Review Article

Artificial intelligence: a novel tool for the food sector

Abstract

Climate change and a rapidly growing population are driving an increase in food demand, posing a significant threat to the national food economy. Research on artificial intelligence (AI) has garnered considerable attention in recent years and is experiencing rapid growth in the food industry. AI technologies in the food industry are becoming more perceptive, surpassing the boundaries of traditional approaches. This paper presents a comprehensive review of the application of AI in the food industry. It provides a concise overview of AI technologies and their impact on the future of the food industry. These include the role of AI in agriculture (soil and field monitoring, crop management, seed selection), food recognition, calorie measurement, food safety (hygiene and traceability), and the supply chain. Also, special emphasis is laid on future research directions of AI in the food industry.

Keywords: smart farming, machine learning, computer vision, deep learning, drones, neural networks

Volume 13 Issue 2 - 2025

Angira Das,[1] Saptoshi Mondal,[2] Pubali Dhar[2]
[1]Department of Nutrition, Vivekananda Mahavidyalaya, Haripal, Hooghly, West Bengal, India
[2]Laboratory of Food Science and Technology, Food and Nutrition Division, University of Calcutta, India

Correspondence: Dr. Pubali Dhar, Laboratory of Food Science and Technology, Food and Nutrition Division, University of Calcutta, 20B Judges Court Road, Alipore Kolkata-700027, West Bengal, India. Tel 9433122560, 7003966709

Received: September 02, 2025 | **Published:** November 12, 2025

Introduction

Within a few decades, Artificial Intelligence (AI) has brought about tremendous change throughout the food industry. Innovations and technologies are advancing rapidly, and as a result, people are becoming increasingly concerned about their health. With the improvement of medical technologies, the mortality rate is also gradually decreasing. The world's population is growing rapidly and is expected to reach 10 billion by 2050, resulting in increased food demand in the future. Rapidly changing climates in recent years have impacted the rate and quality of food production.[1,2] Currently, food wastage is also a significant problem, compounded by persistent food scarcity. Food is getting wasted while millions of people are dying from starvation. All of this somehow affects the health and economy of a country.[3,4] AI can be considered a miracle in the food supply chain. In agricultural production, AI is being used for monitoring nutrients in the soil, diseases in plants, and weather predicting and assisting farmers to make better decisions in seed selection, water, fertilizer requirement, market trends, sowing time, and harvesting time which is also known as precision agriculture (PA) or "**smart farming**".[5] Technologies are being used for agricultural food production, processing, product manufacturing, packaging and also serving. This is known as the "**farm to fork**"[2] concept, where AI is being used to raise the crops on the farm to serve on your table. Experts believe that with the help of AI technologies, the drawbacks in the food supply chain can be resolved, and future food demands can be met. In the future, food demands will need to be met by the limited areas of agricultural land currently in use. Hence, appropriate approaches should be assembled to meet the demand. Recruiting robots to replace humans has shown improved efficiency in various food industries. The application of AI technology in the food industry utilises computerised systems that have been proven to reduce waste, resulting in higher yields and better-quality products.[6] In a study by Kakani et al.,[7] ICRISAT experimented with 175 farmers, instructing them to delay sowing until further notice. After monitoring weather data, farmers are advised to sow, which ultimately results in a 30-40% increase in crop yield. Predictive analysis and monitoring enable farmers to make informed decisions. AI technologies operate to regulate the weather in greenhouses. Not only in agricultural land, but AI technologies are also being used for managing animal farms.

