



## Inaugural Editorial

Welcome to the first issue of *Artificial Intelligence in Agriculture* (AIIA) the first fully Open Access journal of its kind. We are very pleased to be able to present these outstanding contributions from diverse researchers. As such this issue well represents AIIA's goal to serve as a platform for high quality work describing science, technologies and practical applications of artificial intelligence (AI) in all branches of agriculture. As a truly international and fully Open Access journal, AIIA will be publishing original research, reviews, and perspectives on the theory and practice of AI in agriculture, food, bio-system engineering, and related areas.

AI, sometimes called machine intelligence, is a branch of computer science that aims to create intelligent machines that work and react like humans and other animals. Traditional aspects of AI research include planning, learning, natural language processing and perception, to name a few. AI techniques are also being studied by the practicing engineer who is looking to solve a whole range of hitherto intractable problems in the field of computer science, education, healthcare, agriculture, transportation, and more.

In the area of agriculture, AI is playing an irreplaceable role in agricultural optimization management, smart agriculture, agricultural robotics, agricultural automation, decision support systems, agricultural expert systems, and other agricultural knowledge-based systems. In recent decades, AI advancements show improvements in gaining yield and to optimize the production and operation processes of growing crops. The launch of AIIA responds to the need to effectively address critical, often complex tasks in agriculture. The journal also serves as a medium for discussion of such strategically vital scientific topics.

To achieve these aims of the journal, AIIA will publish rigorously peer reviewed scientific studies and technical findings within the following research areas:

- (1) **AI-based decision support systems** which collect, sort out and provide various data related to agricultural decision-making problems, store various models related to decision-making problems and generate intelligent solutions, combined with AI's knowledge reasoning technology.
- (2) **AI-based precision agriculture** using bp-level data, deep learning algorithms that help to gain insight into (or make) planting time, irrigation, fertilization, and pastoral-related decisions that ultimately increase the productivity of land, equipment, and people in agriculture.
- (3) **Smart sensors and Internet of Things:** sensors are the foundation of the agricultural Internet of Things (IoT). In the process of agricultural production sensors collect parameters including soil temperature, humidity, air temperature and humidity, etc. and in combination with artificial intelligence technology improve the utilization rate of data.
- (4) **Agricultural robotics and automation equipment:** an agricultural robot is a kind of automatic or semi-automatic equipment that can be programmed repeatedly, which takes agricultural products as the operating object, combines partial human information perception and limb movement ability.
- (5) **Agricultural knowledge-based systems** adopt modular design ideas and hierarchical structure systems. A large number of databases such as agricultural knowledge Q&A and agricultural experts have been constructed and duplicate checking algorithms have been designed to reduce redundancy.
- (6) **Computational intelligence in agriculture, food and bio-systems** increasingly rely on computer-based systems; modern agricultural business has superior performance in most cases.
- (7) **AI in agricultural optimization management:** with the rapid development of AI and the comprehensive popularization of the agricultural field, a specific mode is developed to find an optimal combination of control techniques and to optimize the production and operation processes.
- (8) **Intelligent interfaces and human-machine interactions** working and reacting like humans can help to solve agricultural problems including planning, learning, natural language processing, perception, and so on.
- (9) **Machine vision and image/signal processing** have sought their task in serving agricultural engineering by providing intelligent solutions.
- (10) **Machine learning and pattern recognition** with modern communication, sensing, and actuator technologies, machine learning and pattern recognition are increasingly applied in agriculture, putting the vision of a sustainable agriculture for anyone within reach.
- (11) **Neural networks, fuzzy systems, neuro-fuzzy systems** motivated by their great potential for knowledge expression, allow for the application of artificial neural networks to solve a variety of serious problems in agriculture.
- (12) **Systems modeling and analysis** express the internal laws and external relations of various agricultural processes to help achieve higher efficiency in agriculture, higher quality of agricultural products and protect the agricultural environment more effectively.
- (13) **Intelligent systems for animal feeding** cover technological means like sensor detection, data processing and remote monitoring to control the feeding quantity accurately and monitor the feed intake in real time.
- (14) **Expert systems in agriculture** effectively leverage management's input into agricultural production systems by allowing for the assimilation of all available knowledge pertinent to the task at hand. Its applications include Crop Management Advisors, Livestock Management Advisors, Planning Systems, Pest Management Systems, Diagnostic Systems.
- (15) **Crop Phenotyping and analysis** is the most direct way in the research of crop breeding by studying the relationship

between phenotypes and genes and the environment. It includes high-throughput data acquisition, data management, data interpretation, modeling, integration and applications.

- (16) **Remote sensing in agriculture** is very important for resource feature space analysis, providing positioning qualitative and quantitative data. It is currently used in estimating the yield of crops, crop growth monitoring, land survey, agricultural ecological environment monitoring and natural disasters and pest monitoring.
- (17) **AI technology in aquaculture** optimizes commercial aquaculture facilities efficiency by reducing labor and utility costs. Anticipated benefits for aquaculture process control and artificial intelligence systems are increased process efficiency, reduced energy and water losses, reduced labor costs, reduced stress and disease, improved accounting and improved understanding of the process.
- (18) **AI in food engineering** gives a sense of the many possible applications in the food industry, from sorting products and packages to food safety compliance and from improved cleanliness to product development and marketing.
- (19) **Big Data and Cloud Computing** is a new computing model based on distributed computing and service computing. Transferring modern agriculture to cloud computing platforms will greatly improve the storage and processing modes of agricultural data.
- (20) **Automatic navigation and self-driving technology** in agriculture are the automated future of - for example - China's mammoth agricultural sector. Automatic navigation is a part of the automobile control used to find direction in an automobile. It typically uses a satellite navigation device to get its position data which is then correlated to a position on a road. In China, autonomous vehicles are also trialed in rice fields.
- (21) **Precision agricultural aviation** is a farming management concept based on observing, measuring and responding to

inter and intra-field variability in crops. Growers demand aircraft that have comparable precision application capabilities to that as a ground rig. Applications must be made with exactly the right amount of material in the right location and have all the data logging capabilities to feed into a grower's crop management system.

Artificial Intelligence in Agriculture is a trans-disciplinary domain encompassing computer science, machine learning, information science, crops breeding, biology, genetics, statistics, physics, chemical, and other related disciplines. The journal aims to bring together experts, industrialists and students to share ideas, problems, and suggestions related to AI and its applications with its convergence strategies, and to disseminate innovative research. The journal welcomes original research articles, review articles, perspective papers and short communications from a wide variety of perspectives concerning the theory and practical application of AI methods.

A dedicated, diverse and highly qualified Editorial Board and the enthusiastic publishing team at KeAi will devote themselves to the ambitions of the journal. We will work closely together to make AIIA the journal of choice for the relevant communities. We believe that in close collaboration with these communities of researchers, scientists, engineers and practitioners AIIA has the potential to rapidly grow into an internationally impactful journal which provides multiple values to the benefit of the research communities and society at large.

Finally, all the members of the complete AIIA team cordially thank all the authors for their continuous contributions and cooperation to the prospective growth and success of the journal.

Chunjiang Zhao  
Editor-in-Chief