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## A REVIEW OF PYTHON LIBRARIES TO DEVELOP APPLICATIONS IN ALL DOMAINS

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**Abstract:** In last few years most of the applications are using Python for development because it supports multiple programming paradigms, provides a large collection of comprehensive standard libraries and Embedded Libraries. It is a high-level programming language, Platform independent, dynamically typed, Portability, procedure oriented, Object-oriented Language. We can build python application which help data analysts to analyze large amounts of data for scientific computing and machine Learning applications which enables computers to learn automatically from past data. In this paper, I explored all the built-in libraries to develop different computer science application such as Image Processing, Data Science, Data Visualization, Cloud Computing, Machine Learning, Deep Learning, Natural Language Processing, Speech recognition, etc. And also, different frameworks for Python which can make the front-end work easier are also mentioned

**Keywords:** Python, frameworks, Data Science, Artificial Intelligence (AI), Machine Learning, Deep Learning, Image Processing, Data Science, Data Visualization, Cloud Computing, Machine Learning, Deep Learning, Natural Language Processing, Speech recognition

### I. INTRODUCTION

Python since its creation in late 1980's by Guido van Rossum has gained a lot of popularity in various domains and application developments due to its simple but effective syntax making it easy for developers to develop their applications. It also paved the way for developers to dwell and return profitable returns in the domains of artificial intelligence, machine learning, neural networks, natural language processing and various other fields.

The main concept of python that made it achieve this level of success is the collection of standard libraries that it has which perform complex tasks and there is a library for just about anything in python. From, basic functions to developing gui based application using "tkinter" or "turtle" to developing protocol based using "telnetlib" to using "pandas" or "numpy" to deal with numerical and then proceed to statistical analysis, python eases this process. These libraries hold a fair value for python to be used to various

domains, and developing complex algorithms for machine learning cases such as social media marketing or social media post management.

## II. IDEs

There are many IDEs such as spyder, jupyter notebook, pycharm, wing, each of which have their own advantages of being cross-platform, light-weight, stable. Anaconda is one other that is an independent IDE that creates an isolated environment for developing python applications.

## III. PYTHON LIBRARIES

- **Matplotlib:** It is used to draw 2D graphs by plotting.
- **Pandas:** It is used for working with data sets for analyzing, cleaning, exploring and manipulating the data from the datasets.
- **NumPy:** It is used for advanced mathematical and statistical functions, multidimensional arrays and matrices.
- **SciPy:** Scipy stands for scientific python which uses numpy underneath. It is used for scientific and technical computing. The main difference of scipy from numpy is that with scipy we are able solve algebraic problems. Integration, gradient optimization, parallel programming are few of the features of scipy.
- **Turtle:** Turtle is a library which is used to create gui based applications like tkinter(standard built-in library).
- **Pygame:** Pygame is used to develop multi-media-based applications like video games where it clusters the common functions

which enable us to write the code more easily.

- **SQLAlchemy:** SQLAlchemy is responsible for communication between python program and databases. It is a ORM (Object Relational Mapper) that talks with database in python language.
- **Pywin32:** This module provides us with the functions that enable us to control processes. This means that we can carry out a bunch of steps to start a new process. It gives us the extensions that gives us the access to window api keys.
- **Wxpython:** This module helps in creating graphical user interfaces using platform native widgets.
- **Nose:** Nose is an automated testing tool based on python. The edge this gives module provides us over other testing tools is that we are able to write and run tests easily.
- **SymPy:** SymPy stands for symbolic mathematics in python, it is used to manipulate and work with mathematical expressions.
- **Pillow:** It is used for image processing in python. It also allows us to extract statistical data from the images.
- **Statsmodel:** Statsmodel is built to work exclusively on statistics. It is built on top of numpy, scipy and matplotlib.
- **Flask:** Flask is a web-based python framework that helps in creating lightweight web applications.
- **Fabric:** It is used for development and deployment of ssh based applications.

