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Research Article

Digital Development Strategy of Agricultural Planting and Breeding Enterprises Based on Intelligent Sensors

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The digitalization of agricultural planting and breeding enterprises is the only way for agricultural development. Now with the development of various technologies, the digitalization of agricultural enterprises is becoming faster and faster. Today, the development of intelligent sensors provides platform support for the digitalization of agricultural enterprises. This article is aimed at introducing the application of intelligent sensors in agriculture to provide strategic research for the digital development of agricultural planting and breeding enterprises. This paper proposes the establishment of a system platform for network intelligent sensors and proposes the establishment of an agricultural short message management publishing platform. And the existing public information transmission methods are used to provide a cheap, simple, and fast way for agricultural producers to quickly obtain agricultural information, so as to provide a feasible plan for solving the agricultural "last mile of agriculture" problem. After inspection and analysis, the information management release platform can meet the design requirements, and the processing rate of short-term interest is above 98%, which can pave the way for the digital industrialization of agricultural enterprises.

1. Introduction

As a descendant of China, China has a profound agricultural heritage from ancient times to the present. Although China is a large agricultural country to this day, since most of its agriculture is scattered, the start of agricultural industrialization is relatively late. From industrialization to informatization, from agricultural mechanization to agricultural informatization, it is an important stage of human progress and agricultural development. Agricultural informatization can speed up the cultivation of agricultural science and technology talents and the dissemination of agricultural science and technology knowledge, improve the international competitiveness of agricultural products, and promote the sustainable development of agriculture, thus becoming a historical opportunity for agricultural development. The rapid development of digitalization is an unquestionable fact, and various signs indicate that intelligence and big data are the general trend, and socialized mass production and extensive resource sharing are the general trend [1].

Digital agriculture refers to the use of digital technologies such as geographic information systems, global positioning systems, remote sensing, automation, computers, communications, and networks to rationally utilize agricultural resources in agriculture, management, operation, circulation, and services; to reduce production costs; and to improve the ecological environment [2]. It is to develop agriculture in accordance with the objective laws inherent in agriculture and the goals and directions required by humans. Compared with traditional agriculture, the industrialization of agriculture should be based on market demand, be regionalized and specialized, and form a comprehensive, integrated, intensive, and socialized enterprise management system. In a perfectly competitive market environment, the high degree of openness and transparency of digital technology not only reduces the resistance to market entry, attracting many competitors, but also makes it easy to identify the path of resource creation capabilities in the value-added process of e-commerce. But it is likely to be imitated or even surpassed by competitors in a short period of time, and the value cannot be effectively realized.

Therefore, when an enterprise forms a unique advantage capability, it must take into account the competition process and dynamic response of the enterprise with its competitors in the external market, so as to realize the value of agriculture in the competitive interaction. The emergence of digital agriculture has made agricultural equipment more complex and precise, making traditional agricultural machinery testing methods more difficult to develop and test. In order to solve the traditional on-site test cycle, high cost, and difficult problems, it is necessary to explore new test methods.

For a long time, the problems in the development, design, manufacturing, and use of modern agricultural equipment are the variety of products, complex working conditions, and high requirements for product performance, service life, and cost. There are many factors that affect product quality, and the consequences of these occurrences are very serious, therefore, a lot of complex testing work needs to be established. The entire process requires the establishment of necessary test sites, the use of a large number of various test equipment, a large amount of test costs, a large experimental team, and a lot of test time. The agricultural information integration service platform has the characteristics of strong database security, good stability, friendly interface, strong operability, easy to learn and understand, and complete and practical functions, which meets the needs of current agricultural information management. The integrated agricultural information service platform is of great significance for standardizing the order of agricultural information management, improving work efficiency, serving farmers, and promoting the economic development of agricultural products [3]. It is helpful to improve the farmers' understanding of agricultural market information, scientific and technological information, and government information and to accelerate the construction of agricultural information.

This article first consults a large number of relevant expositions at home and abroad through the method of data analysis. It is found that most of the research on the digital development strategy of agricultural planting and breeding enterprises focuses on the industrial optimization of planting and breeding. This article takes the intelligent sensor as a breakthrough and summarizes the following innovations: (1) In the intelligent sensor design, the pressure sensor is emphasized. This is very broad for agricultural applications, because whether it is the weather forecast for planting or the air pressure in aquaculture, it is a necessity for the digital development of agricultural enterprises. (2) In the design method, the comparison and selection were carried out many times. From the system algorithm, the network protocol, to the final platform effect test, the conclusions were drawn in full comparison. (3) In the discussion of the digital development strategy, more are combined in experiments and methods, which will be more data-supported and convincing than a completely written discussion.

2. Related Work

Many scholars believe that entering an agricultural society marks the end of a barbaric society. The four ancient civilizations all took the river as the origin of their civilization and relied on the flat and fertile land beside the river as the beginning of agriculture, and agriculture is also the foundation of human development. A large number of scholars have done research on agricultural development, for example, Reganold and Wachter have done research on the controversy of organic agriculture. They believe that organic agriculture plays an untapped role in establishing a sustainable agricultural system, but there is no way to feed the earth safely. Instead, a mix of organic and other innovative agricultural systems is required. However, there are major obstacles to the adoption of these systems, and multiple policy tools are needed to facilitate their formulation and implementation [4]. Aničić and others specifically discussed the agricultural situation in Serbia, and they believed that the economic development of Yugoslavia (Serbia) after World War II was at the expense of agriculture, and they analyzed and demonstrated this. The analysis results believe that Serbia's agricultural development is much more likely, and under appropriate macroeconomic policies, it can become a huge comparative advantage of our economy in the world's developed markets [5]. Gurr et al. started with agriculture to discuss food security issues, believing that global food security needs to increase crop productivity to meet growing demand. They concluded that a simple diversification method, in this case the growth of nectar-producing plants, can promote the ecological intensification of agricultural systems [6]. Tirivayi and others have considered the issue of poverty eradication more deeply, and they believe that eradicating the hunger and poverty of poor small farmers requires both agricultural interventions and social protection interventions. After the research, they concluded that the existing evidence provides an empirical basis for establishing a synergy between social protection and smallholder agriculture to a large extent [7]. There are many different discussions among scholars related to the research of digitization and intelligent sensors. Goel raised the question, "Why is it digital?" He believes that no company is immune to the influence of digital technology, but few companies fully utilize digitalization, and the digital journey of any company is different because different from individual technologies, companies are different. Digitization will touch and significantly affect all aspects of enterprises, but enterprises must think about how to create the greatest value through digitization, namely, marketing, sales, supply chain, and customer service. Once the area is determined, priorities and strategies can be established based on short-term and long-term roadmaps [8]. Szesz et al. also did related research, and they proposed an intelligent fuzzy control system based on the mathematical model of Cruz (2002) and applied it to the Arduino platform for decision support of grain aeration. To this end, an intelligent Arduino system was developed, which receives the environmental values of temperature and humidity, and then processes them in the fuzzy controller, and returns the output as a suggestion to reasonably control the aeration process, and the results show that the system is effective [9]. Lin and others analyzed the CIAA project in Argentina, and their current work includes designing an integrated intelligent system based on the EDU-CIAA NXP version for educational and applied research purposes [10]. Arablouei et al. considered the problem of using acceleration measurement data on resource-constrained sensor nodes to classify cow behavior in real time. They developed a pipeline of preprocessing, feature extraction, and classification specifically for performing inference on sensor node intelligent systems. The results show that this is achieved without causing any significant burden on intelligent system resources in terms of energy, computing, or memory [11].

