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Research Article

Scheduling Method for Agricultural IOT Business Based on Improved Multiobjective Evolutionary Algorithm

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In the modern society where technology is advancing every day, the agricultural industry is also undergoing innovation, and the Internet of Things (IoT) based on machine learning algorithms adds new vitality and yields increasing directions to this ancient industry. This study analyzes and processes data based on improved multiobjective algorithms for the application of IoT in agriculture and establishes the relevant algorithmic models. The components of IoT are introduced, and it is determined that information flow, capital flow, logistics, and Internet are the main reasons why it can be generated. After establishing an improved multiobjective evolutionary algorithm model with good convergence and diversity, the embedded multichannel sensor collection device measured in this experiment in the same cultivated environment has a more stable collection data cycle compared to the external sensor. The embedded multichannel sensor has better stability, so this sensor is selected for this study to monitor parameters such as soil moisture content and oxygen content. The IoT requires timely communication and consultation among users, and the actual experiment found that the use of ultrashort waves with a frequency of 230 MHz is the most stable and efficient.

1. Introduction

Throughout the history of human development, every great progress of mankind in this long history has been an advancement in technology. The invention of the steam engine marked the arrival of the first technological revolution, and since then all mankind has evolved from the inefficient mode of manual production to the efficient mode of machine production [1]. The discovery and use of electricity set off the second technological revolution, and the use of electricity has again greatly improved the efficiency of human production and life. Nowadays, we are experiencing the third technological revolution, and the great leap forward in computer technology has brought all mankind into the era of big data [2]. The Internet of Things (IoT) was born on the basis of the development of certain intelligent technology, which has advanced mankind toward the era of intelligence in everything [3]. The achievement mark of completing the third technological revolution is the realization of the Internet of Things all over the world, where anything is connected to the World Wide Web at any time and place and can interact intelligently with humans. If this vision can be realized, then the lives of more than 7 billion people in the world are radically changed, and to a large extent, the way of thinking of human beings will also be changed. Leaving behind the new technological crisis that could be brought about, human life will enter a new era of efficiency and beauty.

With the end of World War II, humanity entered decades of peace and the global economy expanded to an unprecedented extent. Human exploitation of the Earth's ecology has also become more thorough, and the negative impact on the global environment has expanded more than tenfold [4]. After the global financial crisis in 2008, the United Nations proposed the slogan of green economy and advocated the implementation of energy-saving and low-carbon guidelines for all industries in the face of the spreading economic downturn. And the emergence of IoT provides a viable answer to this problem, which has largely matured in a very few developed countries and become a target of the next decade's plan for most developing countries [5]. With its efficient and orderly nature, the IoT can save natural and human resources and can greatly alleviate energy consumption. And so far, the core technology of IoT has been largely completed, while researchers in various countries are now optimizing and upgrading it. And with the construction of telecommunication infrastructure all over the world, smartphones and laptops are also popular, and wireless network coverage is basically achieved all over the world. This provides a basic soil environment for IoT to take root in various fields, and agriculture, which has a huge footprint and more backward tools, benefits from this to be able to upgrade its business [6–8].

In both daily life and social production, human beings have always strived to get the maximum benefit with the minimum cost. The process of finding the optimal solution by considering two conflicting aspects at the same time is called multiobjective optimization. In fact, scientific research and engineering practice are full of multiobjective optimization problems (MOPs), which are the most common among the many types of problems that researchers need to face on a daily basis [9]. Multiobjective optimization problems are very common and important in engineering applications and other real life. These practical problems are usually very complex and difficult and are one of the main research fields. For example, when designing a particular watering truck, agricultural implement companies generally want to spray as wide as possible, with as much accuracy as possible, with the lightest possible weight of the water tank, and with the least possible consumption of gasoline and diesel fuel. However, two of these design goals are clearly in conflict, for example, a wider spraying range will lead to an increase in gasoline and diesel consumption, so a compromise solution has to be found among these goals [10]. Since such problems are very common and frequent in agricultural production, it is very important and urgent to use multiobjective evolutionary algorithms in computer technology to help farmers solve this problem. However, improvements in these design goals may conflict with each other, e.g., a longer range may lead to increased fuel consumption, so a compromise must be made among the design goals [11]. Since MOPs are widely available in the real world, it is of great theoretical importance and application to study multiobjective optimization algorithms to help people better solve such problems.

The contribution of research innovation lies in the introduction of advanced genetic algorithms to improve the multiobjective evolutionary algorithm. Finally, an improved multiobjective evolutionary model with good convergence and diversity is established. After completing the algorithm optimization, compared with the external sensors, the embedded multichannel sensor acquisition equipment measured in the same farming environment has a more stable data acquisition period. And it can always be stable at the maximum energy output and not lower than a predetermined threshold. The embedded multichannel sensor has better stability, so the sensor is selected to monitor soil moisture and oxygen content. The Internet of Things requires timely communication and negotiation among users. The frequency of ultrashort waves is mainly used for communication between farmers, the transmission of weather information, the water level of nearby reservoirs, and other important information.

