

The Role of Artificial Intelligence in Internet of Things

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Abstract— Internet of Thing is used to collect and handle the huge amount of data that is required by the Artificial intelligence algorithm. In turn, these algorithms convert the data into useful actionable result that can be implemented by the IOT device.

Technology around us is advancing faster everyday, with machine and gadgets gaining human like decision making Abilities, smart technology taking over every aspect of our Lifestyle, and the gap between us and the entire world being bridged by a single click.

Keywords— Artificial Intelligence, Internet of Things.

1. INTRODUCTION

Internet of things services work in five phases: create, communicate, aggregate, analyze, and act. An internet of things service's ultimate efficiency Depends on how well it can execute the act part. The general Internet of Things lies with the sensors built inside the devices that allow access of data from the internet. To act precisely how a smart device is expected it needs to analyze this data accurately. This where artificial intelligence start. While internet of things works as the provider of the necessary information, AI brings the analytical potentials to the table. It enables the devices to respond in ways that are creative and relevant. In this regard, also plays a major role in ensuring the proper and desired performance of the IoT device.

2. Applications of Artificial Intelligence in Internet of Things

A. Collaborative Robots

What if people will help robots. Well, that's exactly what you will get with collaborative Robots or Cobots. These Cobots are highly complex machines that are designed to helps humans in a shared workspace with environment ranging from office to industrial. They can be a robot hand designed to perform tasks or even a complex robot designed to fulfill tough tasks.

B. Drones

Drones are aircraft that are piloted by software rather than by a human. They are extremely useful as they can navigate unknown surrounding (even those beyond the reach of the internet) and reach areas hazardous for humans such as offshore operation, mines, war zones or

Burning building

C. Smart Cities

Why not entire cities, since everything is becoming smart? A network of sensors connected to the actual city infrastructure can be used to develop smart cities. These sensors can be used to monitor a city's energy efficiency, air pollution, water use, noise pollution, traffic conditions, and other civic variables.

D. Digital Twins

Digital Twins are twin objects, one of which is a physical thing and the other a digital reproduction of it. Airplane engines and wind turbines are examples of these items. Digital twins are primarily used to examine the performance of objects without resorting to traditional testing methods, hence lowering testing expenses.

REAL WORLD EXAMPLE

E. Self Driving Cars

Self-driving cars may sound like something out of a science fiction novel, but they are now a reality. Tesla Motors' self-driving cars make use of cutting-edge AI and IoT technology. While these cars are still in the experimental phase (and come with a slew of legal and ethical issues!), they are one of the more straightforward IoT advancements.

Tesla's self-driving cars have a unique feature in that they all work together as a network. When one car learns something new, it informs the other of the cars. And it's used to forecast how cars and pedestrians would behave on the road in certain situations.

F. Endangered Species Preservation

Many creatures in numerous nations are endangered or on the verge of extinction (because to human activity, of course!). Furthermore, typical collar tracking systems are both unpleasant and harmful for these animals (Both to the animals and researchers). As a result, WildTrack's footprint identification approach (FIT) employs IoT and AI algorithms to determine an animal's species, individual, age, and gender from its distinctive footprint. This information can then be used to spot patterns in animal movements, population size, and other factors that aid in the preservation of endangered species

G. Smart Thermostat

Nest Labs' Smart Thermostat (everything these days is smart!) leverages IoT to enable temperature monitoring and management from anywhere via smartphone integration. One of the main reasons for its success (apart from AI and IoT, of course!) is that it is really easy to use.

The Nest Labs thermostat relies heavily on artificial intelligence. It is utilised to determine the users' temperature preferences as well as their daily schedule. The system then adjusts for optimum temperature as well as best energy savings.

H. Automated Vacuum Cleaner

Why not a smart vacuum cleaner, when everything else is getting smart? Three members of MIT's Artificial Intelligence Lab created the iRobot Roomba, which leverages IoT and AI to clean a space as efficiently as possible. It's a robotic vacuum cleaner that detects barriers, unclean patches on the floor, and even steep drops like stairs using a collection of sensors.

So it basically remembers the architecture of the living area (as much as machines can!) and then cleans it using the most efficient and cost-effective actions. With "Clean" mode, "Spot" mode, "Dock" mode, and other features, a smartphone app can be used to change the performance requirements.

3. Uses of Artificial Intelligence in Internet of Things

- Data analysis and management that generates useful insights
- Analyses are completed swiftly but accurately.
- It's critical to have the right mix of localised and centralised intelligence.
- Personalization of the user experience without jeopardising data security and confidentiality Data.
- security in the face of cyber-attacks

4. How does Artificial Intelligence Empower Internet of Things devices?

1. Better consumer experience

AI enables IoT devices to learn consumer preferences and behave in accordance with them, resulting in a personalised user experience for each person.

2. Boosted efficiency

AI aids in the cleaning of IoT's constant data stream and the discovery of certain patterns to aid in the improvement of decision-making abilities. Machine learning combined with AI can even predict operating conditions and adjust settings to the correct levels to obtain perfect results every time
Reduced unplanned downtime

Machine faults and operational failures frequently cost businesses a significant amount of money and disrupt the user experience. However, with AI-enabled IoT devices, this problem can be avoided because the device's operation is constantly monitored, allowing AI to evaluate and predict faults far in advance.

3. Risk management

Integrating AI into IoT allows firms to better analyse and evaluate IoT as well as the dangers associated with it, as well as build automatic responses, which can help with financial loss, employee security, and cyber-attack concerns in the long term.

Despite the fact that these technologies sound futuristic, AI-enabled IoT is now prevalent in our daily lives. Self-driving automobiles and smart houses are two of the most well-known examples. All of the electronics in this room are connected and can be controlled using a digital assistant such as Alexa, Siri, or Google Assistant, as well as face identification technologies in smartphones and fitness bands with body sensors. As a result, a quality assurance service provider is critical in this situation since it assures correct device integration and validation in order to get the intended results.

Whether on a personal or business level, AI-integrated IoT makes life easier for humans.

4. The role of Artificial Intelligence in the

Internet of Thing Revolution.

Without human intervention, AI is expected to execute a variety of sophisticated jobs such as voice recognition, language translation, decision-making, and so on.

Alternatively, Internet of Things (IoT) refers to a network of networked gadgets that exchange data. IoT gadgets have found their way into our daily lives and aim to provide a higher level of comfort. These devices rely on internet connectivity and create enormous volumes of data about user habits, preferences, personal information, and so on, which cannot be ignored. Many businesses, on the other hand, have no idea how to store and manage such massive amounts of data. This is impeding the IoT's growth and promise.

In this instance, artificial intelligence can substantially assist in accumulating the deluge of data produced by IoT devices. It enables the data to be analysed and made meaning of. As a result, AI is expected to be the primary catalyst for the IoT revolution's unparalleled expansion.

5. Conclusion

Everyday objects are being transformed into data factories thanks to the Internet of Things. When IoT is combined with Artificial Intelligence, a new technology with limitless possibilities is formed every minute. Intelligent Internet of Things is providing more reasons for businesses to incorporate the technology into their business structure, from improving operational efficiency to lowering costs.

Continuous advancements in artificial intelligence, together with the Internet of Things, will usher in a new world that will increasingly speak with us.

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