Application of Python in Various Disciplines

Hello folks!

Congratulations on completing the six learning modules of this training. All the essential aspects of Python programming were covered in the six modules. I hope you enjoyed this training as much as I did bringing it to you.

Application of Python in Various Disciplines

Data Science

In recent times, Python has shot up in popularity charts mainly because of its Data science libraries. With huge amount of data being generated by web applications, mobile applications and other devices, companies need business insights from this data.

Today Python has become language of choice for data scientists. Python libraries like NumPy, Pandas and Matplotlib are used extensively in the process of data analysis and collection, processing and cleansing of data sets, applying mathematical algorithms to data and to generate visualizations for the benefit of users. Commercial Python distributions such as Anaconda and Activestate provide all the essential libraries required for data science.

Data science today has become a prominent buzzword and it has been termed as ‘sexiest job of 21st century!’.

Machine Learning

This is another glamorous application area where Python developers are getting attracted. Based upon the past data, Python libraries such as Scikit-learn, Tensorflow, and NLTK are widely used for prediction of trends like customer satisfaction, projected values of stocks etc.

Some of the real world applications of machine learning are as under:

Medical Diagnosis: Machine learning techniques are used for the analysis of the importance of clinical parameters and of their combinations for prognosis, e.g. prediction of disease progression, for the extraction of medical knowledge for outcomes research, for therapy planning and support, and for overall patient management.

Statistical Arbitrage: Machine learning methods are applied to automate trading strategies where user tries to implement a trading algorithm for a set of securities on the basis of quantities such as historical correlations and general economic variables.

Learning associations: Machine learning helps the process of developing insights into various associations between products and buying behaviors of customers.

Basket analysis- studying the association between the products people buy and suggesting the associated product to the customer, is a well known phenomenon we see while doing online shopping. Machine learning is at work behind this analysis.

Prediction: Current prediction is one of the hottest machine learning algorithms. Businesses are interested in finding out what will be my sales next month / year / Diwali, etc. so that business can take required decision (related to procurement, stocks, etc.) on time.

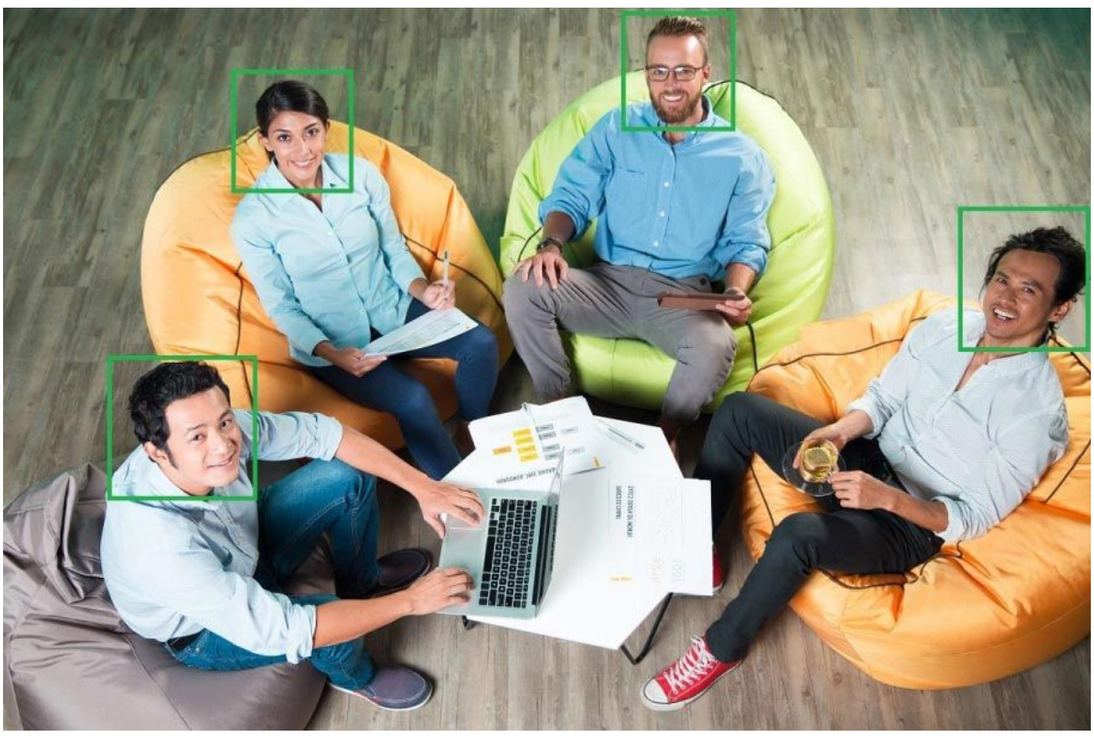
Web Development

Another application area which is becoming increasing popular with Python developers is web development. Simple to complex web applications can be developed using easy to use web application frameworks like django, Pyramid, Flask etc. These frameworks are used extensively by various IT companies. Dropbox for example uses django as a backend to store, synchronize local folders.