AI robots are technically intelligent machines used for various purposes with minimal human intervention. Robots are applicable in every aspect of the food industry, including agriculture, food safety, handling, processing, manufacturing, packaging, planting, monitoring, and harvesting, promoting higher yields and improving quality control. The Internet of Things (IoT) is primarily used for tracing and tracking various food products, including food packaging, as well as for monitoring traceability and risks.[8] Additionally, it is utilised for studying root and shoot growth, as well as leaf growth.[3] An approach[1] was employed to detect weeds in soybean fields using a histogram, yielding an overall outcome of 96%. Big data encompasses a vast amount of data that enables farmers to adjust their fieldworking practices.[9] Computer Vision (CV) came into the technology field in the early 1970s. it is mainly used for pattern recognition, image processing, 3d food printing in the food industry.[7] Machine learning (ML) is an irreplaceable technology in the food industry. It helps to assess sales and revenue prediction, deliveries, and also monitor the safety and quality of the food.[4] Deep learning is a subset of machine learning that utilises artificial neural networks to simulate the complex capabilities of the human brain. Using DL proved beneficial in food product recognition and calorie measurement, thereby improving diet-related illnesses. Convolutional neural networks (CNNs) are utilised for the detection and recognition of food images to achieve better performance. However, CNN together with DL has proven to be even better in recognition.[10] Traceability systems are primarily used to gather information about product safety, quality, and the logistics associated with it.[8] The main objective of these modernised approaches is to imitate Human intelligence and reasoning. The AI-operated machines must undergo processing of a vast number of datasets and tests to achieve this.[11] The significance and value of AI in the food industry became more apparent following the COVID-19 outbreak. Viruses were getting transmitted within a close range, and people were dying after getting infected. AI robots and drones, along with other AI technologies, have been proven to be advantageous as they remain sterile and completely unaffected.[12] In situations like the COVID-19 pandemic, food deliveries using drones could prove to be beneficial.

This review aims to provide an overview of the role and applications of artificial intelligence and its technologies in the food industry, with a focus on their use in addressing various industrial challenges, including food production, packaging, and service. Artificial intelligence (AI) is a computer science technology that emerged in 1956. Artificial intelligence-operated computational systems function like humans. Without human intervention, machines can process statistical models and datasets to learn and then use their own experience to solve problems or make decisions.[13] AI has expanded the possibilities for a vast number of industries worldwide, and the food industry is no exception.

A significant amount of research in the field of AI technology aims for a future where intelligent machines will perform all work automatically, utilising their intelligence, reasoning, and decision-making capabilities, in a future where AI and humans will coexist.[14] Artificial intelligence is a set of disciplines and algorithms. One or a set of these algorithms, when combined, could yield numerous desired results. Several tools and technologies of AI are briefly discussed as follows:[15]

Expert systems*:* Expert systems (ES) are computer program that matches the decision-making ability of a human expert. It uses artificial intelligence and is designed to solve complex problems, making judgments akin to those of a human expert in a particular field.

Fuzzy logic: Fuzzy logic is a multi-valued logic system that allows a range of variables between 0 – 1 based on "degrees of truth" rather than the usual "true or false" logic.

Computer vision (CV): Computer vision is a field of artificial intelligence that focuses on enabling computers to acquire information (from images, videos, and other inputs), process and analyse it to obtain real-world data and produce numerical or symbolic information.

Machine learning (ML): Machine learning is a branch of artificial intelligence (AI) that employs a data-driven approach, enabling machines to learn from historical data, statistical models, and past experiences with minimal human intervention.

Deep learning is a subset of machine learning that utilises multi-layered neural networks, enabling computers and machines to process data in a manner that mimics human intelligence. They perform a given task repeatedly, improving each time. Deep learning has numerous applications, including computer vision and natural language processing.

Neural networks: A neural network is a computer system comprising interconnected nodes or neurons that exchange signals with one another. Neural networks are one of many approaches used in machine learning. It processes complex data inputs in a way a computer can understand. It performs tasks such as speech and image recognition, as well as adaptive control.

Natural language processing: NLP is a machine learning technology that uses computational linguistics, which is the study of how language works. It helps computers understand, manipulate, and interpret human language, whether it is written, spoken, or handwritten.

Robotics: Robotics is a field of engineering that deals with the design, construction, manufacture, and automation of robotic systems. Robots are designed to perform multipurpose work and complex tasks, such as monitoring and bomb detection. Robots come in many forms, including those that resemble humans. Human-appearance robots are designed to perform functions that resemble those of humans and possess a human-like understanding.

Drones: Drones are unmanned aerial vehicles (UAVs) that are operated remotely by computers. In industries, automation is the primary basis for enabling operations to run independently, without the need for constant human intervention. It captures images, analyses and processes them with the help of different AI algorithms and makes a decision (Figure 1).