3. Intelligent-Based Enterprise Digital Development Method

3.1. Intelligent Sensors. The intelligent sensor system is based on a detection device for external information. It can detect the information to be measured [12, 13] and convert it into electrical signals or other forms of signal output according to a certain rule, which is used in a dedicated computer system that performs independent functions [14]. Intelligent systems are based on microelectronics technology, computer technology, control technology, and communication technology, with application as the center, emphasizing the unity and relevance of hardware and software [15]. In addition, in intelligent systems, both software and hardware can be tailored and streamlined to meet the system's requirements for functions, costs, and other aspects. A standard intelligent system generally consists of four parts: processor, peripheral equipment, operating system, and application software [16]. In recent years, with the rapid development of information perception technology, electronic computer technology, and wireless communication technology, low-power multifunction intelligent sensor technology and manufacturing technology have been greatly improved [17–19].

The intelligent agricultural system includes temperature sensor, signal processing circuit, carbon dioxide sensor, image acquisition device, display device, GPRS device, microprocessor, external storage device, image processing device, and carbon dioxide data processing device. The composition of a typical intelligent system is shown in Figure 1.

As shown in Figure 1, the system composition mainly includes the following 8 parts. (1) *Processor core*: the heart of an intelligent system is the processor core. The processor core ranges from a simple and inexpensive 8-bit microcontroller to a more complex 32-bit or 64-bit microprocessor and even multiple processors. Intelligent designers must choose the lowest cost device for applications that can meet all functional and nonfunctional time limits and requirements. (2) *Analog I/O*: D/A and A/D converters are used to collect data and feedback from the environment. Intelligent designers must understand the type of data that needs to be collected from the environment, the accuracy requirements of the data, and the rate of input/output data in order to select the appropriate converter for the application. The response characteristics of intelligent systems are determined by the external environment. Intelligent systems must be fast enough to keep up with changes in the environment to simulate information, such as light, sound pressure, or acceleration being sensed and input into the intelligent system. (3) *Sensors and actuators*: sensors generally perceive analog information from the environment. The implementing agency controls the environment in some ways. (4) *User interface*: these interfaces can be as simple as LED screens or as complex as screens on well-crafted mobile phones and digital cameras. (5) *The specific entrance of the application program*: similar to ASIC or FPGA hardware acceleration, it is used to accelerate the specific function modules that have high performance requirements in the application program. Intelligent designers must use accelerators to maximize application performance to plan or partition programs appropriately. (6) *Software*: software is an important part in the development of intelligent systems. In the past few years, the amount of intelligent software has grown faster than Moore's Law, doubling almost every ten months. Intelligent software is often optimized in some aspects of performance, memory, and power consumption. More and more intelligent software are written in high-level languages, such as C/C++. And more performance-critical code segments are still written in assembly language. (7) *Memory*: memory is an important part of an intelligent system. Intelligent programs can run without RAM or ROM. There are many volatile and nonvolatile memories used in intelligent systems. There will be more explanations about this content at the back of the book. (8) *Simulation and diagnosis*: intelligent systems are difficult to see or touch. When debugging, the interface needs to be connected to the intelligent system. Diagnostic ports, such as the JTAG Joint Test Action Group, are often used to debug intelligent systems. On-chip emulation can be used to provide visibility behavior of the application. These simulation modules can visually provide runtime behavior and performance. In fact, the on-board self-diagnosis capability replaces the function of an external logic analyzer.

Agricultural Internet of Things refers to the application of Internet of Things technology in all aspects of agriculture, including agricultural production, operation, management, and services. The agricultural Internet of Things takes information perception equipment, communication network lines and intelligent information processing technology applications as the core, realizes scientific management of agricultural production, and achieves the goals of optimizing the utilization rate of agricultural resources, reducing production management costs, improving the agricultural ecological environment, and increasing yield and quality. The agricultural Internet of Things is an important part of the application field of the Internet of Things and an important guarantee for the realization of modern agriculture. Its research content is extensive, involving the fields of agricultural information perception (acquisition), information transmission, information processing and information utilization. The core of the agricultural Internet of Things is to realize the intelligent acquisition of agricultural production, operation, management, and service data information through Internet of Things technology, and to improve the degree of intelligence in various links such as agricultural production, management, trading, and logistics. Its essential purpose is to promote agricultural production methods.

3.1.1. Intelligent Atmospheric Pressure Sensor. In the agricultural sensor, the pressure sensor is an important one [20].

