

IoT & Python Programming- An Overview

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Abstract:- One of the most popular era of computer world is from the generation 5th. Here new trends like AI, Internet of things (IoT) etc are came into force. Internet of Technology or simply IoT is considered as an Internet technology which connects devices, nodes and other tools to the internet by means of wireless technologies. By using the IoT one can easily does a lot of things through internet without human interaction. In this paper it is mainly focus on the relationship between IoT and one of the important programming language used today, that is Python.

Keywords:- IOT, Python ...etc.

I. CONTENT

➤ According to Wikipedia, IoT is defined to be: "...the network of physical objects—devices, vehicles, buildings and other items—embedded with electronics, software, sensors, and network connectivity that enables these objects to collect and exchange data".

➤ Some features are:

- The word '**thing**' in Internet of **things (IoT)**, is referred to an entity or we can say a physical object which have a unique identifier.
- Using Iot we can connect 9 billion of 'Things' to the Internet.
- In near future the 'Things' may reach to 20 billions.
- IoT unifies the technologies like embedded systems, big-data, machine learning, cloud computing, and even more to the networks.

Now lets look some of the historic concepts of IoT. In the period of 2000s, we are entering into a new era of technology, where the Internet 'users' will be counted in the range of billions and even more. By the trend of IoT, human became a minority and all the activities are done with the intelligent machines.

➤ Some areas identified as IoT enablers:

- RFID
- Nanotechnology
- Sensors
- Smart Networks

➤ *Characteristics*

- IoT is considered as an Efficient technology which is scalable and it has an associated architecture
- The naming and addressing of IoT is Unambiguous
- It contain lots of mobile, sleeping nodes and non-IP devices
- Connectivity will not be in continuous manner

➤ *Market Share of IoT*

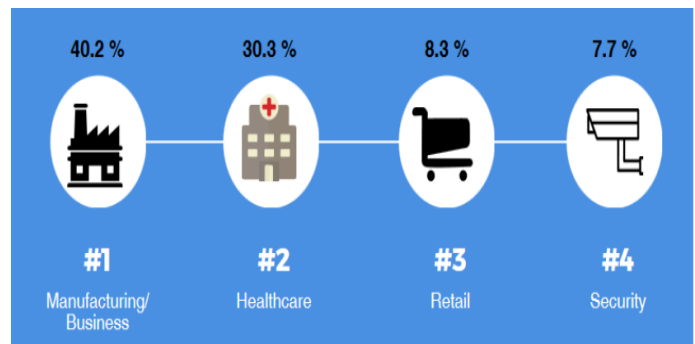


Fig 1

➤ *Business v/s Manufacturing*

- *Robotic Machinery*
 - Supports Real-time analytics of supply chains and equipment.
- *IoT in Healthcare*
 - Supports electronic recordkeeping, Portable health monitoring and pharmaceutical safeguards.
- *Retail*
 - Supports smart phone purchasing, Inventory tracking, and anonymous analytics of consumer choices.
- *Security*
 - Remote sensors and Biometric and facial recognition locks.

➤ *Why Python is used in IoT?*

Python is considered as a general purpose programming language used today. It is mainly used for writing web applications, but now days it is popular for writing things for IoT Systems. It is one of the interpreted language used today that offers high readability with syntax which doesn't compromise its size.

Main reason for using python language for Iot are:

- Python is a versatile language which is easy to script and easy to read.
- It doesn't support strict rules for syntax.
- Its installation comes with integrated development environment for programming.
- It supports interfacing with wide ranging hardware platforms.
- With open-source nature, it forms a strong backbone to build large applications.

➤ *Python IDE*

The Python **IDE** is a free and open source software that is used to write codes, integrate several modules and libraries. It is available for installation into PC with Windows, Linux and Mac. Examples: *Spyder, PyCharm*, etc.

Python gained a significant traction in the **IoT** development and technology. **Python** is considered as a good choice for for writing data-intensive applications I internet. It manages and organizes a huge number of complex data. The source code written in **Python** is compact and extremely readable which has a clean syntax.

Python is easy to learn for the user which is widely **used** and has a robust support. We can manage and organize complex data streams without having to maintain equally complex codebase using IoT.

IoT has an important place in Wireless Sensor Networks, Cyber Physical Systems, Data Analytics, , Big Data and Machine Learning. It mainly focus on processes and real time analytics . For the development of an IoT solution, one needs a programming language which spans all these fields and at the same time it must be scalable and lightweight.

Python is one of the programming language frequently used by developers. It is considered as more flexible than other programming languages like C or Java, which has a lot of rules and regulations built up over the decades ago. Python has become a valuable resource for Web application for developers, but some don't see it transitioning to IoT anytime soon. Another popular Web application language is JavaScript, but here developers see Python as a superior for all IoT projects, due to its support for embedded programming systems.

Python has gained a significant role in the IoT development as well. Python is one of the good choice for data-intensive applications, especially when it comes to managing and organizing complex data. It is especially works well with small devices that have limited computational power and memory.

The Internet of Things(IoT) is a trending topic today. Some how many techies assume it as Buzz word and no classic Definition. In the Progress its meaning about uniform as

philosophical ideas. The Internet of things has so many pies and logic's that depend on your way of thinking. IoT is very simple.

MRAA is a library from Intel that simplifies the logic for connecting to different sensor pins. It allows you to program in C++, Python. It contain well known GPIO library for many SBCs, guided by Python. Using the MRAA, we can use one library for many Devices and there is no need of using Edison and Rasperry Pi. MRAA is one of the high level library writing and reading to pins, single line affair. This library also offers communication Protocols like UART ,I2C, UART and SPI. It also explains Essential Packages in Python and IOT.

Sockets, it's set of package that Facilities Networking on UDP and TCP/IP by Implementing of python. In order to get access to the Internet It offers Access to Berkeley Socket API. Both the UDP and TCP/IP are transferred layer protocols. This will provide a genuine Interaction with gadgets on the familiar Internet network. The best Interesting benefits of Sockets in is that single can design their own Interaction Protocol Implementing this socket as the base.

We all know that Machines have been driving our existence since the first industrial revolution to the current trend of industry 4.0. It is somewhat imperative to be an integral part of this revolution by making yourself well-acquainted with formidable technology platforms like Machine Learning, AI, & Deep Learning.

In this age of innovation and disruption, technology landscape changes rapidly. One has to be up on their toes to remain updated and upgraded. In such a scenario, a course that incorporates the concepts of Advanced Machine Learning with Deep Learning in one package can be the best bet to learn and train you.

One of the a training package, **Cognixia** which offers a comprehensive training package based on the case study approach where participants take a deep plunge into the pragmatic aspects of learning AI, Deep Learning and Advanced Machine Learning.

II. SUMMARY

1. The widespread new technology IoT
2. Relationship between IoT and python programming

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