2. Structural Components of the Internet of Things

2.1. Information Flow. Information is the basis for the establishment of the big data era, and it is the most fundamental element of the moment. Analogous to human beings, information is equivalent to the nervous system, a structure that sustains the normal functioning of society and plays a vital role in the economic trade of goods circulation. In the Internet of Things, the existence of information flow is the primary condition for its existence. The world is full of information, and it can be said that any medium that carries certain content can be called information [12]. However, information in the IoT refers specifically to market information in economic relations. Market information in this study includes the following: characteristics and situation of economically related industries, relations of industries with each other, size and consumption of each industry, number and organization of industrial personnel, generation and elimination of natural disasters, etc. Modern communication technologies allow for rapid, efficient, and wide dissemination of information under this concept in the flow of information [13]. In the field of agriculture, accurate and rapid transmission of information can provide strong support and reliance on policy formulation, disaster prevention, and sowing and harvesting. The smooth flow of information is the basis for rational and orderly implementation of plans and is the cornerstone for the proper functioning of the economy.

Information in the economic market does not generate any profit per se, but it has value in itself, and this value can be transferred to production tools after the purpose of dissemination has been achieved, thus indirectly increasing profits [14]. The rapid dissemination and effective use of information can greatly improve management efficiency, increase labor productivity, and ultimately make companies and enterprises more profitable. And it also plays an important role in environmental protection and energy saving. Information can effectively regulate the supply and demand in the market and make energy mobilized in the direction of gap goods in time to avoid unnecessary waste and loss [15]. "Market allocation mechanism of information resources" refers to the process that the market automatically organizes the production and consumption of information through price leverage. That is to eliminate or reduce the uncertainty in information market activities through the interaction and mechanism of supply and demand, price, competition, risk, and other factors in the market mechanism. Thereby realizing the optimal configuration of information resources. The market allocation mechanism of information resources mainly uses market mechanisms, including supply and demand mechanism, price mechanism, and competition mechanism to effectively allocate information resources. This becomes the basic point of the Internet of Things that differs from the traditional economy. A well-functioning information flow can effectively reduce the cost of products and make their value transferable and realizable.

2.2. Logistics. Logistics is the abbreviation of material circulation, which mainly refers to the storage, packaging, transportation, distribution, loading, unloading, and signing of goods. After the popularity of the Internet, the rapid development of e-commerce has led the logistics industry to undergo a corresponding upgrade and replacement [16]. The Internet has expanded the scope of logistics from local to global, allowing users to choose any logistics company online that meets their needs, and logistics companies to receive more orders and operate in more regions. It also gives rise to third-party trading platforms, which provide open, transparent, and secure transaction information for both buyers and sellers, allowing small and microenterprises and individual merchants to expand their business to dozens or even tens of times the previous range. Web-based logistics offers higher value and more opportunities for both buyers and sellers and has given rise to third-party companies that provide this service. In areas where transportation is not convenient or not operational, it is possible to contract a third-party company or individual to perform the logistics work [17]. In this more lucrative area, the third-party logistics market is now looming large and has even evolved fourth- and fifth-party agencies and companies. The logistics business has not only expanded geographically but also in some of the better value-added industries. Once the user and the agent have signed a good legal contract, the agent can undertake all the services requested by the user and do the heavy lifting of transporting goods for its users. When a user makes an online purchase, he or she first receives information about the product and then decides who to buy after browsing a number of products. Then the user needs enough money to make the purchase, and finally, the logistics are needed to deliver the purchased goods to the user. In this complete business purchase behavior chain can be seen, the user and the merchant to complete the entire transaction process cannot be separated from information flow, capital flow, and logistics, and logistics is the basis to ensure the last link, if there is no logistics, capital flow and information flow will have no meaning, the transaction is also impossible. Logistics in the Internet of Things is an upgrade on the basis of e-commerce logistics. It uses signal transmitters, tracking chips, and signal receivers to realize the function of real-time inquiry and monitoring during the whole process of goods transportation. The IoT infrastructure should be able to connect all possible assets, such as goods, containers, transport vehicles, sensors, and employees, to ensure that the entire logistics system can be tracked and managed as a single Symphony unit.

