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A Review Paper on Python

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Abstract: *Python is a high-level programming language. Python programming is developed by Guido van Rossum. This paper also discusses the reasons behind python being awarded as the fastest growing programming language in recent times supported by research done world wide. In this paper, we explore all the built-in libraries for all different computer science domains such as Data Science, Artificial intelligence, Machine Learning, Data Visualization, Data analytics, Web development and so on. and in this paper we also discuss about why python is powerful language and which type of jobs demands python as a main language.*

Key Words: *Easy to learn, Python in Data Science and AI & ML, Python developer, Future scope in Python.*

I.INTRODUCTION

Python ia a very popular programming language. It was created by Guido van Rossum in 1991. It is used for parallel computing system and has a comparatively simple and easy syntax for coding and still it is a powerful programming language.It is also used in various field like web development, software development and it is also used by data scientist. It also used for creating real time applications or user interective applications. It has very simple syntax and it is iterpreted language and it is object oriented and high level programming language. There code is when you writen, it feel like you write normal english language. It follow intendation when you write their code. It has large and advanced library like Matplotlib, Numpy, Pandas, SciPy and so on.Python has the interpreter for java known as JPython, which is similar to the interpreter for C language.

II.MATERIAL AND METHODS

Python Features:

1. **Simple and easy syntax:** Python has very easy syntax as compare to other programming language like C, C++, Java and so on. And there syntax is also easily readable and understandable. python is dynamically typed, means you don't need to specify a variable data type , direct use and assign value.
2. **Object Oriented Language:** One of the best feature of python is it support OOPS concept like java, C++. Means in this we can create and use class, objects, inheritance, abstraction and polymorphism. python supports oops concept that is make easier to solve real world problems and maintain complex projects.
3. **GUI programming support:** Python supports Graphical user interface programming, allowing developers to create user interactive applications with buttons. Graphical User interfaces can we create in python by using python module like Tkinter and so on.PyQt5 is one of the most famous and used module in python for creating GUI apps.
4. **Large and standard Libraries:** Python has aprox 137000 libraries in current time and this very large numbers. Python have some most used and popular libraries are matplotlib, numpy, pandas, Tkinter, SciPy and so on. This extensive library provides modules and packages to help developers to perform a wide range of tasks without needing to install additional tools.
5. **Manage Databases:** The Python language has powerfull features for database management. it supports tools like SQLite, MySQL, ORACLE, Sybase, PostgreSQL and so on. It also support Data Definition language. Data Manipulation language and Data Query Statements.

Applications of Python:

1. **Python in Data Science:** Python is used in Data Science for many tasks like:

- **Data Analysis:** Python is used to prepare, analyze, and clean data. It can help data scientist to identify patterns, trends, and relationship in large data sets.
- **Data Visualization:** Python libraries like Matplotlib and seaborn are used to create and plots the graph, which is help in Data visualization.
- **Statistical Analysis:** Python provide SciPy library for for statistical analysis, such as regression analysis, hypothesis texting, and cluster analysis and so on.

2. **Python in AI and ML:** Python is a widely used programming language for artificial intelligence (AI) and machine learning (ML), because it has a large library, and it is platform independent. It used in:
- **Data Organization:** Python can help organize data and teach machines to analyze and learn from it.
- **Autonomous Vehicles:** Python is used in AI and ML applications for autonomous vehicles.
- **Collaboration**: Python's active community makes it easy for developers to discuss projects and contribute ideas.

3. **Python in Web Development:** We can also develop a web using python,and it helps in:
- **Web Framework:** Describes popular frameworks like Django flask, and discuss how they streaming the process of building robust web applications.
- **Open Source Contribution:** Mention the strong community for these frameworks and the benefits of open source contributions.

Top reasons why python is demanding language:

1. **Modules and libraries:** Python have a large numbers of libraries and framework that save time in the stages of development. It provides cloud media services and it provide data handling tools and so on.
2. **Large and Active Community:** Python have a largest and most supportive development communities in the entire world, because it is so simple and easy to learn thats why it is famous in the world.
3. **Automation of Tasks:** Python also helps a lot with the automation of tasks because it has a broad library. it also very usefull language for automating software testing.
4. **Internet of Things:** Python is widely used and involved in the internet of things(IoT) sectors, it gives flexibility and adaptability. Its libraries and IoT modules. Like Raspberry Pi, Arduino Intex Einstiesn , and so on.
5. **Support Corporate Sponsorship:** One of the best reason is for growing faster is it have support from corporate componies, and a programming language grows ata faster pace when compony sponsors it. it have several well known sponsors like amazon, Google, Facebook, Microsoft and so on.

