Application and Research of New Power Supply in the Construction of "Internet of Things Plus" Smart City

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Abstract. With the continuous development of China's information technology, the "Internet of Things plus" era, under the background of China's knowledge society, the city gradually evolved into an open innovation model, in order to adapt to the development of the times, smart cities came into being. In addition, the regional industry is mainly in the specific area of the city, the distribution of industry in the city, the specific economic relations between the urban areas to reflect. Therefore, this paper mainly expounds the concept of "Internet of Things Plus" and related technical analysis, introduces the application of "Internet of Things Plus" in new smart city applications, and puts forward specific optimization measures. To this end, after consulting the literature at home and abroad, this paper promotes the better application and research of new smart cities by comparing and analyzing the examples of smart city construction and the application of the Internet of Things, based on a variety of intelligent algorithms to compare and analyze the rational use of the Internet of Things. According to the results of the experiment, it can be found that the rational use of hybrid algorithms can make the "Internet of Things Plus" better applied to the new power supply in the construction of smart cities.

Keywords: Internet of Things Plus, New Power Supplies, Smart Cities, Applications and Research

1. Introduction
The new intelligent city is the inevitable trend of the development of urbanization in our country. Smart city to the latest and hottest Internet technology, based on the realization of intelligent, convenient and humanized development [1]. The establishment of smart city, to a certain extent, for people to provide a more convenient life and a new experience. In recent years, the development of "Internet of Things Plus" technology has effectively promoted the construction of smart cities, which are no longer ideas and blueprints [2].

Smart city is the highest level of urban information development, but also the main trend of modern social development [3]. In the process of building smart cities, the relevant data in urban development
is integrated mainly on the basis of technologies such as the Internet of Things, so as to realize the intelligent processing of cities [4]. In addition, the construction of smart city is also one of the key factors of regional industrial economic development, therefore, the construction of smart city and new power supply belong to the mutual promotion of the relationship [5].

The traditional power supply technology is mainly low-frequency technology, the modern power supply technology is to the "Internet of Things plus"-based new power technology direction, at the same time, this is also the traditional power electronics to the modern network technology transformation of the symbol [6-7]. New power technology supports many emerging industries [8]. In the new energy, green transportation, smart grid, advanced servo drive, extreme environmental exploration, energy conservation and emission reduction and other fields have achieved great economic and social benefits, showing a good application prospects [9-10].

2. Algorithm and Its Establishment

2.1. Positioning Algorithm Based on Dynamic Planning of Anchor Node Movement Path

Anchor node mobile path planning problem is a traveler problem, must be through the virtual anchor node collection equivalent to the tourist attractions that the traveler must pass through the collection, mobile anchor node equivalent to the traveler, mobile anchor node through each must pass through the virtual anchor node equivalent to the traveler through each tourist attraction. Design the move route so that the moving anchor node passes through all the required virtual anchor nodes, and the move path is the shortest.

At present, scholars put forward genetic algorithms, ant colony algorithms, taboo search algorithms, simulated anti-fire algorithms and many other heuristic optimization search algorithms to solve TSP problems. The ant colony algorithm simulates the way ants forage, selecting the next path by the information released in the path when the ants forage.

Must pass through the virtual anchor node collection, will have to pass through the virtual anchor node stored in arrays A and B, where:

\[ V_{indis} a_{ij} = b_{ij} \]

\[ A = a_{ij} (i = 1,2,3 \ldots j = 1,2) \]  \hspace{1cm} (1)

\[ B = b_{ij} (i = 1,2,3 \ldots j = 1,2) \]  \hspace{1cm} (2)

The distance between the virtual anchor node a and the virtual anchor node b.

\[ d_{a,b} = \sqrt{(x_a - x_b)^2 + (y_a - y_b)^2} \]  \hspace{1cm} (3)

The weighted matrix of the virtual anchor node is obtained by the method (3). \( D_{i,j} \)

\[ D_{i,j} = \begin{cases} 0 & \text{if } i = j \\ \sqrt{(a_{i,1} - b_{j,1})^2 + (a_{i,2} - b_{j,2})^2} & \text{if } i \neq j \end{cases} \]  \hspace{1cm} (4)

Set the entire ant colony to have m ants, there are n cities, the distance between the cities is \( D_{i,j} (i,j = 1,2,3 \ldots n) \).