2.3. Internet and Wireless Communication Technology. In 1969 in the United States, the Internet began with the APA network, which refers to computer networks and the vast network system linked by these computer networks. The initial form consisted mainly of Web applications, and with the rapid development of computer technology, the Web entered the Web 2.0 era in the early 21st century. The initial goal of the creation of the Internet was to make it possible for humans to receive the information and content they need at any time and place through this huge system of global access and for everyone to chat and communicate with each other, greatly bringing people closer to each other [18]. After decades of development, Web 2.0 has become increasingly mature, although the current network environment has largely deviated from the inventor's original intention of open source and openness, it does not prevent relevant practitioners and researchers from thinking about Web 3.0. Some scholars believe that Web 3.0 will completely combine reality and virtual, forming a seamless new world. Some scholars also believe that there will be more emphasis on mobility and that there will be more extended applications to make mobile smart devices more popular and comprehensive. Another part of experts believes that cloud computing will be the core of the next phase of development. All three views above show that no matter how Web 3.0 develops, it lays an unshakable foundation for the development of IoT. IoT is the comprehensive purpose of the three, everything is connected to the Internet, and rely on wireless communication technology to make connected devices with more mobile attributes, rely on cloud computing to achieve more and more powerful functions of APP, and finally realize the beautiful technological vision of IoT changing life.

Picturing the description above gives a brief structural diagram of the Internet of Things, which is shown in Figure 1.

3. Agriculture in the Internet of Things

The great Adam Smith, in his 1776 book “”The Wealth of Nations,”” said that the growth and increase of cities would fundamentally change the pattern of agriculture. This will provide a great market for agriculture, which can promote the development of agriculture in the direction of modernization and efficiency, making the countryside more efficient and organized, breaking through the constraints of geographical limitations and traditional relationships. The application of IoT to agricultural production is a new trend in the development of agriculture in recent years. The global arable land area accounts for about 35.9% of the Earth's land area, and the vast majority of countries still use the traditional farming model, which results in a low yield per square meter of the land area [19]. The current applications of IoT technologies in agriculture are mainly focused on remote sensing data detection, cloud computing crop cycles, and automated farming tools. The application of these technologies can greatly increase the dependence of agriculture on weather and minimize the impact of natural disasters on the harvest. Only when agriculture is developed can more financial energy be invested in high-tech industries, and the progress of high-tech industries will increase the yield of agriculture, ultimately reaching a positive virtuous circle. Therefore, the detection of crop growth, soil water and

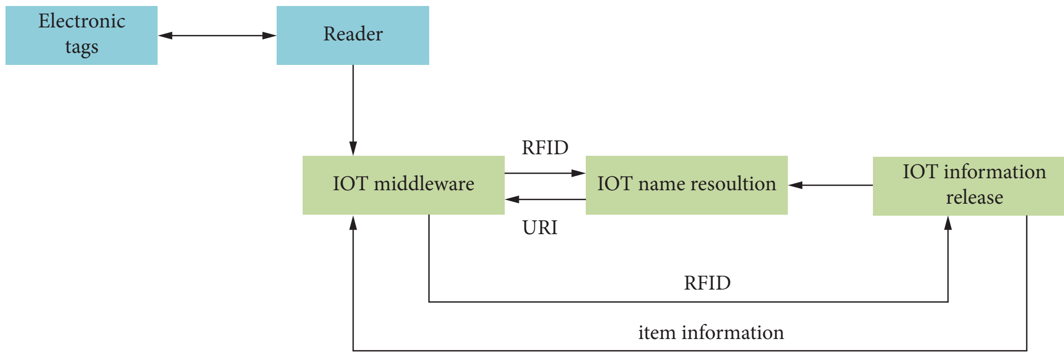

Figure 1: A brief basic structure diagram of the Internet of Things.

fertilizer content, pest and disease news, the establishment of a nationwide spatial information system, digital agricultural data, and the use of computer algorithms for seeding planning should be actively applied to agriculture. Changing the crude agricultural business model, saving human resources, and creating high-yield green agriculture based on ensuring the quality and safety of agricultural products are the new guiding directions of IoT technology for agriculture [20]. In conclusion, the topic of this study is scientific and has practical social value and significance.

4. Improved Multiobjective Evolutionary Algorithm

4.1. Multiobjective Optimization Problem. Many problems encountered in agriculture can be abstracted as multiobjective evolutionary problems, and this study converts the multiobjective evolutionary problem into a mathematical form without loss of generality.

$$\min f(x) = (f_1(x), f_2(x), \cdots, f_m(x))^T, x \in \Omega \subseteq R^n, \quad (1)$$

where x is a n-dimensional dynamic decision vector in the decision space, f is a m-dimensional dynamic target vector in the decision space, and the formula $f(x)$ represents the mapping of the decision vector in the target space, which can be represented by Figure 2.