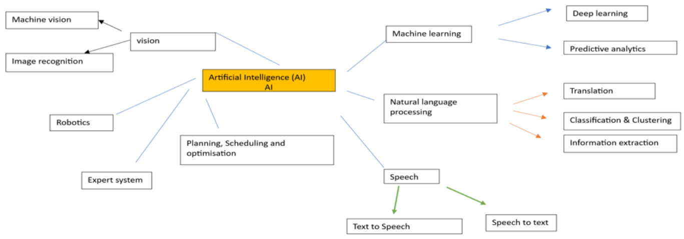

Figure 1 Different branches of artificial intelligence.[13]

How does AI affect the food industry?

Today, the application of AI is widespread throughout the global food industry. The conventional approach with human workers in the food industry is much more expensive, with multiple loopholes and repetitive errors. Instead of relying on outdated methods such as manual labour, food industries should adopt modern technologies and tools, including ML, IoT, and robots, as these are not only cost-effective but also more efficient.[11] Some AI technologies also come in systematic apps that can be used on smartphones, making them convenient. In the food industry, the application area of AI and its effects are discussed as follows:

Food production and agriculture: There are significant challenges in agricultural production, including food waste and quality control. The traditional approach to agricultural production tends to require more labour and has storage problems, resulting in more food waste and distribution issues. The application of an AI approach to precision agriculture can address most of these issues while yielding higher crop yields. Agricultural robots, Internet of Things (IoT), big data, automation, machine learning (ML), computer vision (CV) and drones help analyze the field area, soil monitoring, crop monitoring, weather forecast, and market demands and make an evidence-based decision regarding seed selection, resource requirement, irrigation, quality control and higher yield.[17] Artificial intelligence (AI) based farming is also known as "precision agriculture (PA)" or "smart farming". "*PA is all about applying the right material in the right amount at the right location at the right time*".[5] Recently found AI technologies in agriculture, like (1) Blue River technology, which was founded in 2011 and is a combination of AI, CV, and robotics. Helps detect weeds, reduces chemical use, and manages costs. (2) Farmbot, a physical bot also founded in 2011, assists one man in farming all by himself, while everything from planting to watering is taken care of by the bot. (3) Plantix, a plant disease diagnosis app, uses pictures to identify plant diseases and soil nutrient deficiencies. (4) Prospera, founded in 2014, is a cloud-based solution used to find connections between various data labels to make predictions.[3] IoT-based big data is the key to efficient crop management and agricultural sustainability. Big data deals with large amounts of complex data sets gained from various sources (such as monitoring sources and sensor devices) and analyses them using intelligent algorithms. Big data enables food firms and farmers to gain real-time analytical insights into market trends, consumer preferences, and expectations.[9] Agricultural robots and drones also play a crucial role in the agricultural sector. Different roles of AI in agriculture and farming are discussed below:

Soil monitoring and field management: Vast amounts of data sets are continuously being analysed using big data, including weather forecasts, light, temperature, soil condition, and humidity, which helps farmers determine the exact resources required for a particular field area. Within these, soil conditions and water have the most significant impact on crop growth and development, facilitated by the implementation of big data and high-definition images from drones. Soil conditions are analysed (such as nutrient content, pH level, soil moisture, and temperature), and necessary actions should be taken to improve them. These include the quantities of fertilisers, water, and chemicals needed to maintain soil fertility and achieve the highest quality output of what has been planted. Continuous monitoring of field areas during the cultivation period helps identify areas where plants require water, fertilisers, and pesticides. This helps manage environmental sustainability and reduce waste production.[9]

Planting: Drone planting systems have been invented that shoot pods alongside seeds into the soil.[3]

Irrigation: Drones monitor the field and check for areas that lack something or need some improvement (e.g., areas that need water or fertilizers).[3]

Crop management: With the assistance of AI, ML, CV, and agricultural field robots and drones, every individual plant, its growth, and needs throughout the entire field are monitored, and the information is later shared with the farmer. This prevents unnecessary exhaustion from having to check the field frequently for every little thing.

