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PYTHON PROGRAMMING: A COMPREHENSIVE STUDY

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ABSTRACT

The present study experimentally investigated the Applications and study of python. Python is often used as a support language for software developers, for build control and management, testing, and in many other ways. Over 125,000 third-party Python libraries exist that enable you to use Python for machine learning, web processing and even biology. Python in real world is used for web development, game development, scientific and numeric applications, AI and machine learning, software development and business applications. Python programming is simple, free, easy to use, highly compatible, object oriented and widely applicable which makes it a superior programming language. Python is an interpreted, interactive, object-oriented programming language. It incorporates modules exceptions, dynamic typing, very high-level dynamic data types, and classes. It supports multiple programming paradigms beyond object-oriented programming such as procedural and functional programming.

Keywords: Object Oriented Programming Language, Machine Learning, Artificial Intelligence.

I. INTRODUCTION

Python is a widely used general-purpose, high level programming language created by Guido Van Rossum in late 1989 . Python is a programming language that lets you work quickly and integrate systems more efficiently. Python is an open-source (free) programming language that is used in web programming, data science, artificial intelligence, and many scientific applications. Learning Python allows the programmer to focus on solving problems, rather than focusing on syntax. . Python Programming Language is very well suited for Beginners, also for experienced programmers with other programming languages like C++ and JAVA. There is a need to up - skilling and training young people to need demand of industry needs. One of the greatest strengths of Python is its large standard library which provides tools suited for many tasks. Various modules of creating graphical user interface, connecting to relational databases, generating pseudorandom numbers, arithmetic calculations, regular expressions etc. are included in the library. Python is object- oriented, interpreted, and interactive programming language. It provides high level data structures such as list, tuples, sets, associative arrays (called dictionaries), dynamic typing and binding, modules, classes, exceptions, automatic memory management, etc. It is also used for parallel computing system and has a comparatively simple and easy syntax for coding and still it is a powerful programming language. Python has the interpreter for java known as J Python, which is like the interpreter for C language. Python was developed as a language, which can be used by people with minimal efforts to achieve the requirements in their projects.

II. PYTHON PROGRAMMING LANGUAGE

In the late 1980s, history was about to be written. It was that time when working on Python started. Soon after that, Guido Van Rossum began doing its application-based work in December of 1989 at Centrum Wiskunde & Informatica (CWI) which is situated in the Netherlands. It was started firstly as a hobby project because he was looking for an interesting project to keep him occupied during Christmas. The programming language in which Python is said to have succeeded is ABC Programming Language, which had interfacing with the Amoeba Operating System and had the feature of exception handling. He had already helped to create ABC earlier in his career and he had seen some issues with ABC but liked most of the features. After that what he did was really very clever. He had taken the syntax of ABC, and some of its good features. It came with a lot of complaints too, so he fixed those issues completely and had created a good scripting language that had removed all the flaws. The inspiration for the name came from BBC's TV Show – 'Monty Python's Flying Circus', as he was a big fan of the TV show and also, he wanted a short, unique and slightly mysterious name for his invention and hence he named it Python. The language was finally released in 1991. When it was released, it used a lot fewer codes to

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express the concepts, when we compare it with Java, C++ & C. Its design philosophy was quite good too. Its main objective is to provide code readability and advanced developer productivity. When it was released, it had more than enough capability to provide classes with inheritance, several core data type exception handling, and functions.