Two dynamic decision vectors x and y are selected, where x Pareto dominates y . Define x^* as the Pareto optimal solution in the dynamic decision vector PS , and PF as the dynamic frontier surface of Pareto, both of which are defined as follows:

$$\begin{aligned} PS &= \{x \in \Omega | x \subset \text{ParetoBest}\}, \\ PF &= \{f(x) \in R^m | x \subset PS\}. \end{aligned} \quad (2)$$

Then choose z^* as the ideal point, which takes the following range of values:

$$z^* = (z_1{}^*, z_2{}^*, \ldots, z_m{}^*)^T, i \in \{1, 2, \ldots, m\}. \quad (3)$$

Corresponding to the ideal point is the closest z^{na} , which takes the following range of values:

$$z^{na} = (z_1{}^{na}, z_2{}^{na}, \ldots, z_m{}^{na})^T, i \in \{1, 2, \ldots, m\}. \quad (4)$$

To address the basic features of the diversity problem, the MOPs algorithm requires a set of dynamic decision vectors to be selected and then a set of optimal dynamic objective vectors to be computed. This set of objective vectors needs to exhibit good convergence and diversity, which requires it to be in the objective space, converge infinitely to the frontier surface of Pareto and be distributed as homogeneously as possible in the space.

4.2. Multiobjective Flexible Agricultural Scheduling Problem. When scheduling agricultural machinery operations, there are two major subproblems, the path subproblem and the ranking subproblem. The former refers to the assignment of a number of operations to the appropriate crop machines, and the latter refers to the priority of the processing of a number of operations assigned to each crop machine. The three most important objectives in the agricultural scheduling problem are selected as total completion time, total load, and critical load, which are defined by the following equations:

$$\begin{aligned} C_{\max} &= \max\{C_i | i = 1, 2, \ldots, n\}, \\ W_T &= \sum_{k=1}^{m} W_k, \\ W_{\max} &= \max\{W_k | k = 1, 2, \ldots, m\}. \end{aligned} \quad (5)$$

In the model building of multiobjective evolutionary algorithms, the determination of dynamic change operators is the focus of this study. An excellent dynamic change operator can make an organic balance of extensive and focused search in the decision space. The current algorithms that can be chosen for effective dynamic change operators in the field of computer algorithms are distribution estimation algorithm, differential evolution algorithm, and goal genetic algorithm. The objective genetic algorithm has better adaptability compared with the former two, so it is selected in this study to improve and optimize the multiobjective evolutionary algorithm. The main operation step can be summarized as selecting half of the best individuals in a population of many individuals as the next generation, and

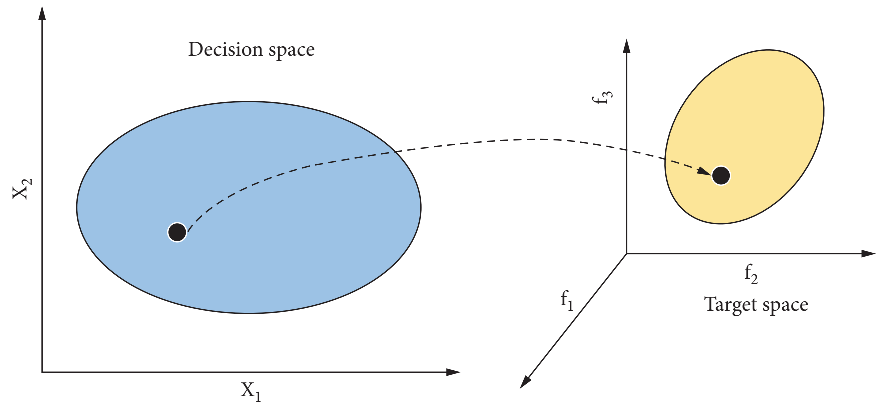

FIGURE 2: Mapping from decision space to objective space in multiobjective evolutionary algorithms.

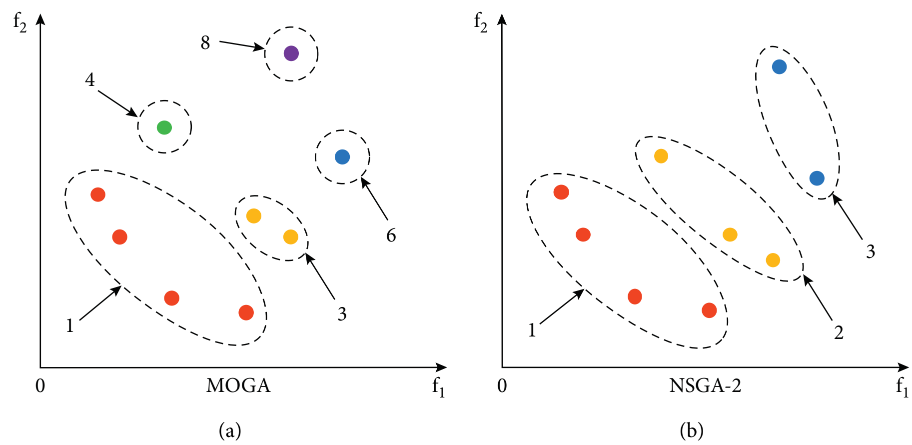

FIGURE 3: Schematic diagram of fitness distribution of population individuals in MOGA and NSGA-2.

then looping this step until the target individuals are found to achieve a balance between convergence and diversity in the target space.

