AIoT - Artificial Intelligence of Things is booming in marketplace applications *How can I start to implement it in my systems?*

In recent years **AIoT** *(Artificial Intelligence of Things)* has seen rapid development in various applications in the field of smart automated factories, security monitoring, intelligent transportation, and medical environments.
By combining IoT with AI, data collected from devices and sensors can be utilized by applying AI techniques such as machine learning and deep learning.

Without the aid of AI for an automatic detection system in the early stage, existing data could only be used for comparisons but with the use of AI algorithms, systems will be able to analyze the quality and characteristics of the data.
Artificial intelligence allows machines to continuously learn and be optimized for efficient reading and testing that would become faster and more accurate than conventional methods.

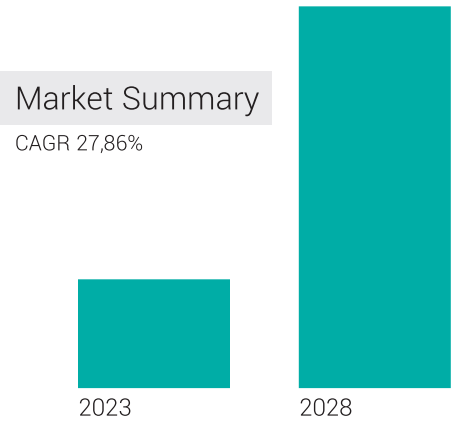
Analysis on Artificial Intelligence in IoT Market

The **global Artificial Intelligence (AI) in the IoT market** is expected to grow at a CAGR of **27.86%** on next 5 years.

The need to efficiently process vast volumes of real-time data generated from IoT devices, the growing demand for performance management appliances, and the need to reduce downtime and maintenance costs are the primary factors driving the market's growth.

IoT technology is essential for various organizations to digitally transform, thus, empowering them to upgrade the existing processes by creating and tracking new business models.
More and more companies view IoT as an important element for business success,

FIGURE 1



SOURCE: MORDOR INTELLIGENCE

thus increasing its adoption. AI and IoT, both technologies, when combined, are creating intelligent machines that simulate rational behavior and support decision-making with little or no human interference.

The growing emphasis on effective management of data generated from IoT devices to gain **valuable insights** and **real-time monitoring** to curate an enhanced customer experience are the key growth drivers for the market.
Furthermore, most companies are shifting to the cloud from on-premise AI, owing to faster delivery time with low latency and real-time tracking, likely to foster the studied market growth during the forecast period 2023/2028.

For instance, **Amazon Echo Amazon** has introduced Web Services IoT, a managed cloud platform and lets devices connect securely to cloud applications and other devices.
In February 2021, **IBM** and **Red Hat** announced a new collaboration to use a hybrid cloud designed to deliver an open, flexible, and more secure solution for manufacturers and plant operators that will drive real-time value from operations data from industrial IoT.

However, the lack of a skilled workforce and growing concerns regarding **data security** are some major factors restraining the studied market growth. It is crucial to ensure that the data is secure and in safe hands because AI and IoT collect sensitive and essential data from their users or clients.

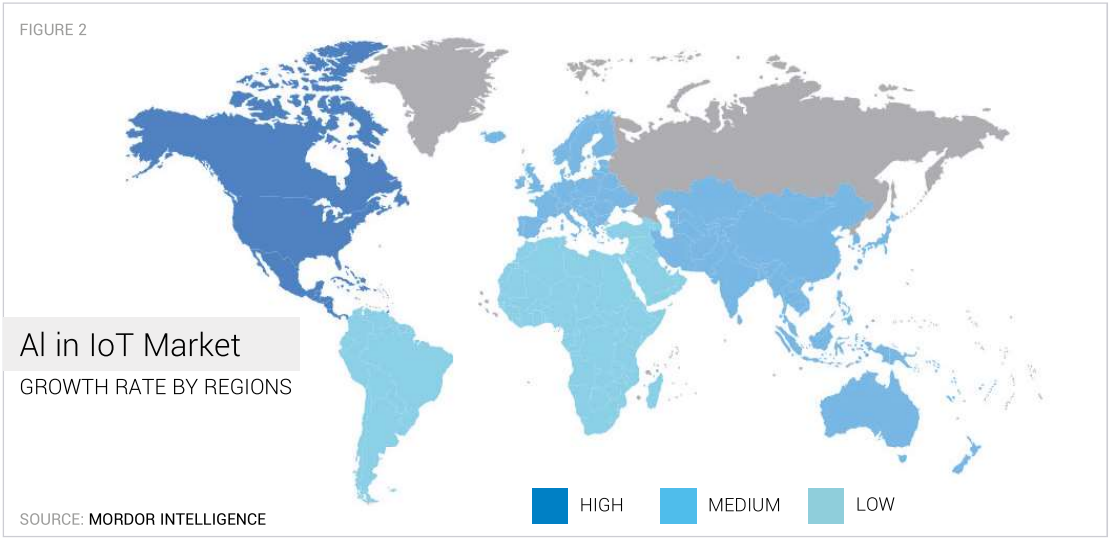
But since users have no idea when someone would attempt to access our private and sensitive data, **security is always a concern** with technology and restricting the market growth.
During the spread of Coronavirus, the ability for organizations to access scalable, dependable, and highly secure computing power, whether for vital healthcare work, to help students continue learning, or to keep unprecedented numbers of employees online and productive from home are some of the critical factors owing to the growth of the market in this situation.