Crop readiness: AI algorithms assist robotic machines in recognising food colour and texture at each step of the production process. Thus, by processing these facts, they can easily distinguish when the produce is ready to harvest.[12]

Crop disease detection: With hyperspectral imaging and 3D laser scanning, computer vision (CV) technology assists in identifying diseased parts of the plant. Sensor drones scan the image of each plant to check for any defect or disease in the plant, prevent it from spreading further or send it to the labs for further diagnosis.[3] CNN models are used for leaf disease detection.[17]

Seed selection: IoT-based big data, ML, and CV process a large volume of historical data on weather patterns, crop variety and yield, pest control, soil condition, resource availability, etc., then make evidence-based decisions on seed selection. For example, a variety of tomato plants is frost-resistant compared to other varieties of the same plant. Thus, selecting that particular variety of tomato seeds for cultivation in freezing weather will result in higher yield and less food waste.

Animal management: The significant increase in animal farming leads to a rise in environmental pollution.[9] AI plays a huge role in animal farming, known as smart animal farming. Application of AI models and tools such as artificial big data, neural networks, deep learning, machine vision, machine learning, and convolutional neural networks (CNN) are used in the animal farm for data collection, animal behaviour detection, disease monitoring, growth evaluation, individual animal identification, recognition and environmental management.[18] AI also assists producers in producing sufficient animal feed, thereby reducing wastage and pollution associated with animal farming. Figure 2 illustrates the role of AI in animal farm management.

Food recognition and detection: Recognition is an important area in industrial automation. Handling, processing, and packaging of food products will be difficult if robots are unable to recognise any products or objects. Intelligent machines are trained using a large number of high-resolution images, utilising convolutional neural networks (CNN). However, over 10000 authentic photos are needed to get high-accuracy results.[19] Pouladzedah et al.[21] proposed a system with two methods: (1) graph cut segmentation and (2) a deep learning neural network. The results show that using graph cut segmentation, the recognition accuracy was approximately 95%. Whereas, using deep learning neural networks, the recognition rate accuracy is 99% for a single portion of food. In Lee et al.,[21] a regression model was trained for mass estimation using a collection of tomato images, applying several steps (data collection-> detection and mask generation module-> geometry module-> mass estimation module), which resulted in over 90% accuracy with a mean error of 7.09% for 77 test samples.

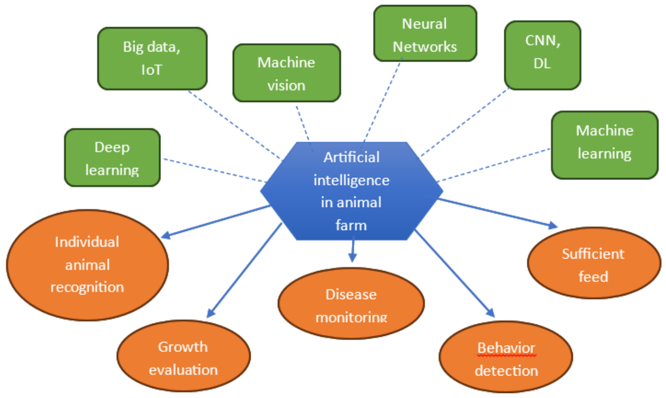

Figure 2 Application of artificial intelligence (AI) in animal farm management.

Food processing: AI robotics is used in various food industries for tasks such as cutting, cleaning, picking, and placing food products from one location to another. They are generally labour-cost-effective and faster at work than the traditional approach. These are ideal for small industries that cannot afford the high labour costs associated with tasks like slicing, picking, and placing. Nevertheless, many small industries find this costly and don't want to invest in it. They need to understand that this is a one-time investment that can save them from several years of expenses.[11] Various robots are being used in meat processing. Automatic machines cut the products into equal amounts and sizes. In the beverage industry, bottles are cleaned, filled, counted, and arranged via automatic robotic machines. Packing and palletising robots are specifically made based on payload specifications and speed range (e.g., Decorating cakes, pizza making, and stacking them). Highly agile robotic structures result in increased productivity. Mainly used for picking and placing products onto trays, cartons, and other machinery.[22]