Figure 3 illustrates the fitness assignment used by the modified multiobjective evolutionary algorithm using the goal genetic algorithm and the NSGA-2 algorithm. In the left figure, it is assumed that all nondominated dynamic individuals have a fitness of 1, then the fitness of other dominated dynamic individuals is added by 1. Using the fitness sharing mechanism, the same fitness individuals can be selected quickly. And in NSGA-2, we can first disregard the nondominated dynamic individuals and set the fitness of the remaining dominated dynamic individuals to 2, and then iterate continuously so that all individuals have fitness values. Then they are distinguished using the crowding distance degree.

After improving the algorithm, the multiobjective problem generator is confirmed. First, the problem is optimally generated for an m objective by splitting the complete problem into two major parts and then subdividing it into both parts. It is expressed as the following system of equations:

$$\begin{cases} \min f_1(x_1) \\ \min f_1(x_1) \\ \cdots \\ \min f_{m-1}(x_{m-1}) \end{cases}$$

$$\begin{cases} \min f_{m-1}(x_{m-1}) \\ \min f_m(x) = g(x_m)h(f_1(x_1), f_2(x_2), \ldots, f_{m-1}(x_{m-1}), g(x_m)). \end{cases} \tag{6}$$

Further classification is based on whether the position of individuals in the population is the same in the dimension in which the Pareto frontal plane is located. All problems with a Pareto front surface in the horizontal dimension of 1 are classified as normalized problems, and those with a Pareto front surface in the horizontal dimension of 0.5 are classified as non-normalized problems, which can be graphically represented as Figure 4.

4.3. Improving the Performance of Multiobjective Evolutionary Algorithms. In this study, different metrics were also selected to test the performance of the improved

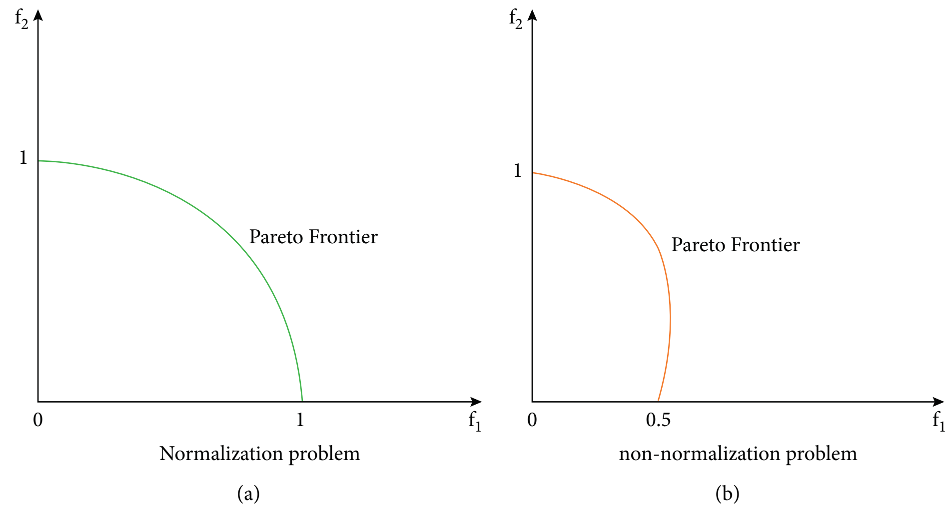

FIGURE 4: Schematic diagrams of the Pareto fronts for the normalized problem (a) and the non-normalized problem (b).

multiobjective evolutionary algorithm. Since there are more than ten metrics that can be tested on it, but all of them can only test convergence and diversity singularly, it is necessary to select four metrics, two of which test convergence and the other two test diversity.

The first is the target generation distance metric to verify whether the convergence of the algorithm is good. The test formula is shown as follows:

$$GD(A) = \frac{1}{|A|} \sum_{x \in A} \min d(x, y). \tag{7}$$

Here, A represents the set of dynamic approximate solutions of the Pareto front surface, and $d(x, y)$ represents the Euclid distance of x and y in the decision space. The smaller the value obtained, the better the convergence of the algorithm.

In contrast to the target generation distance metric, the target inverse generation distance metric does not simply reverse the direction of the above equation but takes the uniformly distributed individuals in the set of dynamic approximation solutions of the Pareto front surface for calculation. Therefore, it does not measure the convergence of the algorithm but characterizes the diversity of the algorithm. The formula for the indicator is as follows:

$$\begin{aligned} IGD(A, P*) &= \frac{1}{|P*|} \sum_{x \in P*} \min d(x, y), \\ \overline{P} &= \frac{\sum_{i=1}^{T} P_i}{T} \, (i = 1, 2, \ldots, T). \end{aligned} \tag{8}$$

As in (7), $d(x, y)$ also represents the Euclid distance between x and y in the decision space. When $|P*|$ is sufficiently large, it approaches Pareto's frontier surface indefinitely, at which point the indicator can even characterize the convergence of the algorithm. When the value obtained from the calculation is smaller, it indicates better convergence. And when the value of $|P*|$ is small, the distribution of sampled individuals is more uniform, and the diversity of the algorithm is better at this time.