\( P^{k}_{ij}(t) \) Represents the probability of ants moving from city i to city j at t-moments, calculated as \( K(1,2,3, \ldots, m) \)

\[ P^{k}_{ij}(t) = \begin{cases} o & \text{if } s \in allow_k \\ \frac{[\tau_{ij}(t)]^a \cdot [\varphi_{ij}(t)]^b}{\sum_{s \in allow_k} [\tau_{ij}(t)]^a \cdot [\varphi_{ij}(t)]^b} & \text{if } allow_k \not\ni s \end{cases} \]  \hspace{1cm} (5)
3. How to Model

The new dynamic planning algorithm based on the physical model should do the solution equation of the system, and this paper intends to use the configuration grid to discrete the solution set.

3.1. Solve the Diffusion Item
Since viscous liquids have some impediment to flow and affect the diffusion of velocity, from some point of view it describes the mass exchange between adjacent cells, i.e. inflow and outflow, and the partial difference equation for viscous expansion is:

\[
1 - \frac{\sum_{i=1}^{k} D_{li}}{\sum_{l=1}^{k} D_{li}} \leq t \quad (8)
\]

3.2. Solve External Forces
Because mass forces directly affect acceleration, the following formula can be used to calculate density field changes caused by external forces:

\[
X = \frac{D - \bar{D}}{D_{MAX} - D_{MIN}} \quad (9)
\]

3.3. Solve the Leveling Item
In this paper, dynamic analysis is used to calculate the tringe term, not to calculate where the particles moved in the current time period to get the tringe term, but to track the particle trajectory from the inverse of each grid cell, find the previous position, and copy it down, and finally draw a conclusion.

4. Evaluation Results and Research

4.1. Evaluation of Research Data Results
Figure 1. Dynamic analysis of the processing state distribution of power supply map A

Figure 2. Artificial intelligence to deal with power supply anomalies after the state distribution map B.

Figure 1, Figure 2 shows the data, in the power management of intelligent, systematic processing, will lead to the possibility of data breaks and analysis anomalies, the consequences of the situation is more serious. On the other hand, in a large number of normal operating conditions and non-normal operating conditions, managers are mainly concerned with non-normal operating conditions, the rest of the normal operation of the state is often accustomed to neglect. Samples of such anomalies play an important role in supervised processing and are often incorporated into data sets for risk assessment and analysis. And in semi-supervised classification processing, such samples have a significant effect on the description of data distribution and the construction of physical models. Therefore, through the design experiment, supervision management and semi-supervisory management are carried out on the same data set marked as part of the same section, the performance of the model is evaluated by consistent evaluation indicators, and the best performing model is finally selected to predict the state of power operation and make a preset plan for subsequent processing.

Table 1. Experimental data sheets for intelligent detection systems based on dynamic analysis.

| out-of-control way. | Abnormal voltage fluctuations. | The current fluctuates abnormally. | The power protection measures are abnormal. | Unusual transport protection measures. |
|--------------------|-------------------------------|----------------------------------|------------------------------------------|----------------------------------------|
| How to diagnose it. |                               |                                  |                                          |                                        |

Table 1.
Intelligent monitoring system. | 99% | 96% | 84% | 72% 
---|---|---|---|---
Manual processing. | 1% | 4% | 16% | 28%

From the data new view described in Table 1, the intelligent monitoring system research based on dynamic analysis for the diagnosis of abnormal data and site survey shows that the new monitoring system can be through real-time data monitoring and analysis to compare which piece of power supply problems, in order to facilitate the early formulation of response measures, quickly complete the task, avoid redundant manpower losses, improve the efficiency of analysis and processing.

4.2. Survey
In order to get better results, we took the questionnaire method to find out the results. So we randomly selected 120 citizens of the city for the survey. We used two sets of questionnaires, the first on the use of new energy applications and the second on the use of traditional energy applications. Finally, we can work out the results and get the information we need.