- **Keras**: Keras is an open-source high level api for tensorflow used for implementing deep learning and artificial neural network concepts in python. It runs on top of tensorflow.
- **Xgboost**: Xgboost is used for improving the gradient of tree-based algorithms.
- **Scikit-learn**: Scikit-learn is used for analysis for machine learning. It is used for data classifying and features regression, clustering algorithms.
- **Catboost**: Catboost is an open-source library developed by Yandex, it is used for boosting the problems like regression, classification where there is huge amounts of independent data i.e; it boosts the variant of the gradient.
- **PyTorch** : PyTorch is used for implementing machine-learning and deep-learning concepts.
- **ELI5**: ELI5 helps in debugging the machine learning classifiers along with their gradients using an API.
- **Nilearn**: It provides support for statistical and machine-learning tools. It works on linear regression models like scikit-learn.
- **TensorFlow**: Tensorflow enables us to perform highlevel mathematical computations which also work across all platforms.
- **Apache MXNet**: It is a framework that is developed to work on increasing the efficiency of the deeplearning concepts.
- **Caffe**: Caffe is used for implementing the artificial neural networks and natural language processing concepts.
- **Fastai**: Fastai enables us in training the models more accurately in the fields of artificial neural networks.
- **CNTK**: CNTK is used for commercial deep learning framework.
- **Tflearn**: It is a deep learning implementing module that works on tensorflow api.
- **Lasagne**: Lasagne is a module that helps us in creating light weight neural networks that works in association with Theano.
- **Elephas**: Elephas is an extension of Keras that work on deep-learning and neural network concepts.
- **Theano**: It works on developing artificial neural networks.
- **OpenCV**: OpenCV is used to image implement computer vision concepts like image/video sensing, object detection etc that work on deep learning concepts.
- **Mahotas**: Mahotas is also used for computer vision and image processing dealing with neural networks and deep learning concepts.
- **Cairo**: Cairo is used for drawing vector graphs.
- **Asyncio**: Asyncio helps us write and execute the code concurrently and use await syntax.
- **NtfPy**: NtfPy is a networking module that runs based upon client-server requests.
- **Telnetlib**: Telnetlib is a library that implements the telenet protocol.
- **Parmiko**: Parmiko is used to implement SSH2 protocol that works on client-server model.

- **Requests:** Requests is a library that helps us to send and receive http requests using as GET and POST methods.
- **Gensim:** Gensim is used for vector modelling in python.
- **Textblob:** Textblob is a natural language processing module that helps in pos tagging, NP parsing and even sentient analysis.
- **spaCy:** spaCy is a natural language processing library written in Cython that provides us with industrial level strength in NLP.
- **NLTK:** NLTK stands for natural language toolkit that possess word wraps that helps in the detection of words more efficiently.
- **CoreNLP:** Corenlp is a python wrapper for the nltk module.
- **Pygal:** Pygal is used to generate interactive graphs/charts of the datasets. It is one of the data visualization libraries.
- **Missingno:** It is a data visualization library used for visualizing the null values (NaN) which help in better representation of the graphs/charts.
- **Seaborn:** It is the graphical representation of statistical data which built on top of matplotlib and in association with pandas and numpy.
- **PyCryptodome:** PyCryptodome is used for low level cryptography using python.
- **Pyplot:** Pyplot is a data is also a data visualization library which produces more interactive graphics which works with pandas, and other numerical manipulation libraries.

#### IV. APPLICATIONS

Python due it's simple but effective feature has gained a lot of use in recent times and applications are now being built and enhanced using python using its libraries.

Several algorithms are developed using python along with its libraries in various fields for various applications. The websites/applications like Instagram, instaram, spotify, Netflix, google, uber, dropbox, pinterest, Instacart, reddit, lyft use these algorithms

#### V. CONCLUSION

From developing basic applications to complex algorithms, python poses as a valuable tool for developers to dwell into and create applications. This is gives it a better edge when compared to other programming languages, easy syntax, easy to learn, robust, effective.

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