The grid comparison metric is a diversity test metric specially developed for the case of high-dimensional multiple objectives. First, we take an approximate solution set of Pareto in the decision space, then divide the target space into several grids, and put the dynamic target individuals in this approximate solution set into the corresponding grids according to the classification, then we can get the corresponding values of the grids as follows:

$$DCI(A_i) = \frac{1}{s} \sum_{j=1}^{s} CD(A_i, h_j). \tag{9}$$

It is important to note that the grid comparison metric is a comparative value of the diversity of individuals within multiple grids, meaning that it is a relative value that is only meaningful when comparisons are made.

The dynamic hypervolume metric is a relatively new characterization parameter, and unlike the previous one that takes an approximate solution set, it is selected as a reference point in the target space.

$$HV(A, r) = \text{volume}\left(\cup [f_1, r_1] \times [f_2, r_2] \times \ldots \times [f_m, r_m]\right). \tag{10}$$

Combined with the following schematic, it can be seen that the selected reference point is dominated by the solution set, and then the result of the calculation is the decision space volume of the solution set bounded by the reference point. This spatial volume is also known as the super volume, and its larger value means better diversity, i.e., better performance of the algorithm, as shown in Figure 5.

5. Application of Algorithms in Agriculture

5.1. Monitoring of the Environment Using Algorithms. Based on the equations obtained in the above study, the data from the most fundamental arable land in agriculture, with the same environmental variables, were collected from the embedded sensor data collection device and the external

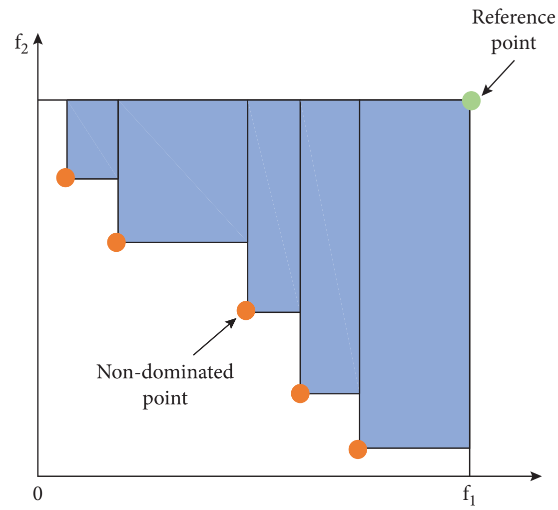

FIGURE 5: Schematic diagram of the hypervolume index of the target space.

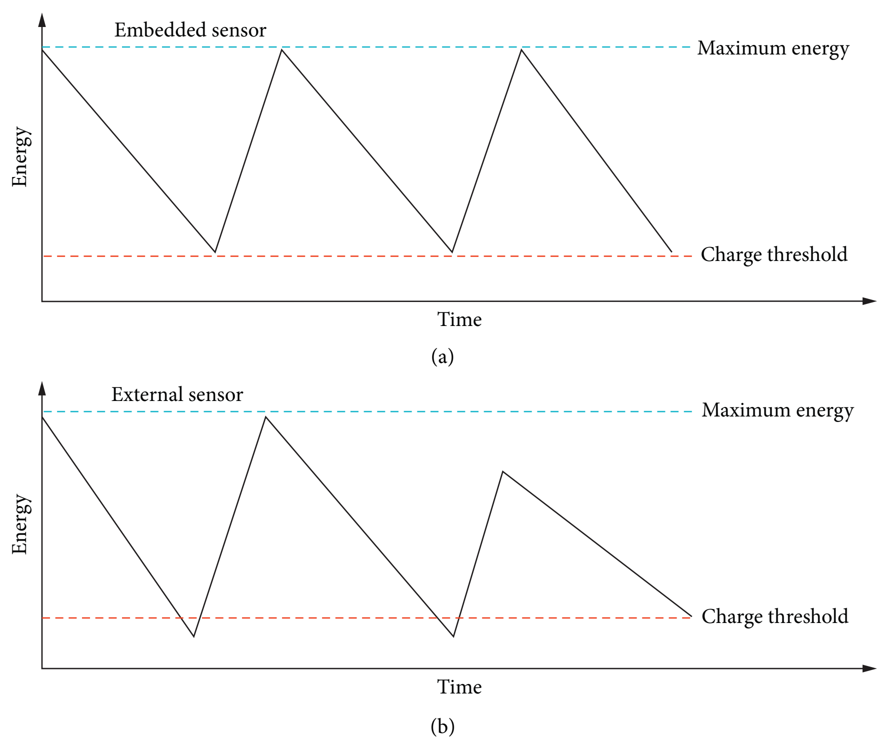

FIGURE 6: Comparison of energy stability between embedded sensors (a) and external sensors (b).

sensor data collection device, respectively, and the energy changes of the two sensors were plotted over a certain period of time and with the change of time.