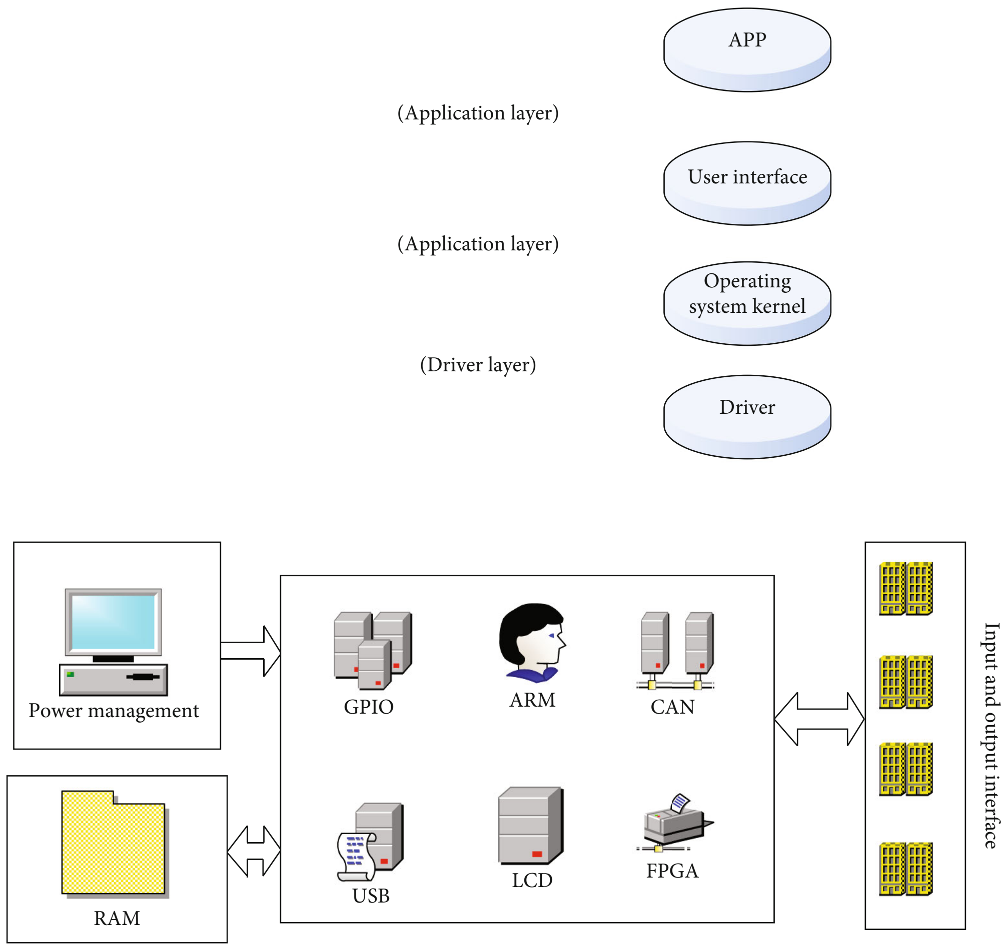

FIGURE 1: Typical intelligent system composition.

The calculation formula of each atmospheric data parameter is as follows:

(1) *Pneumatic height* G_p: can be calculated according to the relationship with static pressure P_∞ [21]:

The stream (-914.4~11000 m) is the following formula:

$$G_p = \frac{T_0}{K}\left[1 - \left(\frac{P_\infty}{P_{\infty 0}}\right)^{KR_a/g_0}\right], \tag{1}$$

The flat layer (11000-20000 m) is the following formula:

$$G_p = G_T + \frac{R_a T_T^*}{g_0} \ln \frac{P_{\infty T}}{P_\infty}. \tag{2}$$

The optical layer (20000~32004) is the following formula:

$$G_p = G_S + \frac{T_T^*}{K}\left[\left(\frac{P_{SS}}{P_\infty}\right)^{KR_a/g_0} - 1\right]. \tag{3}$$

(2) *Lifting velocity* $\dot{G}_P$: also known as the height change rate, it can be directly obtained directly to the air pressure height G_p [22]. However, in order to obtain less calculated delay, the static pressure $\dot{P}_\infty$ is usually taken, and then [23] is obtained according to the static pressure P_∞ and the static pressure change rate $\dot{P}_\infty$

$$\dot{G}_P = -\frac{R_a T}{g_0}\frac{\dot{P}_\infty}{P_\infty}. \tag{4}$$

In the formula (4): T is the actual measurement and corrected temperature value, and the standard atmospheric temperature can be directly taken and the results are not affected [24].

(3) *Atmospheric static temperature TS*: the temperature during high-speed airflow will increase, so sensitive temperature includes temperature increments caused by atmospheric temperature and airflow

delay, referred to as indication temperature TM (atmospheric temperature) [25]. The temperature increase can be solved according to the hypothesis conditions of the Bernu Lee equation and the ideal gas heat insulating process, which can be solved to obtain the atmospheric thermostatic temperature [26]:

$$T_S = \frac{T_m}{1 + \mathrm{RE}0.2M_\infty^2}. \tag{5}$$

The RE in Formula (5) is a recovery coefficient to eliminate temperature probe mounting deviations, which is generally considered to be a constant, at a stagnation point, RE = 1 [27].

(4) *Atmospheric density ratio* ρ/ρ_0: can be based on the relationship between the static pressure and the pressure height $P_\infty = f(G_P)$ [28], eliminating the static pressure to obtain the following formula:

$$\frac{\rho}{\rho_0} = \frac{f(G_P)}{P_\infty}\frac{T_0}{T}. \tag{6}$$

In addition, the atmospheric density ratio can also be calculated by static pressure and measurement atmospheric temperature (indicating atmospheric temperature) [29], as in the following formula:

$$\frac{\rho}{\rho_0} = \frac{P_\infty}{P_{\infty 0}}\frac{T_0\left(1 + \mathrm{RE}0.2M_\infty^2\right)}{T_m}. \tag{7}$$

(5) *True variety VT*: referring to the atmospheric secondary temperature TS by indicating the temperature and can get the local sound, and then, the vacuum speed can be obtained according to the number of Mach [30], as in the following formula:

$$V_T = M_\infty\sqrt{\frac{\gamma R_a T_m}{1 + r0.2M_\infty^2}}. \tag{8}$$

At this point, the underlying formula of the intelligent atmospheric pressure sensor is completed. Table 1 shows the meaning of each symbol in the above formula, wherein the units have been converted to an international common unit [31].

3.1.2. Intelligent Multicore Learning Multimode Feature Selection Algorithm. Multicore learning is also a common algorithm for feature selection algorithms, and its model is shown in Figure 2 [32].

The multicore learning algorithm commonly used by scholars is generally divided into two ways: nonlinear combinations and linear combinations. There are two categories [33] for the linear combination. Formula (9) can be directly summoned:

$$H\left(x_i, x_j\right) = \sum_{k=1}^{M} K_k\left(x_i, x_j\right). \tag{9}$$

Formula (10) is the weighted summation.

$$H\left(x_i, x_j\right) = \sum_{k=1}^{M} d_k K_k\left(x_i, x_j\right). \tag{10}$$

In Equation (9), each item has the same weight by default; this algorithm will be simpler, and the result will be obtained by summing between them [34]. Since the weight of d_k is added in Equation (10), the result will be closer to the actual value, because of the current development of computing technology, multiple weighting will not cause great calculation difficulty, so now the weighted summation method is generally used. Because the weight is not specified, the kernel matrix should be selected from the following set, as shown in the following equation:

$$\kappa = \left\{K : K = \sum_{k=1}^{M} d_k K_k, k \geq 0, tr(k) \leq c\right\}. \tag{11}$$

A further restriction on Equation (11) is to make the value of the weight nonnegative and then select the combined kernel matrix from the set as shown in the following equation:

$$\kappa = \left\{K : K = \sum_{k=1}^{M} d_k K_k, k \geq 0, tr(k) \leq c\right\}. \tag{12}$$

In Equation (12), the method of feature selection adopts the principle of minimization, and the features with a high degree of dispersion are selected, that is, the top-ranked features [35]. In addition, there is also a way to select weight features as shown in the following equation:

$$H\left(x_i, x_j\right) = \sum_{k=1}^{M} d_k(x_i) K_k\left(x_i, x_j\right) d_k(x_i). \tag{13}$$

In Equation (13), because the variable method is limited, the weight distribution cannot be carried out indefinitely. Therefore, related studies have proposed a new combination method, such as an index combination method, as shown in the following formula:

$$H\left(x_i, x_j\right) = \exp\left(-\sum_{k=1}^{M} d_k X_I^T A_X X_j\right), \tag{14}$$

Table 1: Meaning and value of each symbol in the atmospheric data calculation.

