

**Naveed Hamid**  
Innovation & Entrepreneurship Cell  
SKUAST, Kashmir  
India

**Falak Jan**  
Innovation & Entrepreneurship Cell  
SKUAST, Kashmir  
India

**Corresponding Author**  
Naveed Hamid  
[bhatnaveedbhat@gmail.com](mailto:bhatnaveedbhat@gmail.com)

---

# ***AIoT - New Technology Dose Ready to Boost Business Immunity of Agri Startup***

---

**Integration of artificial intelligence (AI) with the Internet of Things (IoT) provides a platform for creating truly intelligent, networked devices and applications. The Artificial Intelligence of Things" (AIoT) is working to develop cost-effective, intelligent, and scalable solutions for a more sustainable, interconnected society. In other words, using IoT sensing and AI decision-making skills enable large-scale industrial automation that is self-healing and self-managed. At the same time, AIoT assists enterprises in promoting learning and customization. AIoT synergizes solutions for a successful digital transition by enabling for the addition of more advanced predictive capabilities. AIoT can employ data analytics to make appropriate recommendations or take appropriate actions.**

## **INTRODUCTION**

The "Internet of Things" (IoT) is rapidly becoming an opportunity for new enterprises to grow. This is especially true as Artificial Intelligence integrated Internet applications is developing at a rapid pace, and an increasing number of startups or research teams are integrating domain expertise from their respective fields through big data analytics and landing various AIoT applications. The convergence of Artificial Intelligence & Internet of Things has been in the focus in recent years as a way to define the future of the Industry 4.0 revolution.

AI and IoT are two distinct technologies that have a big impact on a variety of industries. AI and IoT alone have their own functions and characteristics; their combination opens up a whole new world of possibilities for digital transformation. The AIoT fusion extends beyond standard IoT implementations, resulting in intelligent and linked systems. Following the pandemic, the world has become increasingly reliant on technology. The IoT component of AIoT relates to devices that communicate with the internet, whereas AI allows devices to learn from their data and experience. Businesses can use AIoT to develop predictive analytics or anomaly alerts by moving through millions of tank level data points to achieve digital transformation. Data analytics solutions that derive value from IoT-generated data can benefit from AIoT. While AIoT is still a relatively new idea, it has the potential to promote the growth of different industry verticals.

#### **LET'S PLAY WITH AIOT STEPS TO BE FOLLOWED BY STARTUPS TO FIND SOLUTION VIA AIOT-ENABLED MODELS CAPTURING DATA**

IoT devices detect and generate a stream of sensor data known as Telemetry data. Depending on the type of sensor, there might be a wide range of sensor data (or actuator). A channel is created for each source of telemetry data.

#### **INGEST DATA**

Data generated by a fleet of IoT sensors can be large and unstructured, making it difficult to process. To convert this data, such as a voltage signal to a temperature unit, a data pipeline is required. Data from many devices is combined and enriched, for example, by adding weather or traffic metadata to a data point. The processed data is saved in a suitable data storage location for later analysis.

#### **STORAGE**

Ingest data is stored in scalable cloud storage due to the large amount of data. Because of their low latency and high throughput, NoSQL databases are recommended. Because IoT data is mainly in the form of time series, specialist time-series databases can be used.

#### **AI MODELING**

Machine learning models are built on the foundation of collected telemetry data. Models that have been trained on historical data to make predictions for the future. Depending on the use case and type of input data, a variety of algorithms could be employed.

#### **TUNING OF MODEL**

There's a popular adage concerning machine learning models that goes, "Every model is flawed, but some are useful!" This is an iterative process in which machine learning models are fine-tuned, optimized, and retrained on a batch of new data.

#### **INSIGHTS**

Data points, outcomes, and forecasts are used to perform real-time actions, and visual graphing is used to provide detailed reports. Insights and advanced dashboards aid in the alignment of business goals, the fine-tuning of processes, and the development of future initiatives. Tableau and Microsoft Power BI are two data visualization solutions that have proven to be quite effective in showing large amounts of data with millions of data points.

#### **AIOT IN ENTREPRENURSHIP/STARTUPS**

While IoT collects vast amounts of data via internet connectivity and Artificial Intelligence, with Machine Learning helping in integration and evaluation of this data. In IoT devices, Machine Learning (ML) uses advanced sensors to recognize trends and detect data collection problems. This technique is used to derive things like air stimulation, moisture, temperature, contamination, lighting, sound, vibrations, and so forth. IoT and machine learning, in contrast to older technology, make operational projections 20 times faster and with more accuracy. This is one of the main reasons why organizations that deploy AI technology realize tremendous revenue increases. Artificial intelligence of Things (AIoT) brings a slew of advantages to businesses and consumers, including preemptive intervention, personalized experiences, and intelligent automation.