Food handling: Industrial food production, processing, and packaging require direct contact with the food elements. Hence, food should be handled carefully at every stage to ensure safety measures are in place. Industrial automation, such as robotic automation, plays a significant role in this process. During the packaging of food products, the "pick and place" task is necessary. Food products are mainly delicate, so they tend to get easily damaged when they come into contact with hard surfaces. Different types of food products require specific handling methods.[23] For example, apple harvesting robots utilise a three-fingered gripper that easily twists the fruit from the limb and picks it without leaving any marks or bruises.[12] Machine vision is an AI technology that helps to evaluate product qualities. It can quickly identify any damaged or contaminated food products and remove them immediately.

Food packaging: Increasing industrial production poses rising threats to environmental sustainability. The packaging industry is facing a challenging issue in reducing waste whilst also protecting food from contamination. The usual packaging material produced from polythene poses a threat to the environment due to its non-biodegradable nature. With the application of AI in food packaging, Sustainable Composite Polymers (SCPs) have emerged as an assuring alternative. SCPs are a composite of natural plant and animal fibres (such as wool, silk, leaf fibres, seed fibres, etc.) and natural fillers like particulate fillers (starch, nanocellulose), fibrous fillers (kenaf, rice husk, etc.), etc. These are durable, environmentally friendly, and biodegradable, and also offer renewable options.[24]

Industrial hygiene: Human workers in the food industry face a massive possibility of contamination. They are very much capable of transmitting microorganisms. The risk increases when food is handled by individuals who are unwell, as they can easily contaminate it.[11] Industrial automation plays a valuable role in it. Industrial robots, assisted by various AI algorithms (including machine learning and computer vision), are trained to efficiently handle different food items. Today, robots are being operated for food manufacturing, processing, packaging, and serving. The grippers of the robots are cleaned using industrial detergents and hot water.[22] Unlike humans, robots are incapable of contaminating food, allowing hygiene parameters to be maintained to a greater extent. Hence, it increases the shelf life of the food product.

Food safety: Human increases the chance of contamination when handling food without maintaining proper safety protocols. That's why the food industry is one of the best fields for the application of AI robots. They are very productive at work and also don't get affected by infections and illnesses as humans do. Two gifted innovations for food safety are next-generation sequencing (NGS) and electric noses (ENs). The NGS has the potential to quickly identify harmful tendencies and prevent them from affecting a large number of people. ENs are substitutes for human noses as they can easily detect a diversity of smells and chemical odours during the food processing period.[11,25] Other than that, smart farming, monitoring, robocop, and predictive analysis are all linked with food safety. The roles of ML and IoT are considered huge in food safety. IoT is present in objects that include some sensors (e.g., temperature, location), and also in objects that facilitate communication (e.g., Bluetooth, RFID, WSN). IoT covers a vast area in the food industry, from agriculture to quality control. Applications are mainly based on monitoring, sensing, controlling, and prediction.[8,27]

Food serving and delivery: Artificial intelligence (AI) drones and robots are used for food serving and delivery. Serving robots are generally seen in places where food is being served to customers (e.g., restaurants). For example, Sushi restaurants in Japan use an automated food line, where all the different types of sushi from the menu move in front of the customers, allowing them to pick the ones they want. Intelligent automation robots can take orders from customers and fulfil their requests. They are also capable of receiving feedback from customers over time and developing new recipes that might fit their preferences.[22]

Drones are used for delivery purposes. Since they fly delivering the product to the destination, there is no bother from traffic jams and such. Delivery is much quicker, safer, and of good quality. Drones utilise autonomous navigation to deliver products to their destinations, and when the battery level is low, they use this navigation system to return home.[12]

Product traceability: A traceability system is primarily used to obtain information about product safety, quality, and logistics. Traceability helps to monitor the products from the early stages to after-sales. IoT and ML technologies are primarily used for tracking food products. It allows consumers to gather background information, such as cultivation, farm, slaughterhouse, and product freshness, which helps in controlling food fraud.[1,8] Using DL technology, every piece of present information can be tracked. Food traceability systems based on the CPS system can help mitigate the presence of poor-quality and unsafe products throughout the supply chain.[13,22]