Symbol	Significance	Standard value
$P_{\infty 0}$	Sea level pressure	101.325 kPa
$P_{\infty S}$	Top tropospheric pressure value	22.632 kPa
P_{SS}	Atmospheric pressure at the top stratospheric altitude	5.47482 kPa
T_0	Sea level temperature	288.15 K
*	Top tropospheric temperature	216.65 K
K	Tropospheric temperature decline rate	6.5 × 10-3°C/m
	Increasing rate of actinic layer temperature	1 × 10-3°C/m
HT	Top troposphere height	11000 m
HS	Stratospheric top height	20000 m
H	Height of top layer of photochemical layer	32004 m
g0	Sea level acceleration of gravity	9.80665
Ra	Gas constant	287.0529 J/K/kg
A0	Sea level sound velocity at standard air pressure and standard temperature	340.294 m/s

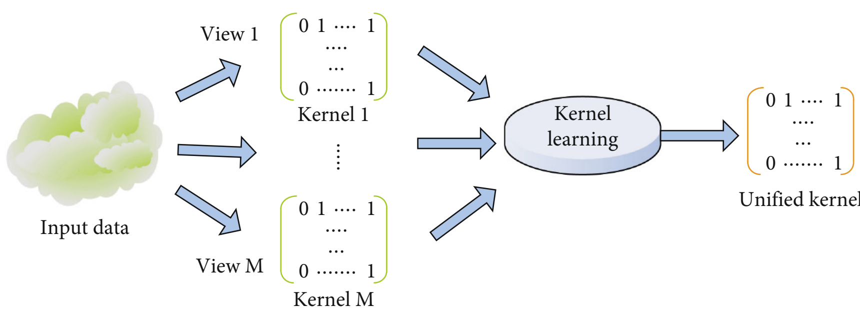

Figure 2: Multicore learning diagram.

or the exponentiation combination method, as shown in the following formula:

$$H(x_i, x_j) = \left(d_0 + \sum_{k=1}^{M} d_k X_I^T A_X X_j\right)^n. \quad (15)$$

Some scholars have tried to use the product of basic cores or other combinations to achieve multicore learning. The nonlinear combination based on polynomials is shown in the following equation:

$$K = \sum_{0 \le K_1 + K_2 + \cdots + k_m \le d, k_m \ge 0} \mu k_1 \cdots k_m \prod_{m=1}^{M} K_m(x_i, x_j) K_m. \quad (16)$$

3.2. Digital Development Strategy. The concept of corporate strategy refers to the fact that in order to achieve its own predetermined goals, after considering the internal and external environments of the company, the company makes a systematic and holistic strategic deployment of the company's long-term development goals and operational implementation, so as to ensure that the company has a sustained and stable development. Since the emergence of corporate strategy theory, there have been different development stages, and many schools with different propositions and styles have emerged. Looking at its evolutionary trajectory, it can be roughly divided into the following 4 stages:

(1) *Early stage of strategic thinking*: during this period, the strategic thinking is in the lead-in period, and a relatively complete theoretical system has not yet been formed.

(2) *Traditional strategic theory stage*: research on corporate strategy systems mostly takes the book "Business Strategy" written by Ansoff in the 1960s as a starting point. Strategic theories have gradually formed a systematic theory, and many theoretical schools have also emerged.

(3) *Competitive strategy theory stage*: many academic schools have conducted multifaceted research on strategy in the aforementioned traditional strategy stage, which has enabled continuous progress in corporate strategy research. As the times change, the research on corporate strategy has gradually deepened. In the process of being closely integrated with the reality of business management, the research direction of the corporate strategy system began to shift to corporate competition, and the industry

structure school, core strength school, and resource strategy school all have their own achievements.

(4) *The stage of dynamic strategy theory*: entering the 21st century, the trend of economic globalization continues to increase. While enterprises continue to expand, they are also threatened by domestic and international competition, and the traditional strategic view has been difficult to adapt to the changes in the corporate living environment, and a new strategic theory emerged as the times require, that is, the dynamic strategy theory.

4. Intelligent Sensor Platform Construction

4.1. Hardware Platform Construction

4.1.1. Hardware Module Design. Agricultural information technology is a comprehensive application of sensors, computers, and communication technologies in agriculture. Its content mainly includes agricultural databases and management information systems, geographic information systems, agricultural remote sensing monitoring, global positioning systems, agricultural decision support systems, agricultural expert systems, crop simulation models, agricultural information networks, and agricultural intelligent control technologies. At present, agricultural information databases, agricultural expert systems, crop simulation models and their integrated systems, and precision agricultural technology systems are widely used in agriculture. At present, there is no unified and standardized management system standard for the management of agricultural leading industries, and there are also differences in the management of different regions and different leading industries. There is no database standard for multimedia data and policy document data of leading industries; therefore, we refer to relevant national laws and regulations to integrate the actual needs of management work in different regions and different agricultural leading industries.

The hardware platform structure is shown in Figure 3.

Most of the hardware devices built as platforms have output and input interface connections, and the design of peripheral interface circuits is particularly important.

Part of the circuit design in Figure 3 is as follows.

(1) Power Supply and Reset Circuit. The total power supply uses the VCC5V DC power supply, the processor's on-chip peripherals use VDD3.3 DC power supply, the processor core power supply uses 2.5 V DC power supply, and the real-time clock power supply uses VCCTR continuous power supply. In order to ensure the stability and reliability of the system, the chip IMP811T is selected to form the system reset circuit.

(2) Ethernet Interface Circuit. Comprehensive agricultural management requires a large amount of data for support, including a large amount of real-time monitoring (measurement) data, basic agricultural resource data, GIS data, and remote sensing data. According to the application data from different sources and methods, the comprehensive database is logically divided into the spatial database, basic operation database, agricultural management business database, decision business database, model database, planning database, and professional knowledge database.

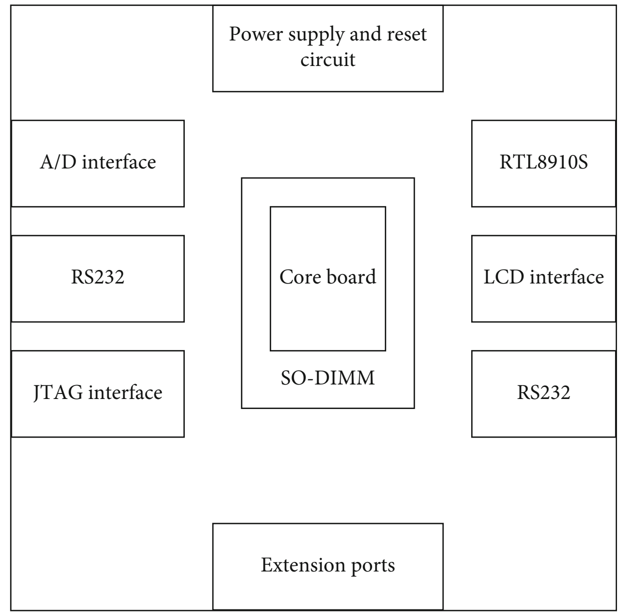

Figure 3: Block diagram of the system platform.