The following are some of the most significant advantages of merging these two disruptive technologies in a business:

### • MINING DATA AND FORMULATING PERCEPTIONS OF USER

For a company's growth and development, data collection is critical. One of the most significant advantages of using cloud-based AI is the capacity to swiftly identify important and notable insights when processing large amounts of data. As a company, you can get previously untapped insights and gain a competitive advantage.

You may also utilize data collection and analysis to predict future trends ahead of your competition, create a more efficient and faster data input process, forecast market swings, and gain a better understanding of your target market. You may make the most out of the knowledge you have at your disposal.

### • IMPROVED CUSTOMER EXPERIENCE

The Internet of Things has transformed how we handle data, and AI makes it easier to keep track of it all. IoT devices bring a unique technique for tracking, recording, and observing user interaction patterns.

Companies use the data they've obtained to come up with innovative ways to improve customer service. AI Chatbots are only one example of how companies are using AI to improve their customer experience. Chatbots can be programmed to reply to and solve any client concern. Unlike humans, AI chatbots can speak with an infinite number of clients at the same time and can react as well as start communication.

### • ELIMINATION OF DOWNTIME

Heavy machinery is used in oil and gas manufacturing, and it is susceptible to unanticipated/unplanned breakdowns, resulting in downtime and significant financial losses. Predictive maintenance is possible with an AI-enabled IoT platform, which uses analytics to predict mechanical failures and breakdowns. You may devise a strategy to ensure that your operations are not disrupted.

### • IMPROVING OPERATIONAL EFFECTIVENESS

Artificial Intelligence in the Internet of Things analyses the never-ending stream of data and uncovers patterns that simple gauges overlook. Machine learning (ML) and artificial intelligence (AI) coupled can predict operational conditions and

determine which parameters need to be changed to get best results. As a result, intelligent IoT provides insights into which activities are redundant and time-consuming, as well as which jobs can be fine-tuned to increase efficiency, such as Google's reduction in cooling costs, which they could do via AIoT.

### • HELPS IN PROCESSING BUSINESS ANALYSIS

A precise balance between demand and supply is required. AI can assist you improve inventory management and relieve stock strain by letting you know when you need to refill in advance.

This helps retailers if they stockpile too much things and subsequently discover they can't sell them all, demonstrating how much more precise it is than manual techniques. There are IoT applications that assist them in gathering data and analytics for stock management.

### • BETTER RISKS MANAGEMENT

- Businesses can better analyze and predict a wide set of risks by combining AI and IoT, as well as automate responses. As a result, they are better able to manage financial loss, worker safety, and cyber threats.
- Enhances operational efficiencies by assisting in the streamlining of business procedures.
- Algorithms based on artificial intelligence (AI) help to reduce garbage data and arrange unstructured data into useful and meaningful insights.
- Allows you to better understand your customers' behavior and the difficulties they confront, allowing you to provide more personalized experiences.
- Businesses can pinpoint cost savings without sacrificing productivity by easy access to data.

Most notably, AIoT can evaluate telemetry data in real time from a massive number of connected devices. Unlike traditional IoT systems, which are reactive and geared to respond to urgent gaps by alerting key stakeholders, AIoT architectures are proactive and capable of anticipating equipment failures and shutting down malfunctioning machinery before an accident occurs. To fully benefit from these intelligent connected systems, manufacturers will need to upgrade their networking infrastructure.

### SMART AGRICULTURE VIA AIOT MODELS

Any sector has the potential to be transformed by technology. Agriculture is one of the fields where AIoT-based solutions have the potential to tackle major issues.

### AGRICULTURE AND THE INTERNET OF THINGS

India is an agriculture-based country, with more than 70% of the people still relying on farming for a living. On this terrain, technology to boost farming efficiency becomes even more important. Smart farming, also known as precision farming, is a method of using cutting-edge modern technologies to improve the quality and quantity of agricultural products. Sensors connected to the internet of things capture spatial and temporal data and send it to a cloud server. Deep learning techniques are used in AI-based models to comprehend data, detect patterns, and create automatic analysis and forecasts. The smart pest monitoring system is one of the more advanced applications in this field.

### SMART PEST MONITORING SYSTEM

AI and IoT-based techniques for intelligent pest control on farms have been determined to be beneficial. It monitors insect population density in potential hotspots using the environment and wireless image sensors deployed within greenhouses. To detect pest objects in an image sensor stream, AI-based approaches like as picture segmentation and object detection are used. The classification of an identified object as pest or not-pest is done using CNN-based neural network algorithms.

- IoT devices become smarter and more self-sufficient when they are powered by AI. These gadgets have the ability and intelligence to use the data they receive to make appropriate suggestions or conduct appropriate actions.

### PRECISION FARMING

AIoT makes farming more precise by enabling smart agricultural applications such as animal monitoring, vehicle tracking, field observation, and inventory monitoring. Precision farming examines sensor data in order to make well-informed and timely recommendations.