Food supply chain: Industry 4.0, also known as the Fourth Industrial Revolution. "Industry 4.0 is a technological initiative that aims to revolutionise manufacturing through the digital transformation of processes and products".[1] The upcoming technologies are expected to be more autonomous and intelligent. AI-initiated steps ("production, harvest, storage, and distribution") aid in supply chain management by improving tracking capabilities of products throughout the supply chain, enabling companies to perform better product quality control before reaching the customers. IoT-generated big data contributes not only to the sustainability of the Agri-food supply chain (AFSCs) but also aids in managing the substantial waste generated by food waste and animals.[9] Figure 3 shows the applications of AI technologies in the sustainable agri-food supply chain.

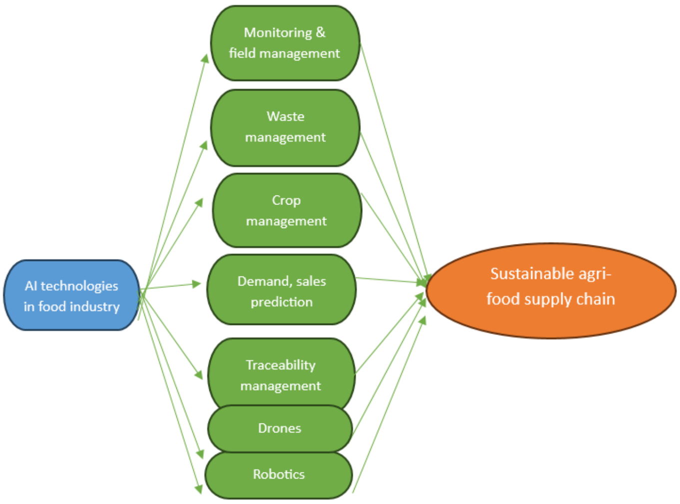

Figure 3 Application technologies for the sustainable agri-food supply chain of AI.

Food calorie measurement: Technology has a significant impact on our lifestyle. Today, a large group of people lead a sedentary lifestyle where obesity is a big problem. And obese people are more prone to multiple complex issues like hypertension and diabetes.[17] So, keeping the weight in check is the key. In this era of the internet, obtaining information about the nutritional value of food is not a significant issue; however, the information provided is often insufficient to drive meaningful change. Using a deep learning neural network based on a convolutional neural network (CNN), systems can recognise different foods on plates with 99% accuracy in seconds. Furthermore, it calculates the calories of the entire portion based on the image. For high-accuracy calorie measurement with minimal error, two methods are employed. (1) using a finger (where the finger is positioned next to the food on the plate), (2) using distance estimation (where the space between the food and the mobile device is evaluated using multiple sensors). Recognition and calculation occur with high accuracy in seconds, making it convenient to use. Helps to keep track of calories consumed for days without human interventions.[10,20]

Social media advertising: In the 21st century, the internet has become a remarkable occurrence in our everyday lives. Thousands of searches occur in a moment; extraordinary information is within grasp with just a touch. People from every corner of the world are connecting. This is the exclusiveness of social media. Just like other aspects, AI also plays a vital role in individual food choices. Food choices differ from person to person. And everyone wants the best for themselves. Suppose a traveller is travelling to a particular place and she wishes to eat something in particular, but she doesn't know of any place near her. Thus, she searched for it on her intelligent device. The result included the best-recommended places that fit her preferences. In the future, AI in the food advertising industry might execute all the processes for an advertisement, from copywriting to editing. However, it is still in its early stages.[26]

Restaurants: AI is utilised in restaurants to streamline food orders and reservations, thereby enhancing the customer experience. Additionally, it aids in advertising restaurants and revenue prediction through machine learning, ultimately driving business growth. AI robots and drones are also used in restaurants for food serving and home delivery.[25]

Robotics: Robots are one crucial element, being used in every aspect of the food industry. They perform all work, from agricultural planting and field monitoring to management and harvesting. Harvesting robots can detect the readiness of fruits and crops, indicating when they are ready to be harvested and picked. Other than that, labour-intensive work such as food processing, food handling, packaging, and serving can also be handled by robots. Robots also play a huge role in food safety and hygiene.[12,22]