The system is designed with an Ethernet interface, and the design system selects RTL8019S as the network control chip. Because of its excellent performance and stability of the processing core, it has always been very popular. This article bought a cost-effective chip in a shopping software.

(3) Serial Interface Circuit. The baud rate is controlled by the UART baud rate divider register, and its calculation formula is shown in the following equation:

$$\mathrm{UBRDIVn} = \left[\frac{\mathrm{MCLK}}{\mathrm{bps} * 16}\right] - 1. \tag{17}$$

In Formula (17), MCLK is the system frequency, bps is the baud rate, UBRDIVn is the value of the register, and [] represents the rounding function number.

(4) LCD Display Interface Circuit. The intelligent controller installed under the rotating platform collects the sensor information and transmits it to the industrial computer through the serial port. The industrial computer calculates the deviation between the actual position and posture information and the data in the virtual scene, then gives the feedback control signal to realize the interactive control and cosimulation of the system. The built-in LCD controller provides the following external control signals, as shown in Figure 4.

4.1.2. Comparison of Related Network Protocols

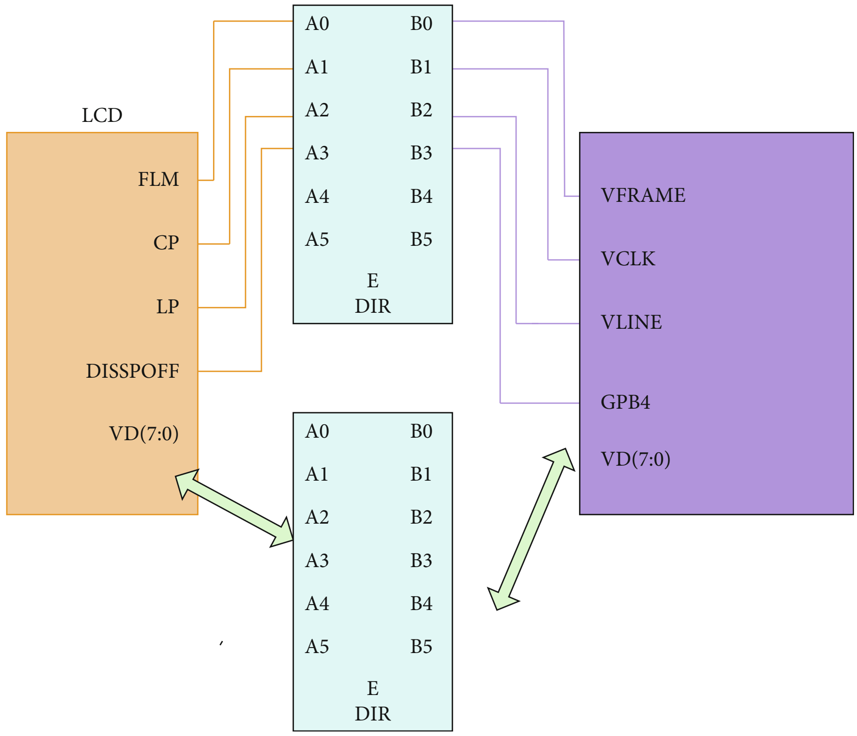

Figure 4: Block diagram of the connection between LCD display module and S3C44B0X.

(1) Comparison of Network Survival Time. Figure 5 shows the comparison of the survival time of the four network protocols. For the other three, it is almost a vertical decline; only the decline in the EEUCP agreement will be more moderate, and this can also discover the advantages of the EEUCP protocol. For the protocol, this will save more energy, provide more process network support for the subsequent platform operation, and be more stable, and other network protocols will undoubtedly consume more energy.

(2) Comparison of Remaining Network Energy. Figure 6 shows the comparison chart of the remaining energy of the network. The figure shows that under the same abscissa, the ordinate value corresponding to the curve of the EEUCP protocol is the largest, which means that the remaining energy of the network of the protocol is the largest in each round. From the perspective of the slope of the curve, before the node death, the slope of the EEUCP protocol curve is smaller and more stable than the other three protocols, indicating that the protocol proposed in this article is more effective in saving energy.

(3) Protocol Selection. From the above comparison chart, it can be clearly seen that the efficiency of the EEUCP protocol will be significantly better than others, so this article chooses the EEUCP protocol as the model of the intelligent sensor will be more suitable.

4.2. Software Design Based on μClinux Intelligent System

4.2.1. Development and Application of Driver Program Based on μClinux. The overall integration of the system is one of the difficulties in realizing a multidisciplinary cross-system. For many kinds of software, it is difficult to modify the underlying data structure and functions due to their huge functions and structures. The modification of the bottom layer will affect the whole body, so it is difficult to achieve a unified design and integrated realization based on the bottom layer. The intelligent program driver is the front end of the software application, and it determines the user's fluency, and if optimized, the effect will be even better, as shown in Figure 7.

4.2.2. Fractal Algorithm Based on Improved Random Number Generator. The optimization of the model is inseparable from the optimization of the algorithm. Although the generated number of ordinary random numbers is different, the generated algorithm is the same, and based on this idea, an algorithm based on an improved random number generator was selected. Assuming that the continuous random variable x obeys a uniform distribution in the interval (a, b), then the probability density function of x is the following equation:

$$f(x) = \begin{cases} \dfrac{1}{b-a}, & a < x < b, \\ 0, & \text{other}. \end{cases} \tag{18}$$

The distribution function of x is the following equation:

$$F(x) = \begin{cases} 0, & x < b, \\ \dfrac{x-a}{b-a}, & a \le x \le b, \\ 1, & x \ge b. \end{cases} \tag{19}$$

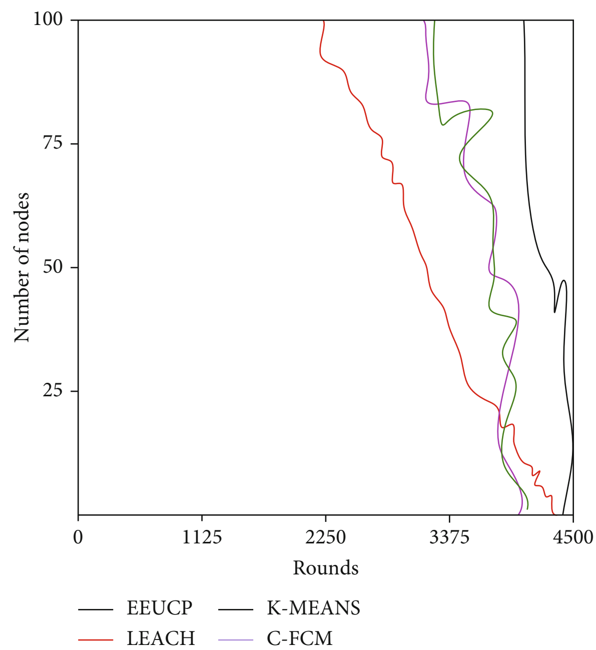

Figure 5: Comparison of network survival time.