The validity of the questionnaire refers to the validity of the questionnaire, and the higher the degree of agreement between the measurement results and the content to be examined, the higher the validity. In order to test the effectiveness of the questionnaire, it is necessary to carry out factor analysis on the questionnaire, in the test, the author selected the numerical size of sampling appropriateness KMO to determine whether it is suitable for factor analysis. The purpose of factor analysis is to find out the construction efficiency of the questionnaire. The commonly used KMO metrics are as follows: 0.8 means "excellent" means "moderate"; 6 means "normal"; Bartlett's spherical test value has a significance level of less than 0.02, indicating that it is suitable for factor analysis. The last KMO in this volume should be 0.84, which is good and can be used as a reference value.

Table 2. On the results of the survey

| Public comment. | Praise. | Mid-review. | Poor reviews. | Overall future trends. |
|---|---|---|---|---|
| New energy applications. | 86. | 23. | 11. | OK. |
| Traditional energy applications. | 26. | 62. | 32. | No |

According to Table 2, after 120 questionnaires, we learned that the majority of the public still have high hopes for the treatment of new energy applications, and expressed burnout and dissatisfaction with the treatment of traditional energy applications. And after some anonymous letters, we found that there are still a small number of people for the existing use of new energy treatment is still a little unsu fit, and even a few letters show that this model is less "human", and expressed distrust of electronic technology, but most people still expressed their vision for the future and support for this model. We think it's a good start, but that's what we need to be aware of, how to get it going better and get it done, and that's what we should be paying attention to.

4.3. Introduction and Application of New Energy Sources
Today's new power supplies are different from the traditional power supplies made of clean energy. For example, lithium phosphate battery, hydrogen energy. But because of the price and treatment of hydrogen energy, we focus on this so-called lithium iron phosphate battery.

Lithium iron phosphate battery has the characteristics of high energy density, good safety performance and long cycle life. And now the synthesis process has been basically perfect, suitable for large-scale use. Because lithium iron phosphate battery has a high operating voltage, high energy density, long cycle life, small self-discharge rate, no memory effect, green environmental protection and a series of unique advantages. It also supports levelless expansion and is suitable for large-scale energy storage, with good application prospects in the fields of renewable energy power station, grid peak adjustment, distributed power station, UPS power supply, emergency power supply system and so on. It is understood that lithium iron phosphate battery in the start-up power supply is of great use, because in addition to the characteristics of the power lithium battery, the start-up lithium iron phosphate battery also has the ability of instantaneous high-power output. Powered lithium batteries with less energy than once electricity replaced traditional lead-acid batteries, while BSG motors replaced conventional start-up motors and generators. It features not only idle start-stop, but also engine shutdown sliding and brake energy recovery, acceleration assistance and electric patrol functions.

With the rise of energy storage market, in recent years, some power battery enterprises have laid out energy storage business, for lithium iron phosphate batteries to open up a new application market. Due to the inherent randomness, intermittence and volatility of wind power generation, its large-scale development will inevitably have a significant impact on the safe operation of power systems. With the rapid development of wind power industry, especially most of China's wind farms belong to the "large-scale centralized development, long-distance transmission" state, large-scale wind farm grid-connected power generation on the operation and control of the large power grid has put forward a serious challenge.

Because photovoltaic power generation is affected by ambient temperature, intensity of daylight and meteorological conditions, it is characterized by random fluctuations. China presents the development trend of "decentralized development, low voltage in-place access" and "scale development, medium and high voltage access". As capacity and scale continue to expand and integrated technologies mature, the cost of energy storage systems will be further reduced. Because the pumped storage power station needs to be built up and down the reservoir, affected by geographical conditions, it is not easy to build in the plain area, covers a large area, high maintenance costs. The use of lithium phosphate battery storage system instead of pumped storage power station, can cope with the peak load of the power grid, not limited by geographical conditions, with freedom of location, less investment, less land area, low maintenance costs and other advantages, will play an important role in the power peak grid.

5. Conclusion
To sum up, due to the improvement of modern technology, the society pays more and more attention to environmental protection, so we propose to replace the use of traditional energy sources with new energy sources. But new types of energy come in a variety of uses, so we need to carefully screen them to make the right choices. Although we use new energy, but because of social progress, industrial system, the current society is a data-wrapped society, so we use the "Internet of Things plus" for differential use processing, so we need to choose the right algorithm for co-ordination, then, we use dynamic analysis, although the final result is poor, but we will not give up, so we firmly believe that the future will be better development, to build a real smart city.

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