As can be seen from Figure 6, the embedded multichannel sensor collection device measured in the same tillage environment has a more fixed data collection period compared to the external sensors. And it can always be stabilized at the maximum energy output and will not go below a predetermined threshold. So, the embedded multichannel sensor has better stability and this sensor is selected for this study to monitor parameters such as soil water content and oxygen content.

This study also compared the accuracy of data transmission for irrigation water around the farm using an embedded device and an external device with multiple data transmissions. The same amount of data from the embedded sensor data collection device and the external sensor data collection device were transmitted 10 to 70 times, again under the same environmental variables, and the integrity of the data transmitted every 10 times was collected. The

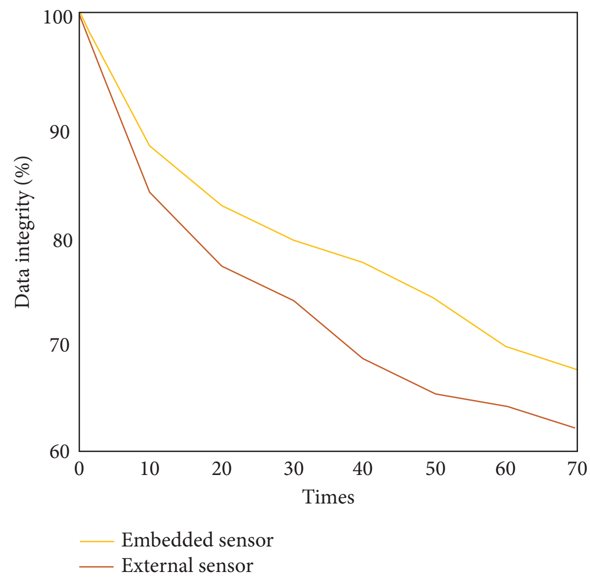

Figure 7: Data integrity comparison between embedded and external sensors for irrigation water.

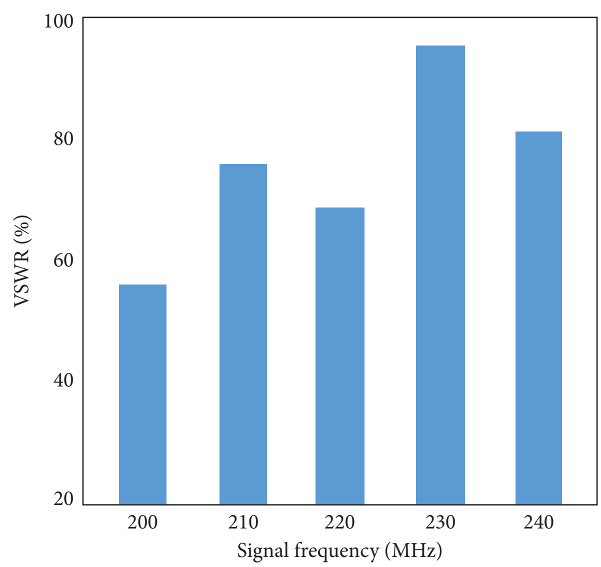

Figure 8: Reception ratio at different signal frequencies.

variation in the integrity of the data transmitted by the two sensors over 70 times is plotted in Figure 7.

As can be clearly seen from the above graph, 70 repetitions of the same data transmission were performed in the same environment. The measured final data integrity rate of the embedded multichannel sensor is 68.8%, whereas the final data integrity rate of the external sensor is only 62.5%, which can be concluded that the signal transmission accuracy of the embedded multichannel sensor data acquisition device is higher.

Modern agriculture usually consists of a small number of farmers using advanced technology to cultivate a large area of land, so the transmission of information between each other is particularly important. In this study, five groups of signal transmission frequencies, 200 MHz, 210 MHz, 220 MHz, 230 MHz, and 240 MHz, were selected for calculation, and the results are shown in the following bar chart.

Figure 8 shows the reception ratio at different signal frequencies. It can be seen from Figure 8 that when the used ultrashortwave frequency is 230 MHz, the signal reception ratio reaches the highest 95.63% in this group, so the ultrashortwave with the frequency of 230 MHz is mainly used for communication between farmers, weather information, and transmission of important information such as water level of nearby reservoirs.

