Journal of Engineering and Software Applications

Taleghani Md, et al., Journal of Engineering and Software Applications. 2025;1(1):3-4.

Editorial

Modern agriculture based on artificial intelligence and the internet of things

Mohammad Taleghani[1,*], Fatemeh Alidoosti Hesari[2]

[1]Department of Industrial Management, Rasht Branch, Islamic Azad University (IAU), Rasht, Iran.

[2]Department of Industrial Engineering, Science and Research Branch, Islamic Azad University(IAU), Tehran, Iran

*Author for correspondence:
Email: M.Taleghani454@yahoo.com, Taleghani@iaurasht.ac.ir

Received date: December 15, 2025
Accepted date: December 17, 2025

Introduction

AI and IoT bring a plethora of advantages to the agricultural domain. AI, with its capability for advanced data analysis, can aid in crop disease prediction, soil health monitoring, and yield forecasting. This predictive capacity allows for timely and precise interventions, thus enhancing crop quality and quantity. Technologies used for smart farming include artificial intelligence (AI), automation and the Internet of Things (IoT). While new technologies and tools have long been integral to farm management and food production, urgent concerns drive the development and adoption of smart farming technologies today.

The Importance and Necessity of the Issue

The new developments of Smart Farming with use of IoT, by day turning the face of conventional agriculture methods by not only making it optimal but also making it cost efficient for farmers and reducing crop wastage. It is a network of different devices which make a self-configuring network. ML is used in agriculture to help farmers more accurately predict crop yields, optimize irrigation systems, and choose the most efficient agricultural production strategies. In recent years, machine learning algorithms have been used to develop new ways to identify pests and diseases and to map crops more accurately. For agricultural companies, generative AI can gather and crunch even more granular and timely information and analysis that help them improve their products, customer service, and processes and operations to better meet business goals—including sustainability targets. AI can help farmers by providing information on the crop's health and its growth. It helps to enhance resource use and predict potential issues related to various diseases. AI helps to improve precision farming methods, and it makes it possible to make the agricultural industry more predictable.

Sustainability Achievements

Resource use efficiency is a measure of how effectively resources such as land, water, energy, and labor are used in agricultural production. It is an important concept in sustainable agriculture as it can help to reduce the negative environmental impacts of agriculture while maximizing productivity and profitability. By collecting data on plant growth, AI can help produce crops that are less prone to disease and better adapted to weather conditions. With the help of AI, scientists can identify the best-performing plant varieties and crossbreed them to create even better hybrids. By promoting the reuse and recycling of materials, AI supports responsible consumption and production practices, aligning with SDG Goal. AI can contribute to sustainable product design by optimizing materials and energy usage.

New Applications

AI could become a master gardener, perpetually monitoring and fine-tuning every growth stage in the farm, from seed selection to harvest and beyond. It can help adjust farming practices in real time to climatic shifts, ensuring optimal crop health and yield. Smart agriculture involves using precision equipment and machinery, including advanced technology in farm tyre design. Tractors, harvesters,

and other farm equipment are equipped with GPS and IoT sensors, allowing for precise planting, harvesting, and monitoring. Resource efficiency means using the Earth's limited resources in a sustainable manner while minimizing impacts on the environment. Resource efficiency includes for example re-manufacturing, repair, maintenance, recycling and eco-design. Linear programming optimizes the allocation of scarce resources like land, labor, and inputs, thereby maximizing agricultural profitability. AI can help farmers by providing information on the crop's health and its growth. It helps to enhance resource use and predict potential issues related to various diseases. AI helps to improve precision farming methods, and it makes it possible to make the agricultural industry more predictable. Sensors measure environmental factors such as soil moisture, temperature, and light levels while drones provide aerial imagery for precision farming practices like weed detection and crop health monitoring.

Future Prospects

AI adjusts demand to use the least amount of energy to ensure ambient conditions. This not only saves energy, but also reduces the building's carbon footprint. Less energy consumed means lowers operating costs, allowing companies to allocate these resources to other areas. In regions such as London, the UK, Europe, Asia, India, the USA, and China, AI-driven agricultural startups are providing innovative solutions, from precision farming to crop monitoring and supply chain management. AI helps farmers by suggesting the nutrients they should apply to increase the quality of the soil. AI can help farmers choose the optimal time to plant their seeds. Intelligent equipment can calculate the spacing between seeds and the maximum planting depth.

Summary and Conclusion

AI-powered systems can process massive amounts of structured data quickly and accurately, reducing the need for human clerks. These systems not only reduce human error but also manage workloads more effectively. According to a study by McKinsey, up to 38% of data entry tasks could be automated by 2030. The future of farming lies at the intersection of technology, innovation and sustainability. Precision agriculture, vertical farming, genetic engineering, sustainable practices, robotics and blockchain are more than just buzzwords — they are transformative forces reshaping the agricultural landscape.