Most of the web servers today are compatible with WSGI (Web Server Gateway Interface) – a specification for universal interface between Python web frameworks and web servers. All leading web servers such as Apache, IIS, Nginx etc can now host Python web applications. Google's App Engine hosts web applications built with almost all Python web frameworks.

Image processing

Face detection and gesture recognition using OpenCV library and Python is another important application. OpenCV is a C++ library, but has been ported to Python. This library has lot of extremely powerful image processing functions.



Facebook's automatic tag suggestion feature, which used face recognition to suggest people you might want to tag in your photos, is an instance of OpenCV at work. Other instances of OpenCV applications are:

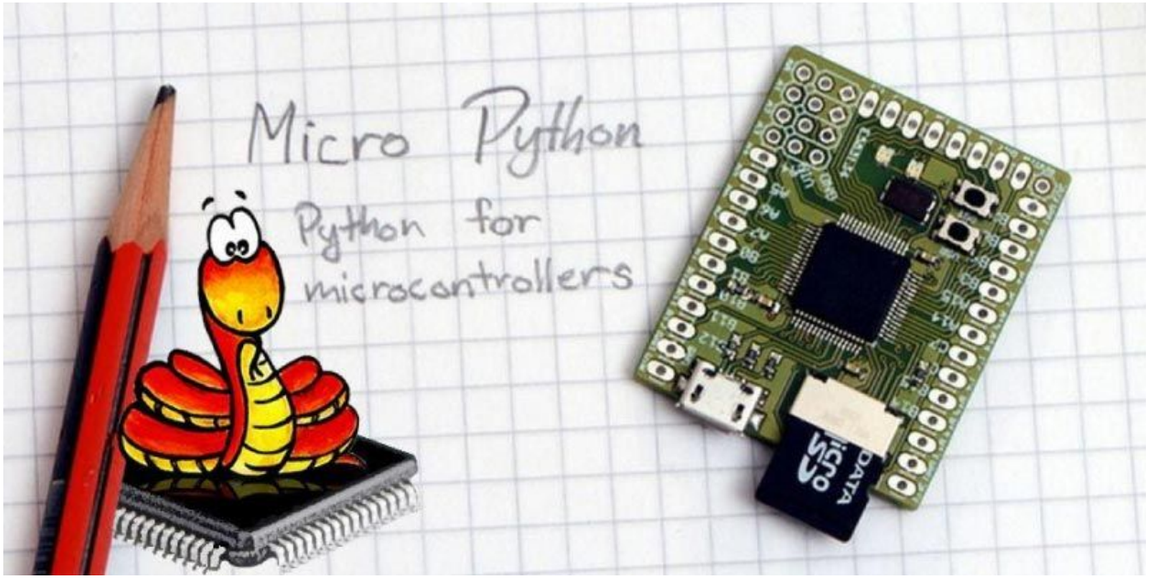
- Automated inspection and surveillance.
- Robot and driverless car navigation and control.
- Medical image analysis.
- Video/image search and retrieval.

Game Development

Python is a popular choice of game developers. The Pygame library is extensively used for building games for desktop as well as mobile platforms. Pygame applications can be installed on Android too.

Embedded Systems and IoT

Another important area of Python application is in embedded systems. Raspberry Pi is a very popular yet a low cost single board computer. It is being extensively used in automation products, robotics, IoT, and kiosk applications. Those of you with Electronics background can certainly explore the possibility of becoming innovators.



Apart from Raspberry Pi, other microcontrollers can also be programmed with Python. A lightweight version of Python called micropython has been developed especially for microcontrollers. Popular microcontrollers like Arduino are used in many IoT products and programmed with Python. A special micropython compatible controller called Pyboard has also been developed.

Android apps

Although Android apps are predominantly developed using Android SDK which is more or less like Java, Python can also be used to develop Android apps. Python's Kivy library has all the functionality required to build a mobile application.

Automated Jobs

Python is extremely useful and widely used for automating CRON jobs. Certain tasks like backups can be scheduled to be invoked automatically. These tasks are defined in Python scripts and operating system scheduler executes them at predefined times.

Python is embedded as a scripting language in many popular software products. This is similar to VBA used for writing macros in Excel, Powerpoint etc. Similarly Python API is integrated with Maya, PaintShop pro, etc.

Python as a Rapid Development Tool

Although Python is becoming increasingly popular, software development field is still dominated by Java and Dot net platform. However, Java and C# developers are also taking help of power of Python's rapid development capabilities. Jython, the JRE implementation of Python and IronPython, the dot net implementation interact seamlessly with Java and C# respectively. For example- Jython can use all Java libraries such as Swing, etc. So the development time can be minimized by using simpler Python syntax and Java libraries for prototyping of the software product.

Python has found applications in very diverse fields. There is Astropy library is a collection of software packages written in the Python programming language and designed for use in astronomy. BioPython package contains functionality useful for computational biology and bio-informatics.

More and more companies, be it start ups or established ones are using Python for one or other purpose in their development activities. Hence, lot of opportunities are waiting for those with appropriate Python skills. This training program has given a solid foundation for you to grab these opportunities. Internshala wishes you all the best in your endeavour!