Hospital networks, pharmaceutical companies, and research labs are using AI-enabled IoT devices to care for patients, explore treatments, and mitigate the impacts of COVID-19 in many other ways. All of the above factors have accelerated the market's growth rate in the short run and are expected to augment it further in the long term.

Artificial Intelligence in IoT Industry Segments

IoT is enabling businesses across the globe to collect a considerable amount of data from multiple sources.
The role of Artificial Intelligence in IoT is to **identify patterns** and **detect anomalies automatically**.
The study covers detailed segmentation by different types of components, providing its solutions to end-user market studies, such as Telecom & IT, BFSI, and others, along with geographical analysis.

FIGURE 2



Artificial Intelligence in IoT Market Trends

Manufacturing industry are increasingly taking steps to achieve 100% automated data management systems.
AI-enabled IoT applications for manufacturing can also efficiently deal with operations such as **monitoring** and **optimizing equipment performance**, **production quality control** and **human-to-machine interaction**. Faster and more efficient manufacturing and supply chain operations significantly reduce product cycle time.

Moreover, with the high rate of adoption of sensors and connected devices and the enabling of M2M communication, there has been a massive increase in the **data points** generated in the manufacturing industry. These data points could be of various kinds, ranging from a metric describing the time taken for a material to pass through one process cycle to a more advanced one, such as calculating the material stress capability in the automotive industry.
The growth in the North American AI in the IoT market is associated with an increase in the number of early adopters of the technology. Modern manufacturing facilities in the United States rely on new technologies and innovations to produce higher quality products at a significant rate with lower costs.
The emerging technologies that are expected to emerge out of the existing technologies, transforming manufacturing are expected to include the convergence of AI and IoT, with companies, like SAS Software touting IoT as the next wave for IoT based on AI.

Additionally, awareness about IoT solutions in industries is significantly higher in the region compared to others. According to a study by Mendix in March 2021, **78% of the US manufacturing workers** welcome digitalization, and eight in ten manufacturing workers are interested in learning new digital skills.

Other factors influencing the market's growth are the presence of several significant players in the region. The higher cloud adoption rate among end-users drives investment in the studied market. The market players in the area are observing strategic partnerships and collaborations among various significant players.

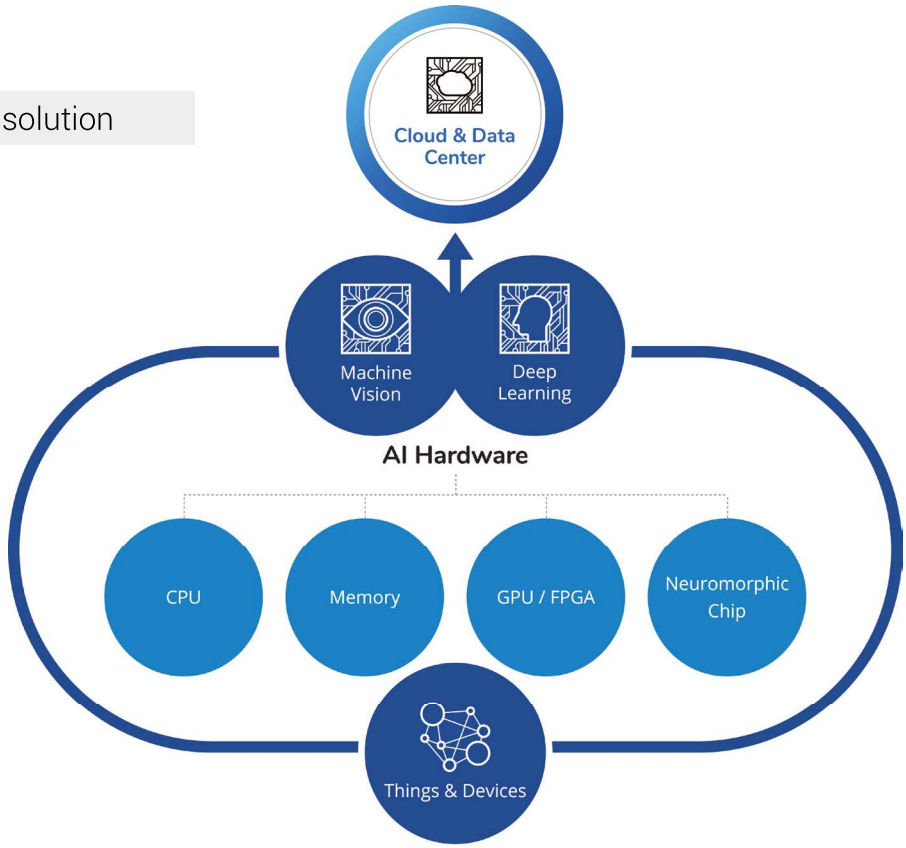
The adoption of intelligent robots across several end-user industries is driving the growth of the market studied. North America is among the advanced innovators and pioneers in adopting **robotics** and is one of the largest markets.
The fundamental reason for the market's growth is the increasing adoption of robots across numerous industries. The region also homes several robotics manufacturers and companies that provide AI for robot manufacturers.
The AI in IoT Market is highly competitive owing to the presence of a large number of players in the market which appears to be fragmented. Due to the increase in the applications of AI in the IoT market, major players are adopting strategies like product innovation, partnerships and acquisitions.