The most important thing that needs to be provided by IoT in agriculture is security risk assessment. The construction of security risk standards is influenced by various factors in the environment, and developed countries have started this research earlier, so there are already some

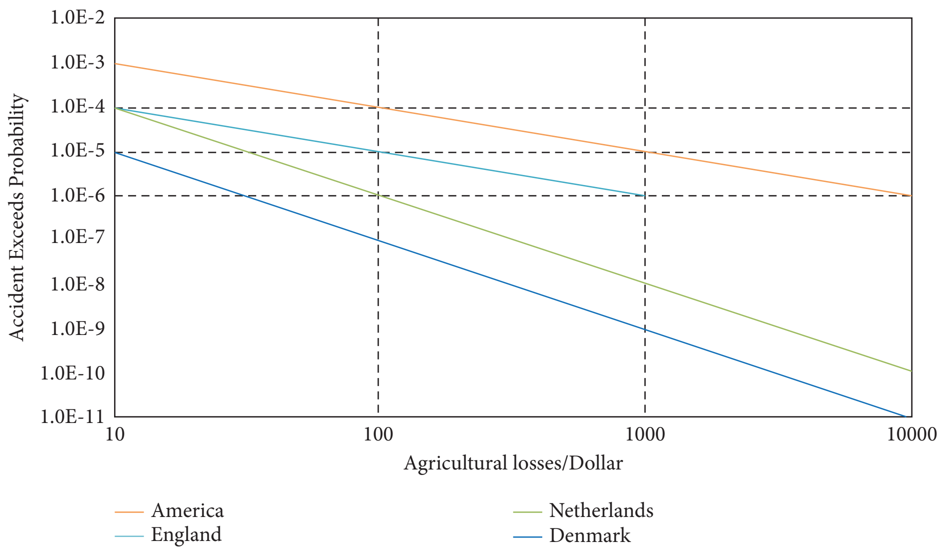

Figure 9: Relationship between foreign loss rate and agricultural property loss.

research results. The research in this paper cannot be completely copied because of the different environments at home and abroad, but the data from foreign countries have some reference value. With reference to foreign research results and the concept of “”human-centered,”” we can use the improved multiobjective evolutionary algorithm to obtain the following linear graphs for the United States, the United Kingdom, the Netherlands, and Denmark. Intolerable level and measures need to be taken to reduce the risk.

In terms of results given in Figure 9, it is important to draw on the data already available in developed countries and to use the Internet of Things flexibly and rationally to reduce agricultural losses from natural disasters and other causes to an acceptable level.

6. Conclusion

Nowadays, the Internet of Things (IoT) technology is becoming more and more mature, the Internet industry uses it as a new tool to revolutionize the generation, and the education industry uses it as a prop to assist teaching, while its development is not perfect in agriculture where people’s food is the mainstay. This study analyzes and processes the data of IoT applications in agriculture based on an improved multiobjective algorithm and establishes the relevant algorithm model. This study first introduces the definition of IoT technology, and then briefly describes its development and future prospects. After introducing its advantages, a detailed analysis of its application in agriculture is also presented, and it is concluded that the development and construction of IoT should be given first priority for the improvement of agricultural production. After that, its components are elaborated, and it is determined that information flow, capital flow, modern e-commerce logistics, and Internet are the fundamental components that can be generated and developed. The multiobjective evolutionary algorithm is improved by introducing the advanced genetic algorithm, and finally, an improved multiobjective evolutionary algorithm model with good convergence and diversity is established.

After completing the optimization of the algorithm, the embedded multichannel sensor acquisition device measured in this experiment under the same tillage environment has a more stable acquisition data cycle compared to the external sensor. And it can be stable at the maximum energy output all the time and will not go below the predetermined threshold. The embedded multichannel sensor has better stability, so this sensor was selected for this study to monitor parameters such as soil moisture content and oxygen content. The same data transmission was repeated 70 times in the same cultivation environment. The final data integrity rate of the embedded multichannel sensor was 68.8%, while the final data integrity rate of the external sensor was only 62.5%, leading to the conclusion that the embedded multichannel sensor data acquisition device is more accurate in signal transmission. The IoT requires timely communication and consultation among users, and the signal reception rate reached the highest 95.63% in this group when the used ultrashortwave frequency was 230 MHz, so the ultrashortwave with the frequency of 230 MHz was mainly used for communication among farmers, weather information, and transmission of important information such as water level of nearby reservoirs. Although certain results have been achieved in this study, the agricultural industry is a rather large and complicated system, and there are many more points that can be studied and deepened. Moreover, IoT is a rapidly changing technology, and it is important to use new research results reasonably and timely in order not to be left behind by the times. This paper has some limitations. Although this research has made some achievements, the agricultural industry is a very large and complex system. Therefore, it is necessary to establish a clear and standardized method and change the thinking mode of enterprises to make full use of the potential of the Internet of things.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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