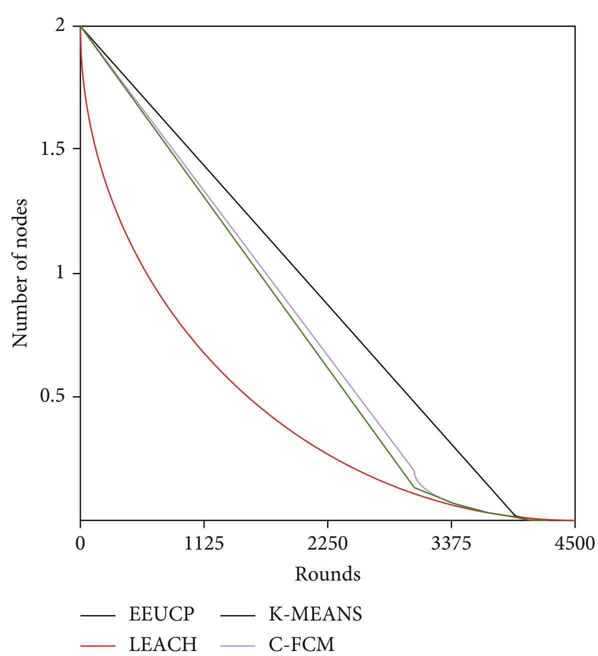

Figure 6: Comparison of remaining network energy.

The rand() function algorithm of an ordinary random number algorithm in a computer is as follows:

$$x(i+1) = (l * x(i) + m)\%n. \tag{20}$$

In Equation (20), i, m, and l are set constants. If they cannot be set properly, things often go against one's wishes and often lead to errors. Therefore, this paper proposes a new algorithm

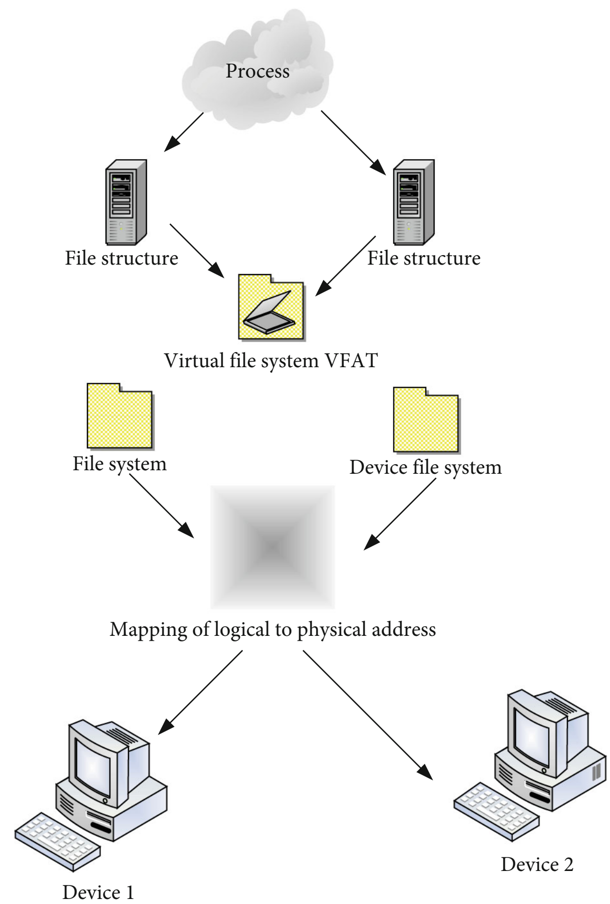

Figure 7: Hierarchical structure diagram of device driver.

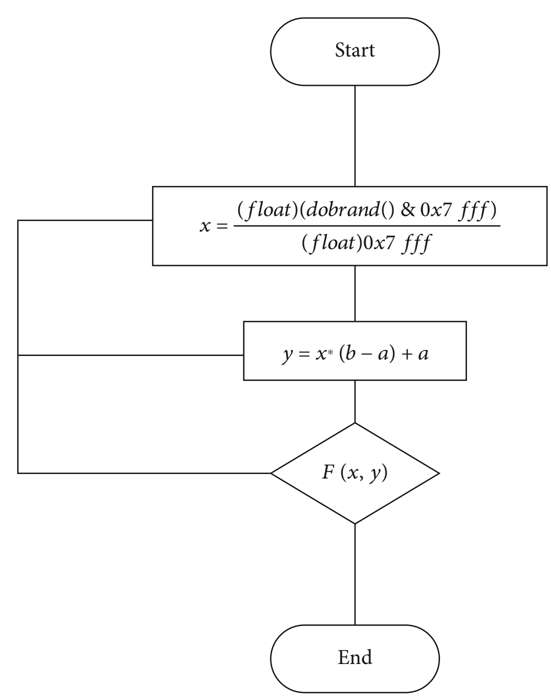

Figure 8: The flow chart of the fractal algorithm of the improved random number generator.

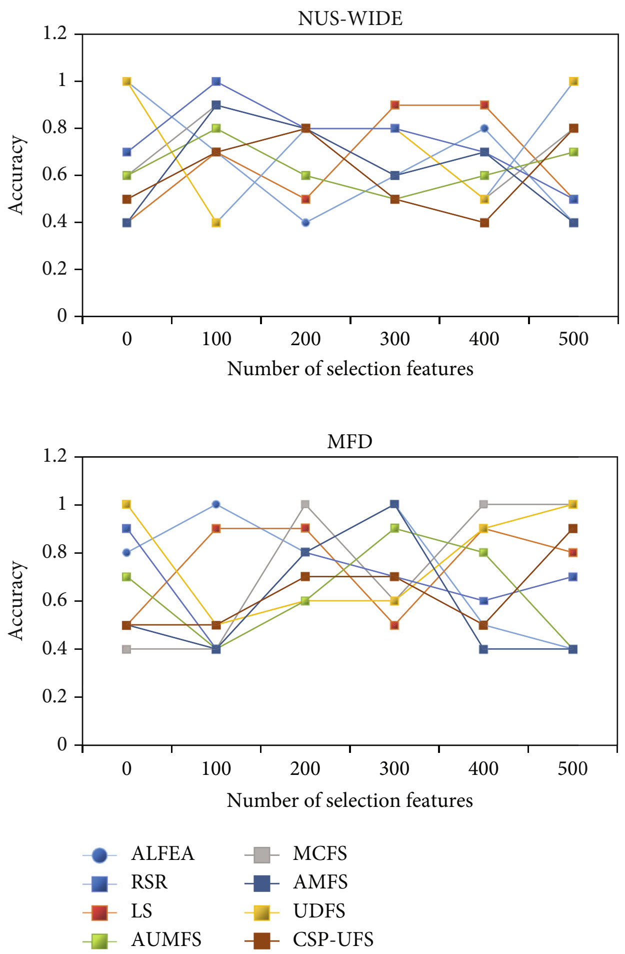

Figure 9: Clustering result ACC vs. the number of selected features.