Top Companies Using Python:

1. **Google:** Python plays an important role in google, according to google python has been a important part og google since the google start. Google has a a strong relationship with the language itself and the python software foundations.
2. **YouTube:** YouTube is a big user of Python, youtube uses python for control templates for websites, view video, administer video, accessing canonical data and so many reasons where youtube uses python.
3. **NASA:** Python is also used by space componies like NASA. NASA is used python for research and scientific computation, used for satellite design and testing, image processing, for analyze the big and complex data and find better results.Python is one of the very powerful tool for space exploration because it have powerfull and large library.
4. **Netflix:** According to Python developers in Netflix python is use through the full content lifecycle, from deciding which content to fund all the way to operating the CDN that serves the final video to 148 million members. Python is often used in Netflix's recommendation algorithms as well as to serve content to viewers.
5. **Instagram:** Instagram's key objective is to be productive in massive data circumstances when utilizing python for a huge scope. Instagram utilzes python in one of the world's biggest setting, operating it to carry out the business expected to serve 900 million dynamic users.

Top Job Demands in Python:

1. **Data Analyst:** Data Analyst is used python modules such as analyzing numerical data with NumPy, Tabular data with Pandas, data visualization Matplotlib, and Exploratory data analysis. In this technique of collecting, transforming, and organizing data to make future predictions and dta driven decisions.
2. **Operations Automation Engineer:** A Python automation engineer specializes in utilizing Python programming skills to automate tasks within software development, testing, and system administration. Their role involves creating scripts, tools, and frameworks to automate repetitive processes, streamline workflows, and improve opera tional efficiency. Python automation engineers design and implement automation solutions, integrate automated tests into development pipelines, troubleshoot and optimize scripts, and collaborate with teams to drive automation initiatives across different technical areas.
3. **Data Engineer:** With the shift from analytics to machine learning and app development, the logic and transformations of data became more complex and required the flexibility of programming languages such as Python. Python's inherent characteristics and the wealth of resources that have grown around it have made it the data engineer's language of choice.
4. **Python Developer:** Python, one of the most popular programming languages in the world, has created everything from Netflix's recommendation algorithm to the software that controls self-driving cars. Python is a general purpose language, used to create a range of applications, including data science, software and web development, automation, and improving the ease of everyday tasks.
5. **Full Stack Developer:** Python full-stack developers are responsible for both front-end and back-end components, designing accessible and functional websites using their knowledge of web development languages and expertise in database management and security.Full-stack development refers to the design, implementation and testing of both the client, and server sides of a web application.

Limitations of Python: Python is a popular and widely used programming language known for its simplicity, flexibility, and productivity. It is used in various applications, including web development, data science, and automation. However, like

any language, Python has its limitations. Python's main limitations include its performance and speed, memory management, support for concurrency and parallelism, static typing, and web support.

1. **Performance and Speed:** Python is a popular and widely used programming language known for its simplicity, flexibility, and productivity. It is used in various applications, including web development, data science, and automation. However, like any language, Python has its limitations. Python's main limitations include its performance and speed, memory management, support for concurrency and parallelism, static typing, and web support.
2. **Memory Management:** Python uses a garbage collector to manage memory and clean up unused objects automatically. While this can make writing and maintaining code easier, it can also lead to inefficiencies and slowdowns if not used properly. Additionally, Python does not provide low-level memory access, making writing memory-intensive or real-time applications difficult.
3. **Static Typing:** Python is a dynamically typed language, which means that variables do not have a fixed type and can be assigned any value at any time. While this can be convenient and flexible, it can also make catching errors or bugs at compile time difficult. In contrast, statically typed languages like Java or C++ require variables to be explicitly declared with a specific type, which can help to prevent errors and improve code quality.
4. **Threading Issues:** Python has a Global Interpreter Lock (GIL) that prevents more than one compute thread from running at a time, making multithreaded processing difficult.
5. **Mobile Application Development:** However Python is strong in desktop and server platforms, that is it is an excellent server-side language but for mobile development, Python is not a very good language which means it is a weak language for mobile development. It is very rarely used for mobile development. This is the reason very few mobile applications are built into it like Carbonnelle, which is built in Python.

Future Scope of Python: However Python is strong in desktop and server platforms, that is it is an excellent server-side language but for mobile development, Python is not a very good language which means it is a weak language for mobile development. It is very rarely used for mobile development. This is the reason very few mobile applications are built into it like Carbonnelle, which is built in Python. Some of the main Python features and advantages are as follows: Readability: Python's clean syntax supports the readability of its code, which makes it easy to understand and maintain, particularly when working on a collaborative project or doing long-term maintenance. Python is constantly growing. It will be the programming language of the future for various reasons.

III.CONCLUSION

Python plays an important role in data analytics for analysing the complete set of data, prediction, diagnosis, and mining the data to provide recommendations of future course of actions. Python is free and is an open-source language which makes it easy to distribute. In this paper, we briefly introduced the Python programming language as a suitable choice for learning coding and real-world programming. The paper has discussed features of python, top companies use python, emerging jobs and many more things. After all study about python programming language i say it is a very easy and powerful language in current time.

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