### CROP MONITORING

Farmers may gain insights regarding temperature, precipitation, wind speed, and solar radiation using AIoT in agriculture. This allows them to make informed decisions and plan ahead of time. Climate change, pest and weed infestations that lower crop productivity and the production of high-quality agricultural goods are all key concerns in agriculture that AIoT solutions have the potential to solve. Farmers will be able to forecast future problems that may arise because of the real-time data collected. These technologies will boost production, improve farmer's understanding of their land, and make farming more sustainable.

### DIGITAL IMAGING

This sort of imaging requires strategically placing sensor cameras across the farm to capture images that are then digitally processed through AIoT techniques.

#### ○ Controlling the quality

Image processing paired with Artificial Intelligence (AIoT) compares photographs from the database to images of crops to determine size, shape, color, and growth, and adjusts the quality as a result.

#### ○ Grading and Sorting

Computer Vision can help in Sorting and Grading on the basis of color, shape, and size.

#### ○ Monitoring of Irrigation

Smart irrigation has helped in the monitoring of irrigated fields over time. Having this automated system will help in deciding whether or not to harvest during the pre-harvest season.

### SMART RETAIL

A smart system with computer vision capabilities can use facial recognition to identify consumers as they go through the door in a smart retail setting. The system gathers data on visitors or buyers, such as gender, product preferences, traffic flow, and other aspects, and analyses it to predict customer behaviour exactly. It then makes decisions about store operations, such as marketing, staffing, and product placement, based on the data.

### QUALITY OF THE SOIL

Using sensors, the analysis of soil quality supports in identifying nutritional value, soil drainage capacity, and acidity, allowing for the modification of irrigation water requirements and the selection of

an advantageous type of cultivation using AI models.

### REMOTE MONITORING OF CROPS

The sensors, which are strategically placed across the farms, monitor the crops for changes in shape, size, light, humidity, and temperature. Any anomaly detected by the sensors is evaluated, and the farmer is notified. As a result, AIoT helps in the prevention of disease transmission as well as the tracking of crop progress remotely.

### MONITORING CLIMATIC CONDITIONS

Crop productivity is influenced by the weather. Different crops require different climate conditions to develop, and even a fundamental understanding of climate has a significant impact on crop quantity and quality. Farmers can use AIoT technologies to get real-time weather updates.

Sensors installed in agricultural fields collect data from the environment, which farmers use to select a crop that can thrive in specific climatic conditions. Sensors in the IoT ecosystem detect real-time meteorological factors such as humidity, temperature & rainfall, which are most critical for agricultural productivity. These sensors can detect any significant changes in climatic conditions that may have an impact on productivity. The server is notified of the change in climate, which helps to reduce the need for physical presence. This, in turn, leads to increased yields.

### SUCCESSFUL AIoT STARTUPS

#### YESHEALTH GROUP

YesHealth Group, which was founded in 2011, produces 1,500 kg of leafy greens each day at its iFarm, a 2,500 square metre warehouse complex. According to YesHealth, this yield is 100 times more efficient than a regular farm on the same land, and it requires only 10% as much water. YesHealth has also opened a farm in Shenzhen, made an investment in the United Kingdom as an overseas base, and teamed with a Danish business to build Copenhagen Market's new 14-story vertical farm. Instead of relying on a major manufacturer like Philips, the company makes its own LED lights through a local contractor, allowing it to be more nimble in introducing new technology: the iFarm uses sixth-generation LED lighting, and new, more

energy-efficient iterations are introduced on a nearly annual basis.

### NEW GARDEN

New Garden is a Taiwanese firm that specializes in "Artificial Intelligence of Things" (AIoT). It was founded in 2016. AIoT is a mix of Artificial Intelligence and the Internet of Things, in which AI technology is directly built into IoT hardware, analyzing and interpreting data on the fly. ULTRON, New Garden's AIoT ecosystem, is the company's core offering. The ULTRON Smart AI Gardener, a self-caring planting system with smart lighting, a watering system, and several connected sensors, is their new ULTRON-powered product. It's a cloud-to-edge Smart Agriculture System that lets users grow any plant with absolutely no effort.

### LEBIO SMART FARMING SOLUTIONS

LeBio is a three-part turnkey smart farming system founded in 2007 by an accomplished orchid grower who noticed big technology and climate challenges hanging over his sector. One of the smart technologies it has introduced is the Spectral X, a new variant of agriculture net that changes sunlight and RGB spectrum ratios to promote plant health and growth over time.

### CONCLUSION

Artificial intelligence and the Internet of Things are **critical pillars of digital transformation**. The integration of AI with the Internet of Things (AIoT) allows for the creation of truly intelligent, networked devices and applications. The "Artificial Intelligence of Things" (AIoT) is working to develop cost-effective, intelligent, and scalable solutions for a more sustainable, interconnected society. In other words, using IoT sensing and AI decision-making skills enables large-scale industrial automation that is self-healing and self-managed. At the same time, AIoT helps businesses promote learning and customization. By enabling the integration of more advanced predictive capabilities, AIoT synergizes solutions for a successful digital transition. Data analytics can be used by AIoT to generate relevant recommendations or actions.