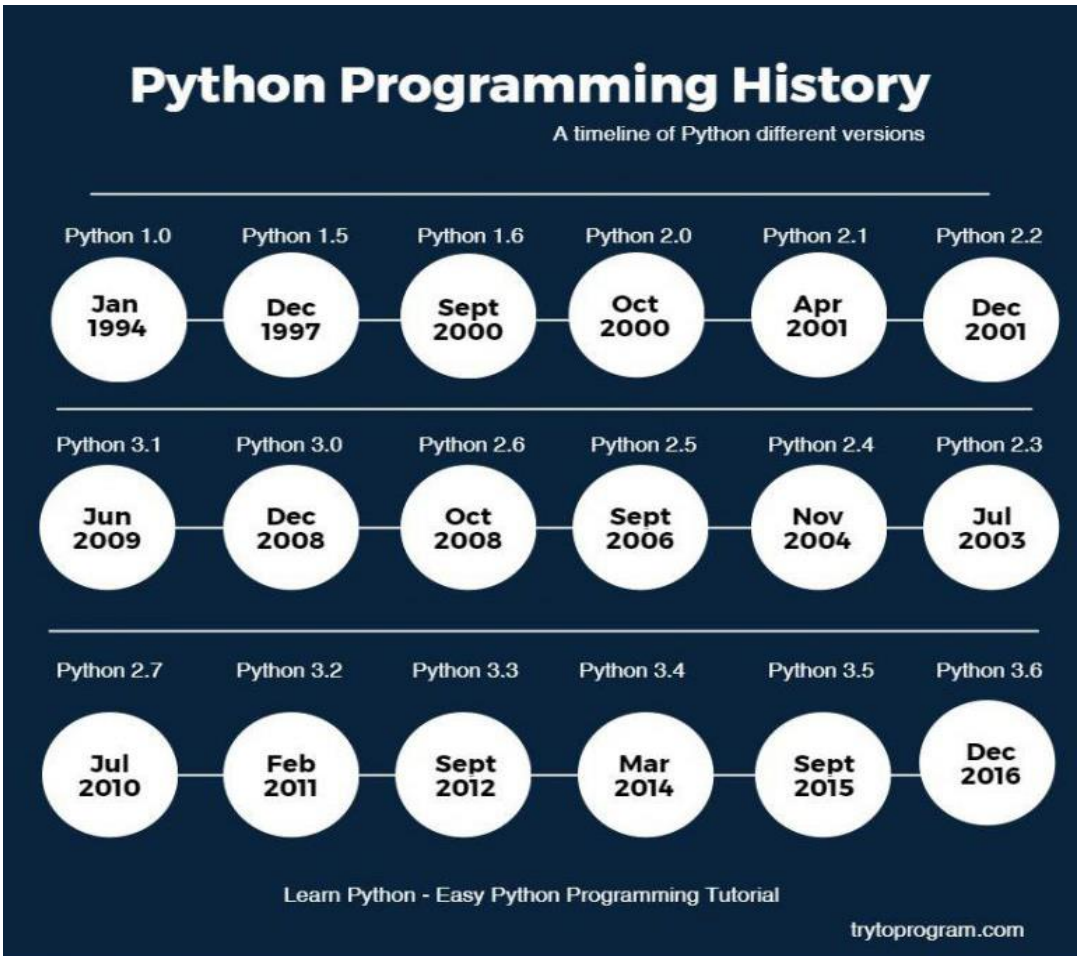

Figure 1: 3D view of building

III. FEATURES OF PYTON PROGRAMMING LANGUAGE

Python is a specification for a language that can be implemented in different ways. There are many implementations of this specification written in different languages. is a very high-level programming language, yet it is effortless to learn. Anyone can learn to code in Python in just a few hours or a few days. Mastering Python and all its advanced concepts, packages and modules might take some more time. However, learning the basic Python syntax is very easy, as compared to other popular languages like C, C++, and Java. When a programming language is interpreted, it means that the source code is executed line by line, and not all at once. Programming languages such as C++ or Java are not interpreted, and hence need to be compiled first to run them. There is no need to compile Python because it is processed at runtime by the interpreter. Python is portable in the sense that the same code can be used on different machines. A programming language is object-oriented if it focuses design around data and objects, rather than functions and logic. On the contrary, a programming language is procedure-oriented if it focuses more on functions (code that can be reused)[1][2]. One of the critical Python features is that it supports both object-oriented and procedure-oriented programming. One of the key aspects of any programming language is support for GUI or Graphical User Interface. A user can easily interact with the software using a GUI. Python offers various toolkits, such as Tkinter, wxPython and JPython, which allows for GUI's easy and fast development. All the implementations are compilers as well as interpreters. The compiler converts the python program into intermediate byte code. This bytecode is then interpreted by the interpreter.

