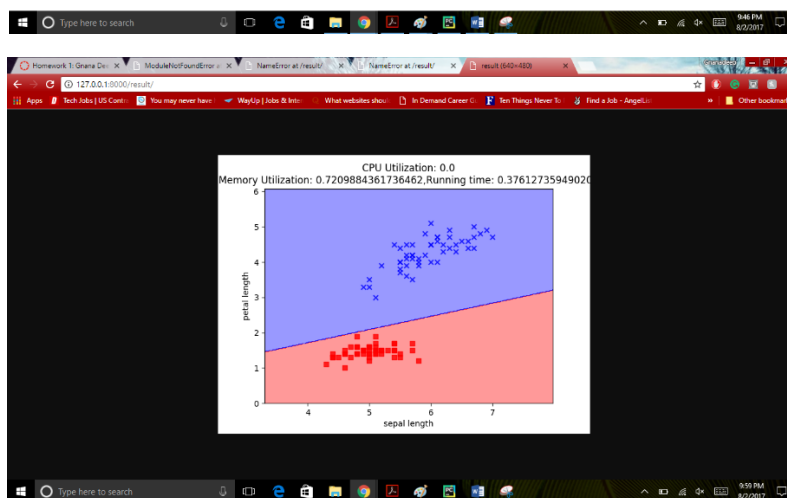
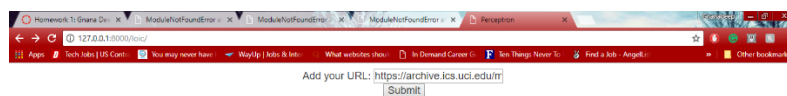
When the .csv file is uploaded and clicked the submit button. The plot is successfully displayed on the new page with the performance evaluation calculated above the figure.





2. Perceptron algorithm

When the URL is entered and clicked the submit button. The plot is successfully displayed on the new page with the performance evaluation calculated above the figure.



Resource Utilization:

The CPU utilization, Memory utilization and the running time of the program are calculated by importing the libraries such as psutil, os and sys. And, printing the results on the console or the PowerShell.

```
start = timeit.default_timer()
stop = timeit.default_timer()

psutil.cpu_percent()

process = psutil.Process(os.getpid())
```

1.SVM Algorithm:

CPU Utilization:

28.8

Memory Utilization for this process:

0.6306725838826907

Running time:

0.27779527148131783

2.Perceptron Algorithm:

CPU Utilization:

44.3

Memory Utilization for this process:

0.6427873433454235

Running time:

0.3750226115423417

References

1. <https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data>
2. http://scikit-learn.org/stable/modules/generated/sklearn.linear_model.Perceptron.html
3. http://www.bogotobogo.com/python/scikit-learn/Perceptron_Model_with_Iris_DataSet.php
4. http://www.360doc.com/content/14/1203/23/60849_430239390.shtml
5. <https://docs.djangoproject.com/en/1.10/intro/tutorial01/#creating-the-polls-app>
6. <https://stackoverflow.com/questions/4996504/how-to-output-horizontal-barchart-to-django-site-page>
7. https://github.com/puneethreddy20/DDoS_detection
8. <https://stackoverflow.com/questions/5622976/how-do-you-calculate-program-run-time-in-python>