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# How Artificial Intelligence is related with Internet of Things?

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## Abstract

The Internet of Things, or IOT, is a network of different devices that are connected to the internet and are able to exchange and collect data. These devices produce a large amount of data that needs to be gathered and mined for useful information using artificial intelligence (AI). This paper provides a brief overview of the concepts of IOT, AI, algorithms, challenges posed by IOT, and the use of AI systems in IOT applications. The software-defined network and self-optimizing network are two of the crucial elements of the artificial intelligence Internet of things.

## Keywords

Internet Of Things (IOT), Artificial Intelligence (AI)

## Introduction

The term "Internet of Things" (IOT) was first used in 1999 by a member of the Radio Frequency Identification (RFID) development community. Due to the proliferation of mobile devices, embedded and ubiquitous communication, cloud computing, and data analytics, the IOT has recently gained greater relevance in real-world scenarios [1].

A typical definition of the internet of things is: an interconnected network of physical items. The internet is no longer just a network of computers; it has grown to be a network of all kinds of devices, including smart phones, cars, toys, medical equipment, cameras, home appliances, industrial systems, people, animals, and buildings. These devices communicate and share information according to predetermined protocols, enabling clever reorganizations, positioning,



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tracing, safe and control, and even personal real-time online monitoring, online upgrades, process control, and administration [2, 3].

Software-defined networks and self-optimizing networks should make up a very basic Internet of Things system. An autonomous network can be achieved by having a router and system update the router's table. This helps to optimize the network for large-scale data transmission and reception. The shortest path for the data to flow will be calculated and determined by the system [4].

Artificial intelligence (AI) algorithms and approaches may analyze and learn from the massive volumes of data generated by connected IoT devices to produce value and public services. The increased use of AI, which offers more possibilities for advanced data analytics, significantly enhances the use of IoT.[14] "Artificial intelligence is the science and engineering of making intelligent machines" refers to the field of artificial intelligence (AI), which is concerned with creating intelligent machines or, more accurately, with integrating intelligence into computers.[8] Artificial Intelligence (AI) is the field of computer science that seeks to develop machine intelligence.

"The study and design of intelligent agents" [10] is how AI textbooks define the field. An intelligent agent is a system that senses its surroundings and acts in a way that maximizes its chances of success [11]. The definition provided by the term's creator, John McCarthy, in 1955 [12], is "the science and engineering of making intelligent machines."[13] Certain words and principles need to be understood in order for the Artificial Intelligence system to be applied into the Internet of Things networks. Neural networks and fuzzy logic are the two methods most frequently utilized in artificial intelligence [6]. Numerous AI algorithms, such as depth-first search, uniform cost search, bidirectional search, depth-limited search, and genetic algorithm, can be applied to tackle a variety of issues.

## Architectural Alternatives for AI in IOT

AI approaches can be extracted to address any problem in terms of a two-stage process. The first stage of process, a set of AI models are built , these model are built by machine learning algorithms with a set of training data , the best models are built with a large amount of training data . Once

these models are built, they can be used to make inferences from the sensor input data, and guide the operation of the system [5].

## Challenges in AI with IOT

There are difficulties with both AI and IOT; these difficulties increase in complexity when we combine the two technologies. A few of these difficulties are [7]:-

**1. Safety:** Since AI and IOT are gathering sensitive and vital user data, we need to make sure that the information is safe.

**2. Compatibility and Complexity:** The Internet of Things (IOT) has various devices that are connected to each other and employ a variety of technologies. This can lead to a number of issues when merging these devices.

**3. Concealed Stupidity:** Artificial stupidity refers to the inability of an AI program to do fundamental tasks flawlessly. To make more accurate and logical conclusions, AI systems' algorithms must be well-developed and able to comprehend and analyze data.

**4. Insufficient Self-Belief:** Given that IoT is a relatively new technology, both organizations and consumers are quite concerned about its security and lack complete faith in its ability to protect IoT devices and on integrity of the produced data.

**5. Cloud Attacks:** As cloud computing technologies evolve quickly, malicious viruses are focusing their attention there. Because IoT requires a lot of data, which is stored in the cloud, there is a higher danger of data security.

**6. Technology:** Compared to other issues, we can state that this one is the biggest because it involves rivalry for all technologies. However, it is not a simple task to face these challenges and give competition to all technologies.

## Some applications of artificial intelligence system in the IoT

Following are some of the applications of AI in the IOT

**1. Home automation:** This is an embedded system that employs a PIC microcontroller to deliver intelligent energy preservation. It is an Internet of Things-based monitoring and control system for home automation. With an easy-to-use android interface on a smart phone, it can automatically turn on and off the majority of household appliances, including fans and lights [9].

**2. Oil field production:** To maximize oilfield production, an oil and gas business uses IoT. In order to achieve this, the business measures well pressure, temperature, oil extraction rates, and other factors using sensors [9].

**3. Smart hotel:** offering its patrons AI-based IoT Intelligent reservation system, Adaptability in controlling the temperature in the room, Useful information selection based on clientele, Re-synchronization of customer history by returning visitors Customers can get real-time assistance online to address their issues. [9].

## Conclusion

Even if the Internet of Things is quite stunning, it is not really useful without a strong artificial intelligence system to make use of it. For both technologies to perform as well as we believe they should, they must both reach the same stage of development.

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