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IV. IMPORTANCE OF PYTHON PR0GRAMMING LANGUAGE

Some of the important and useful uses of python programming described in Fig[2] are

a) Python is used in machine learning & artificial intelligence, fields at the cutting-edge of tech

Experts argue that Python is the most compatible programming language for machine learning and artificial intelligence. Its extensive libraries and frameworks are ideal for kickstarting new ideas (more on this later). Plus, it's relatively concise and supported by a wide community of programmers known for documenting their successes and failures. Python is at the forefront of artificial intelligence innovation [3].

b) Python is simply structured and easy to learn

In a nutshell, data science is the alchemy of tech: it takes vast amounts of data and spins it into golden information. Businesses then translate that information into innovative solutions to problems they might not have otherwise been able to pinpoint. Data science saved Southwest Airlines $100 million dollars by reducing idle plane time. It optimized UPS's fuel use, helping decrease emissions and saving them $39 million dollars. The magic making this happen? Python programming. Since 2012, the field has experienced a 650% growth spurt and is still growing. Those who learn Python can hold the keys to success in this field; its capabilities can handle vast sets of data and tackle big business dilemmas [4].

c) Features of Data Science are supported by Python

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Coding sometimes gets a bad rap for appealing only to logical skill sets, but that could not be more wrong. Creative types enjoy using Python for its beautiful game graphics and its ability to generate new images using the deep learning we just mentioned. Python combines the meticulousness of coding with right-brained artistry—the best of both worlds [5].

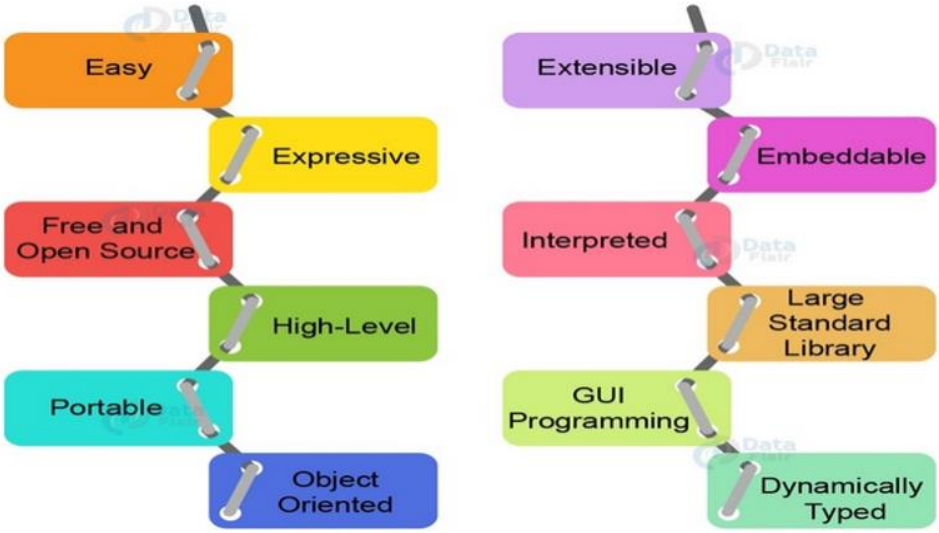

Figure 2: Importance of Python Programming

V. APPLICATIONS OF PYTHON PROGRAMMING

Different applications of Python programming described in Fig[3] are

a) AI and Machine Learning

Python is perfect for various machine learning (ML) and artificial intelligence (AI) projects as it is stable, flexible, and simple programming language. In fact, Python is the preferred languages among data scientists, and there are many Python machine learning and AI libraries and packages available.

b) Web Development

Python is a great choice for web development. This is largely because there are many Python web development frameworks to choose from, such as Django, Pyramid, and Flask. These frameworks have been used to create sites and services such as Spotify, Reddit and Mozilla.

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c) Data Science

Python is an entrusted language for scientific computing tasks, including analysis and visualization of large data sets. The use cases of Python in data science stems from the large and active ecosystem of third-party packages, such as NumPy for manipulation of homogeneous array-based data, Pandas for manipulation of heterogeneous and labeled data, SciPi for computing tasks, Sci-Kit Learn for machine learning, etc. So, a data scientist combines statistical techniques with Python programming language to analyze and interpret complex data [6].

d) Massive Libraries

Python's standard library is vast, and herein, all the necessary functions required for any given task can be found. This makes Python independent of external libraries. Although, if it is desired to use some external libraries, then with the Python package manage (pip), several packages can be imported from the massive Python Package Index (PyPi), containing more than 200,000 packages[7][8].

Figure 3: Applications of Python Programming

VI. CONCLUSION

Python is a programming language that lets programmer work more quickly and integrate your systems more effectively. It causes gains in productivity and lower maintenances costs. It is easy-to-use, robust programming language that is freely available. Python's objects and functions are very versatile and is a very high-level object-oriented language. It is a general- purpose, interpreted high-level programming language whose design philosophy emphasizes code readability. Its syntax is said to be clear and expressive. Also it has a large and comprehensive standard library.

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