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Water Pollution Prevention Engineering Device Based on Intelligent Recognition

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Abstract: With the rapid development of industry and technology in modern society, people's life has become more convenient. However, the industrial development and the uncontrolled discharge of pollution in the daily life of residents have also led to the increasingly serious problem of water pollution. At the same time, the further improvement of people's living standards also makes more and more people pay more and more attention to their health, which also makes the water pollution problem more and more people pay attention to. The prevention and treatment of drinking water and domestic water pollution in the ecological environment has also become one of the focus issues in the relevant research fields. The pollutants in the existing residential water sources present a variety of situations, which also makes the prevention and treatment of water pollution a relatively difficult task at present. First, various pollutants in the water source were analyzed and classified. Then, appropriate pollution control measures were selected to ensure that the water source can be treated in a short time to meet the standard of residential water use. Therefore, a variety of emerging technologies have been applied to the prevention and treatment of water pollution, of which the intelligent identification technology is the most applicable. In the prevention and treatment mode of water source pollutants under the intelligent identification technology, multiple types of intelligent sensor equipment were usually used to collect, analyze and process the environmental information around the water source. Then, the quality of water source was analyzed automatically through Analytic Hierarchy Process (AHP), so as to select appropriate pollution treatment technology for it. In this paper, a new type of water source pollution prevention and treatment engineering device was proposed through intelligent identification technology and AHP algorithm. Through this device, pollution control can be completed automatically. Through a series of experiments, it was determined that the performance of this new type of engineering device was improved by about 24% on average compared with the existing water pollution treatment.

1. Introduction

With the improvement of the living standard of modern residents and the development speed of various information technologies, people pay more and more attention to the pollution control of the ecological environment. This kind of pollution of the ecological environment can not only have a direct impact on the high-quality development of social economy, but also harm the health of the residents around it. Therefore, in order to reduce the harm caused by the pollution of this ecological resource, people have carried out in-depth research on the source of pollution, the type of pollution and the treatment mode, hoping to find a better pollution treatment mode.

Among them, some researchers have analyzed the pollutants and pollution categories of existing water sources to judge the pollution level of current water sources. Lyu Yizheng studied the pollution of water sources around the industrial park in a certain area. He determined the impact of the industrial park on the water source by analyzing the waste in the industrial production process and the pollution in the water source [1]. Kadam A K analyzed the quality of water sources in an area. He established an automatic analysis model through a variety of emerging information technologies and algorithms, and verified the reliability of this model [2]. Ji Mengzhi explored the role of a cell in water pollution and prevention. He determined the performance of such cells by analyzing the effect of such cells in the treatment of various pollutants [3].

He Mingjing explored a biological substance that could play a better role in the pollution of water sources, and confirmed its superior performance through simulation experiments [4]. Li He explored the role of relevant policies in a region in the treatment of transboundary river pollution, and determined the role of such policies in the treatment of water pollution through a series of investigation and analysis reports [5]. Ahmed Shahid conducted an in-depth investigation of the categories and sources of water pollutants in a certain area. He identified the source of pollutants by studying several pollution control and analysis reports [6]. Deletic Ana explored the relationship between the control effect of water pollution and the sustainability of social economy, and determined the reliability of pollution treatment [7]. However, most of the researchers' analysis of the pollution degree of water sources is limited to a certain area, and they cannot propose a general method of pollution degree analysis.

Another part of the researchers have analyzed the treatment mode of water pollution, hoping to put forward a relatively perfect treatment technology or mode of water pollution in turn. Ezemagu I G explored the effect of combining a response level method with neural network technology to analyze water pollution, and determined the feasibility of this technology [8]. Wang Gongming explored the role of a new information technology in the analysis of wastewater quality, and confirmed the reliability of the application of this information technology through experimental simulation [9]. Rink Karsten explored a water source pollution control technology, and determined the reliability of this technology through the analysis of the actual effect of its application in multiple water source pollution areas [10]. Chen Tao made a deep analysis of the pollution of water sources in a certain area, and confirmed the feasibility of this technology through the analysis of the role of a multifunctional sponge made of natural polymers in controlling the pollution of water sources [11]. Long Bui Ta analyzed the effects of various technologies in the control of water pollution, and determined that an algorithm model could play a better role in the control of water pollution [12]. However, some of the technologies proposed by these researchers are often relatively independent and cannot form a more complete pollution control technology or model.

This paper mainly analyzed the pollution status of existing water sources, and determined the pollutants of current water sources through various analysis algorithms. It has been determined that the current water pollution and prevention need the participation of emerging technologies to have a better governance effect, so as to meet the needs of social development. Then, through intelligent

identification technology and AHP algorithm model, a new type of water pollution control engineering device was constructed. Through relevant experiments, it was confirmed that this device could play a better role in the current treatment of water pollution and meet the needs of society and people.