Drawbacks: Artificial intelligence and its innovations have benefitted industries in multiple ways and taken the food industry to new heights. Still a few questions – are all these innovations and technologies without any drawbacks? While there are many benefits, there are also some drawbacks. Those are -

i. Cost is a considerable issue that potential adopters face while buying these types of high-tech systems, especially those of small-scale industries.[16]

ii. Integration is also a problem. These types of high-tech technologies are hard to integrate.[16]

iii. Innovations in agricultural sectors are causing advancement in environmental degradation. The FAO report indicates that global surface temperatures are approximately 0.6 degrees Celsius higher than those of the last century. The levels of greenhouse gases and CO_2 are increasing. These side effects may potentially devastate natural resources and the environment.[7]

iv. AI machines and tools need a large amount of authentic data to imitate human intelligence. However, obtaining this much authentic data within a short period is very challenging. These are usually real-time analytical data that are received only after a specific period.

v. Misconception about robots turning autonomously evil also creates confusion and fear among people.[28]

Future perspectives: Considering all the published data, it appears that considerable work has been done, while numerous projects are still in progress. However, the areas highlighted below require further attention.

i. Many fraudulent businesses are going on. One is adulteration. However, in the market today, many foods are being entirely replaced by fraudulent alternatives made from artificial chemicals and other harmful substances that are detrimental to human health. It is also not possible to identify this stuff without a better understanding and awareness. Determining the authenticity of food is a crucial matter. So, further research could be done on this matter.

ii. Many researchers emphasise the role and applications of AI in the management of storage and distribution problems. However, it's still in its early stages. Storage and distribution remain a challenge. So, further research should be done to improve it.

iii. AI technologies are capable of determining food portions and estimating their calorie amount. Further research could be done on AI-created diet charts or meal plans, depending on the person's health.

Conclusion

AI is one of the prominent areas of future technology and has gained considerable attention in the last several years. AI has vast applications in the food industry and is addressing various food-related challenges. This paper provides a brief overview of how AI and its technologies address various agricultural and industrial applications, including farming, processing, manufacturing, and packaging. We discovered that AI-based smart farming is more assured than conventional farming. The role of AI in the food industry is growing rapidly due to its potential and the development of new technological skills. It helps in better crop management, monitoring, food safety, hygiene, cutting, packaging, and waste management. Many industries are recognising the importance of AI and embracing it. In the future, the field of AI will reach a much greater extent.

To wrap up, the key performance indicators of AI impact are found to be considerably more environmentally friendly (with lower resource consumption and a smaller carbon footprint) as well as economical (with lower production costs and higher yields and quality).

Acknowledgements

None.

Conflicts of interest

The authors declare that there are no conflicts of interest.

References

1. Monteiro J, Barata J. Artificial intelligence in extended agri–food supply chain: A short review based on bibliometric analysis *Procedia Computer Science*. 2021;192:3020–3029.

2. Marvin HJ, Bouzembrak Y, Van der Fels–Klerx HJ, et al. Digitalisation and Artificial Intelligence for sustainable food systems. *Trends in Food Science & Technology*. 2022;120:344–348.

3. Panpatte DG. Artificial intelligence in agriculture: An emerging era of research. *Anand Agricultural University*, 2018:1–8.

4. Kler R, Elkady G, Rane K, et al. [Retracted] Machine learning and artificial intelligence in the food industry: a sustainable approach. *Journal of Food Quality*. 2022;(1):8521236.

5. Misra NN, Dixit Y, Al–Mallahi A, et al. IoT, big data, and artificial intelligence in agriculture and food industry. *IEEE Internet of things Journal*. 2022;9(9):6305–6324.

6. Kutyauripo I, Rushambwa M, Chiwazi. Artificial intelligence applications in the agrifood sectors. *Journal of Agriculture and Food Research*. 2023;11:100502.