IBASE solutions for the AIoT environment

IBASE Technology specializes in the design and manufacturing of robust industrial PC products, delivering high quality products and excellent service since its establishment in 2000.
IBASE carries out manufacturing and quality control at its own facilities in Taiwan that are certified with ISO 9001, ISO 13485, ISO 14001 and ISO 27001 standards. Current product offerings comprise of x86- and RISC-based industrial motherboards, embedded systems, panel PCs, digital signage players and network appliances for applications in the AIoT, industrial automation, smart retail, intelligent transportation, networking

FIGURE 3

IBase solution



SOURCE: IBASE

& communication and medical sectors. The company is publicly listed in the Taipei Exchange (TPEx: 8050) and is now a leading global provider of innovative industrial and embedded computing products.

Their rugged industrial PC and edge gateways leverage high-end processors and can be integrated with advanced AI chips such as GPU and FPGA to perform multiple, simultaneous high-speed computations for deep learning implementation with improved accuracy and performance.

These platforms support multiple I/O interfaces for connecting cameras and sensors and capturing high-resolution images that can used as collected data in the process of real-time AI analysis.

Typical applications reference are:

- **Control center** or **control room** to analyze and better manage real-time traffic flow in **smart cities** or to optimize the efficiency of operational processes in **smart factories**.
- **Medical AIoT Application**, the customized 3D visualization system provides a real-time 3D vision of the endoscopic surgical images. It converts the 2D endoscopic image into 3D to increase the accuracy and boost the safety for minimally invasive surgery.

Some key platforms provided by IBase

ASB210-953-AI

Edge AI Computing System with 11th Gen Intel® Core™ U-Series CPU & Hailo-8™ M.2 AI Acceleration Module
With Hailo-8™ AI accelerator module supporting up to 26 Tera-Operations Per Second (TOPS)
System with IBASE IB953 3.5" Single Board Computer (TDP-up 28W)
Onboard 11th Gen Intel® Core™ U-Series Processor
Supports 2x M.2 sockets (B-Key/E-Key)
12V (-10%) ~ 24V (+10%) DC-in power input
2x DDR4-3200 SO-DIMM, Max. 64GB
3x USB 3.1, 1x USB 2.0, 2x Intel® GbE, 1x COM
External GPIO, 2x DisplayPort, TPM (2.0)

CMB100/CMB101 Series

High Performance Expandable Industrial Computer Based on MicroATX Solutions
Supports 9th/8th/7th/6th Gen Intel® Core™ DT processors (TDP 65W) with specified M/B
Supports discrete GPU cards via reserved expansion slots
Multiple expansion slots :
CMB100M (C236 platform):
1x PCI-E(x16), 1x PCI-E(x8), 1x PCI-E(x4)
CMB101M (H310 platform):
1x PCI-E(x16), 2x PCI-E(x1), 1x PCI
500W 1U Flex ATX power supply [Default]
2-pin remote boot extension design
Supports multi-display interfaces [HDMI, DP, CRT] and GbE ports , USB 3.0 ports
Four removable 2.5" storage bays (supports RAID 0/1)
MiniPCI-E and
M.2 M-Key (2280)