Experiment No. 1

Title :- Implementation of basic Python libraries

Aim :- 1) To understand and apply analytical concept of python.
2) To study basic python libraries used for ML and data science.

Software requirement :-
i) Ubuntu 14.04 / 14.10
ii) Python 3.9
iii) Anaconda, Spider / Jupyter notebook

Theory :-

Python libraries for Machine learning (M.L)

Machine learning as the name suggests is science of programming a computer by which they are able to learn from different kinds of data. A more general definition given by Arthur Samuel is "Machine learning is field of study that gives computers the ability to learn without being explicitly programmed." They are typically used to solve various types of life problems.

In the older days, people used to perform machine learning tasks by manually coding all the algorithm and mathematical and statistical formula. This made process time consuming, tedious and inefficient. But in modern days, it is become very much easy and efficient compared to older days by various python libraries, frameworks, and modules. Today, python is one of the most popular programming languages for

this task and it has replaced many languages in the industry, one of reasons is its vast collection of libraries. Python libraries that used in machine learning are:

i) Numpy
ii) Pandas
iii) Matplotlib
iv) Scipy
v) Scikit - learn
vi) Theano
vii) Tensorflow
viii) Keras
ix) ~~pu~~ pytorch

i) Numpy:-

Numpy is a very popular python library for large multi-dimensional array and matrix processing, with help of a large collection of high-level mathematical ~~scientific~~ function. It is very useful for fundamental scientific computations in machine learning. It is particularly useful for linear algebra, Fourier transform, and random number capabilities. High end libraries like Tensorflow use numpy internally for manipulation of tensors.

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2) Pandas :

Pandas is a popular python library for data analysis. It is not directly related to machine learning. As we know that the dataset must be prepared before training. In this case, pandas comes handy as it was developed specifically for data extraction and preparation. It provides high-level data structures and wide variety tools for data analysis. It provides many inbuilt method for grouping combining and filtering data

3) Matplotlib :

Matplotlib is a very popular python library for data visualization like pandas, it is not directly related to machine learning. It particularly comes in handy when a programmer wants to visualize patterns in data. It is a 2D plotting library used for creating 2D graph and plots. A module named pyplot makes it easy for programmers for plotting as it provides features to control line styles, font properties, formatting axes, etc It provides various kinds of graphs and plots for data visualization, viz, histogram, error charts, bar charts, etc.

4) Scikit-learn :

Scikit-learn is one of most popular ML libraries for classical ML algorithm. It is built on top of two basic python libraries, viz, Numpy and Scipy Scikit-learn supports most of supervised and un-supervised learning algorithm. Scikit-learn can also be

used for data-mining and data-analysis, which makes it a great tool who is starting out with ML.

5) Theano:

We all know that ML is basically mathematics and statistic. Theano is popular python library that is used to define, evaluate and optimize mathematical expressions involving multi-dimensional arrays in an efficient manner. It is achieved by optimizing the utilization of CPU and GPU. It is extensively used for unit-testing and self-verification to detect and diagnose different types of errors. Theano is a very powerful library that has been used in large-scale computationally intensive scientific project for a long time but is simple and approachable enough to be used by individuals for their own projects

6) Tensorflow:

Tensorflow is a very popular open-source library for high performance numerical computation developed by people team in google. As name suggests, Tensorflow is a framework that involves defining and running computations involving tensors. It can train and run deep neural net-works that can be used to develop several AI applicat-ions. Tensorflow is widly used in field of deep learning research and application.

7) Keras:

Keras is a very popular ML for python. It is a high level neural network API capable of running on top of Tensorflow, CNTK, or Theano. It can run seamlessly on both CPU and GPU. Keras makes it really for ML beginners to build and design a neural network. One of best thing about Keras is that it allows for easy and fast prototyping.

8) Scipy:

Scipy is a very popular library among ML enthusiasts as it contains different modules for optimization, linear algebra, integration and statistics. There is a difference between Scipy library and Scipy stack. Scipy is also very useful for image manipulation.

Conclusion:

The practical practical we learned different types of python ML libraries.