7. Kakani V, Nguyen VH, Kumar BP, et al. A critical review on computer vision and artificial intelligence in food industry. *Journal of Agriculture and Food Research*. 2020;2:100033

8. Bouzembrak Y, Klüche M, Gavai A, et al. Internet of things in food safety: Literature review and a bibliometric analysis. *Trends in Food Science & Technology*. 2019;94:54–64.
9. Rejeb A, Rejeb K, Zailani S. Big data for sustainable agri-food supply chains: a review and future research perspectives. *Journal of Data, Information and Management*. 2021;3:167–182.
10. Kagaya H, Aizawa K, Ogawa M. Food detection and recognition using convolutional neural network. *Proceedings of the 22nd ACM international conference on Multimedia*. 2014:1085–1088.
11. Khan R. Artificial intelligence and machine learning in food industries: A study. *Journal of Food Chemistry Nanotechnology*. 2022 7(3):60–67.
12. Hwa LS, Te Chuan L. A Brief review of artificial intelligence robotic in food industry. *Procedia Computer Science*. 2024;232:1694–1700.
13. Oana O, Cosmin T, Valentin NC. Artificial Intelligence–a new field of computer science which any business should consider. Ovidius University Annals, *Economic Sciences Series*. 2017;0(1):356–360.
14. Liu J, Kong X, Xia F, et al. Artificial intelligence in the 21st century. *Ieee Access*. 2018;6:34403–34421.
15. Sadiku MN, Fagbohungbe O, Musa SM. Artificial intelligence in food industry. *International Journal of Engineering Research and Advanced Technology.* 2020(10):12–19.
16. Sahni V, Srivastava S, Khan R. Modelling techniques to improve the quality of food using artificial intelligence. *Journal of Food Quality*. 2021;1(1):2140010.
17. Liu Z, Wang S, Zhang Y, et al. Artificial intelligence in food safety: A decade review and bibliometric analysis. *Foods*. 2023;12(6):1242.
18. Bao J, Xie Q. Artificial intelligence in animal farming: A systematic literature review. *Journal of Cleaner Production*. 2022;331:129956.
19. Liu C, Cao Y, Luo Y, et al. Deepfood: Deep learning–based food image recognition for computer–aided dietary assessment. *Inclusive Smart Cities and Digital Health: 14th International Conference on Smart Homes and Health Telematics, ICOST*, May, 25–27, 2016, Wuhan, China, Proceedings 14:37–48.
20. Pouladzadeh P, Kuhad P, Peddi SVB, et al. Food calorie measurement using deep learning neural network. *International instrumentation and measurement technology conference proceedings*. 2016:23–26.
21. Lee J, Nazki H, Baek J. Artificial intelligence approach for tomato detection and mass estimation in precision agriculture. *Sustainability*. 2020;12(21):9138.
22. Iqbal J, Khan, Z H, et al. Prospects of robotics in food industry. *Food Science and Technology*. 2017;37(2):159–165.
23. Wang Z, Hirai S, Kawamura S. Challenges and opportunities in robotic food handling: A review. *Frontiers in Robotics and AI*. 2022;8:789107.
24. Yakoubi S. Sustainable revolution: AI–driven enhancements for composite polymer processing and optimization in intelligent food packaging. *Food and Bioprocess Technology*. 2024;18(1):82–107
25. Kumar I, Rawat J, Mohd N, et al. Opportunities of artificial intelligence and machine learning in the food industry. *Journal of Food Quality*. 2021(1):1–10.
26. Başev SE. The role of artificial intelligence (AI) in the future of the advertising industry: Applications and examples of AI in advertising. *International Journal of Education Technology and Scientific Researches*. 2024;26:167–183.
27. Bhushan S, Bohara B, Kumar P, et al. A new approach towards IoT by using health care–IoT and food distribution IoT. *2nd International conference on advances in computing, communication, & automation*. IEEE 2016:1–7.
28. Kaplan A, Haenlein M. Rulers of the world, unite! The challenges and opportunities of artificial intelligence. *Business Horizons*. 2020;63(1):37–50.

Citation: Das A, Mondal S, Dhar P. Artificial intelligence: a novel tool for the food sector. *MOJ Food Process Technol.* 2025;13(1):81–86.
DOI: 10.15406/mojfpt.2025.13.00327