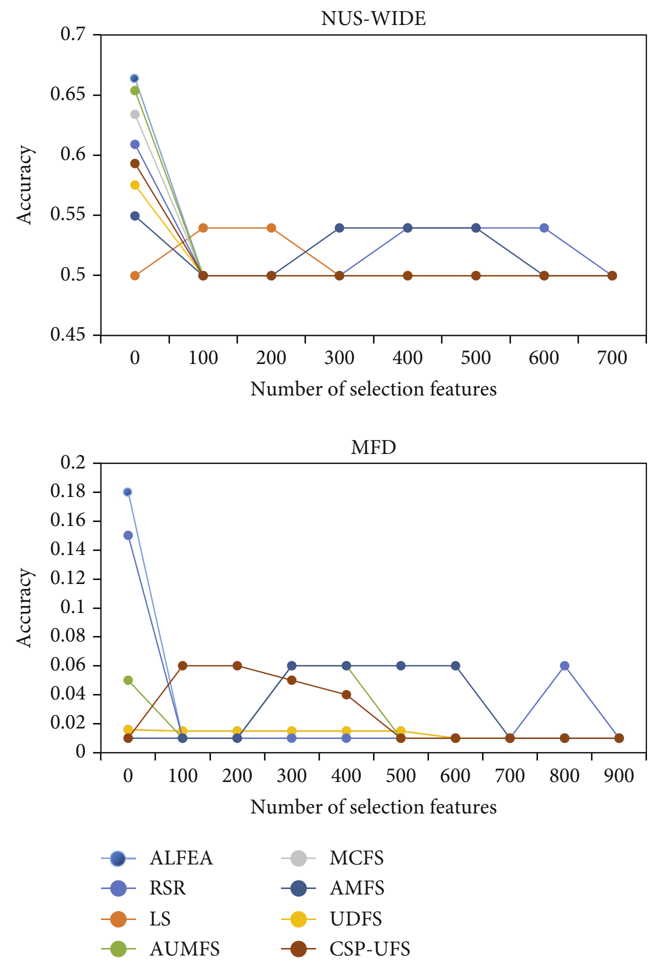

Figure 10: Clustering result NMI vs. the number of selected features.

that efficiently uses the rand() function twice, as shown in the following equation:

$$x = \frac{(\text{float})(\text{dobrand}()\&0x7fff)}{(\text{float})0x7fff},\quad y = x * (b - a) + a. \tag{21}$$

It can be seen from Figure 8 that the optimized random number algorithm proposed in this paper efficiently uses the rand() function twice and generates random numbers based on the principle of chaos. Not only is the random number sequence internally random, but the random number sequence itself is also random. This is very beneficial to the data support of the system in the text.

5. Effect Analysis

5.1. The Effect of Different Software Algorithms Based on μClinux Intelligent System. Each feature selection algorithm is executed separately, and then, the clustering algorithm is executed on the selected feature subset. We use the clustering accuracy ACC and the normalized mutual information NMI to evaluate the clustering results. For the evaluation of the algorithm, we use two public data sets, NUS-WIDE and MFD (Multiple Feature Data Set), as the test sample data. The dimension sum and feature value of the data are the highest dimension and the largest feature value of the data.

From the experimental results of Figures 9 and 10 and Table 2, we can draw the following conclusions. First of all, according to the experimental results, we can know that all comparison algorithms get better results than All Features, which fully illustrates the importance of feature selection. The noise and redundant information contained in the original feature will affect the efficiency and performance of the learning algorithm. After feature selection, removing these noise and redundant data will enable the learning algorithm to obtain better performance and improve the efficiency of the learning algorithm. Secondly, the AUMFS algorithm and the CSP-UFS algorithm have obtained better clustering effects than several other single-modal feature selection algorithms. This shows that making full use of the relevant information and complementary information of each mode in the process of feature selection can improve the performance of the algorithm. Finally, we can know that the CSP-UFS algorithm has achieved the best results. We summarize the

Table 2: The comparison algorithm has the best clustering effect on the five data sets.

	Animal with attributes		NUS-WIDE		Multiple features		Protein fold		CASIA-CASSIL corpus	
	ACC	NMI	ACC	NMI	ACC	NMI	ACC	NMI	ACC	NMI
All Fea	0.45	0.448	0.24	0.173	0.667	0.721	0.5	0.013	0.274	0.064
LS	0.565	0.535	0.251	0.147	0.671	0.728	0.503	0.019	0.302	0.068
MCFS	0.574	0.521	0.246	0.182	0.802	0.799	0.503	0.019	0.33	0.074
UDFS	0.849	0.846	0.271	0.192	0.911	0.844	0.525	0.062	0.326	0.08
RSR	0.837	0.846	0.268	0.193	0.894	0.827	0.608	0.062	0.319	0.076
AUMFS	0.956	0.915	0.29	0.202	0.965	0.922	0.607	0.062	0.339	0.097
AMFS	0.948	0.907	0.262	0.179	0.956	0.906	0.705	0.141	0.324	0.071
CSP-UFS	0.969	0.936	0.29	0.217	0.973	0.936	0.687	0.181	0.344	0.101

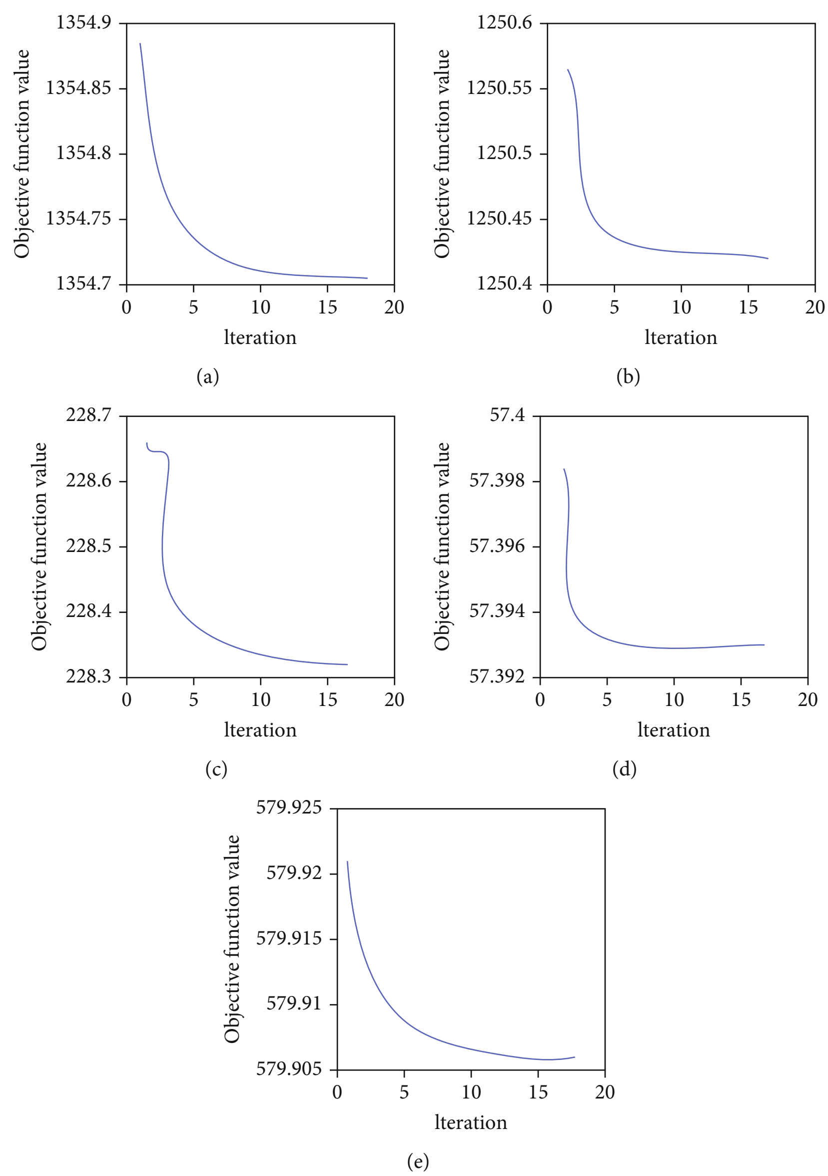

Figure 11: Convergence of CSP-UFS algorithm on five data sets.

reasons as follows: First, the CSP-UFS algorithm uses local regression and global alignment strategies to learn the Laplacian matrix. At the same time, the local structure information and global distribution information of the data are used to learn the Laplacian matrix. Secondly, the CSP-UFS algorithm uses linear discriminant analysis in the feature selection process, so that the data can also maintain the clustering structure of the original data in the low-dimensional feature space, thereby retaining the discriminant information in the original data. It can be seen that ME-K-means can stably obtain reliable initial gathering points instead of the K-means algorithm. The results of each run are full of randomness, and the k value needs to be specified, which is completely impossible when faced with an unfamiliar data set.

5.2. Statistical Verification. Finally, in order to illustrate the superiority of our proposed method, we use symbolic verification to study the difference between our algorithm and other algorithms. Sign test is a common method used to compare the performance of two classifiers, and this method counts the number of data sets, and the effect of a certain classifier on this data set is better than other methods, and we perform sign testing on all experimental results.

As shown in Figure 11 and Table 3, a, b, c, d, and e, respectively, represent Animal with Attributes, NUS-WIDE, Multiple Features, Protein Fold, and CASIA-CASSIL corpus. In these five data sets, it can be seen that in the accuracy of these five data sets, the accuracy of the c map will be smaller, and the peak value of a is the highest.

For the classification accuracy of the clustering evaluation indicators NMI and KNN classifiers, our algorithm performs better than other comparison algorithms on all data sets. Therefore, according to Table 3, the result of the sign test is that the CSP-UFS algorithm is superior to other comparison algorithms at a significance level of 0.05. For the remaining two evaluation indicators, except for the AUMFS algorithm and the AMFS algorithm, the CSP-UFS algorithm is almost better than all comparison algorithms.

6. Discussion

As we all know, companies need to carry out strategic marketing in three kinds of time: the beginning of business, the time of large-scale integration, and the time of entering new fields and developing strategic products and strategic services. For the emerging digital field, if agricultural planting and breeding companies want to occupy a place in it, they must redo strategic planning and redistribute strategic marketing. Many industrial planting and breeding enterprises attach great importance to the construction of the database and have achieved gratifying results. The database is like the digital logistics department of a planting and breeding enterprise. What kind of resources it needs and how many resources it needs are prepared and equipped in advance by the database department, and then, these resources are delivered to the platform vendors or users. The database solves the problem of idleness and waste of enterprise resources and realizes the optimization of resource allocation and cross-enterprise, cross-industry, and cross-platform sharing, which is conducive to creating new sources of value; the registration system of the database is conducive to targeted database marketing.

Table 3: Key values corresponding to the sign test when the significance is 0.05 and 0.10.

Number of data sets	5	6	7	8	9	10	11	12	13
W0.05	5	6	7	7	8	9	9	10	10
W0.10	5	6	6	7	7	8	9	9	10

Therefore, the database is the key to the digital development strategy of agricultural planting and breeding gas companies. Although the platform designed in this paper is an intelligent network sensor platform, the following data is processed by a database. If companies can build their own databases and conduct independent analysis on their own, then the development of agricultural digitalization will be longer, and the development of enterprises will be more stable.

This article has related discussions from the design of the algorithm to the construction of the following platform. However, due to space limitations and limited knowledge, the author did not have an in-depth discussion, just a taste of it, and this article also has many shortcomings and can be improved, as follows: (1) The numerical development of agriculture can be combined with the Internet of Things technology to explore in more depth the impact of climate, water conservancy, and soil on agriculture. (2) For the optimization of the algorithm, on-site inspection of agricultural planting and breeding data can be used as analysis, and the results will be more in line with the needs of this article.

7. Conclusions

This article is based on the design of intelligent sensors to escort the digitalization of agriculture and realize the long-term development strategy of agricultural enterprises. This design ensures the stability and reliability of the system and improves the operating speed of the system. It can be predicted that the future development of precision agriculture will require the use of modern information technologies such as information management, automatic monitoring, precise control, and network communications. As far as the solutions involved in this article are concerned, with the rapid development of science and technology, new technologies will be used to develop relevant equipment and instruments to better solve the problem of agricultural data collection and transmission and realize the monitoring, management, and control of agricultural system digitization. At the same time, the intelligent system market has huge potential, and it has very important practical significance for the research of intelligent system, so more in-depth discussion and research should be done. In the future research, we will be specializing in more depth the research of intelligent sensors, have a deeper understanding of artificial intelligence technology, and apply intelligent sensors to the field of artificial intelligence.

Data Availability

No data were used to support this study.

Disclosure

The author confirms that the content of the manuscript has not been published or submitted for publication elsewhere.

Conflicts of Interest

There are no potential competing interests in this paper, and the author has seen the manuscript and approved to submit to your journal.

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