2. Intelligent Identification Technology

With the development of various science and technology, researchers have proposed various types of information technology every year, and these information technologies have also been widely used in many industries. Among them, intelligent recognition technology has been applied in many fields, such as face recognition, life security and so on. The existing intelligent identification technology generally collects and analyzes data through a variety of information sensing devices, so as to identify and judge the target according to some data analysis algorithms built in. In the treatment of water pollution, intelligent identification technology can also be applied. Intelligent identification technology is generally used to analyze the categories of various pollutants in water resources in order to determine the proportion of these different types of pollutants in water. Based on the judgment of this proportion, the appropriate water pollution control technology is selected [13]. This kind of water pollution prevention and control engineering device combined with intelligent recognition technology can generally greatly improve the purification efficiency of water pollution, and can also make the purification effect of water pollution better. The general flow of intelligent identification technology is shown in Figure 1.

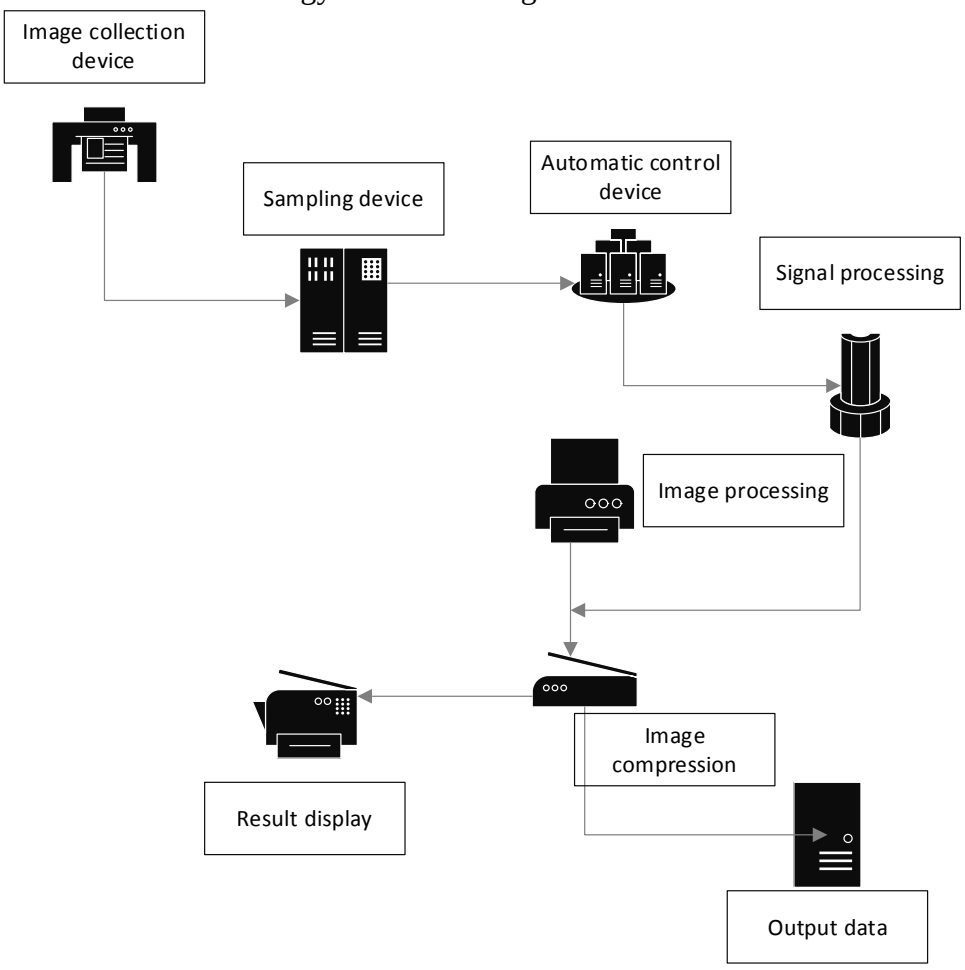


Figure 1. General flow chart of intelligent recognition technology

3. Water Pollution Prevention Engineering Device

At present, the problem of water pollution in society has become increasingly prominent and serious. On the one hand, this situation is due to the weak awareness of water environment protection in the process of people's life, and it is also caused by the unrestricted discharge of waste in the process of industrial production [14]. However, with the gradual increase of people's attention to the problem of water pollution, today's society needs a better performance of water pollution control model. In this paper, through the analysis of the existing water resources pollution treatment mode, it is determined that there are still many parts to be optimized in the current water resources pollution treatment technology. These parts can be combined with some emerging technologies to further improve the efficiency and effect of water resources pollution treatment technology. This new prevention and control mode can also purify water resources caused by different degrees, thus providing a variety of water resources that people need [15]. The pollution process of water resources is shown in Figure 2.

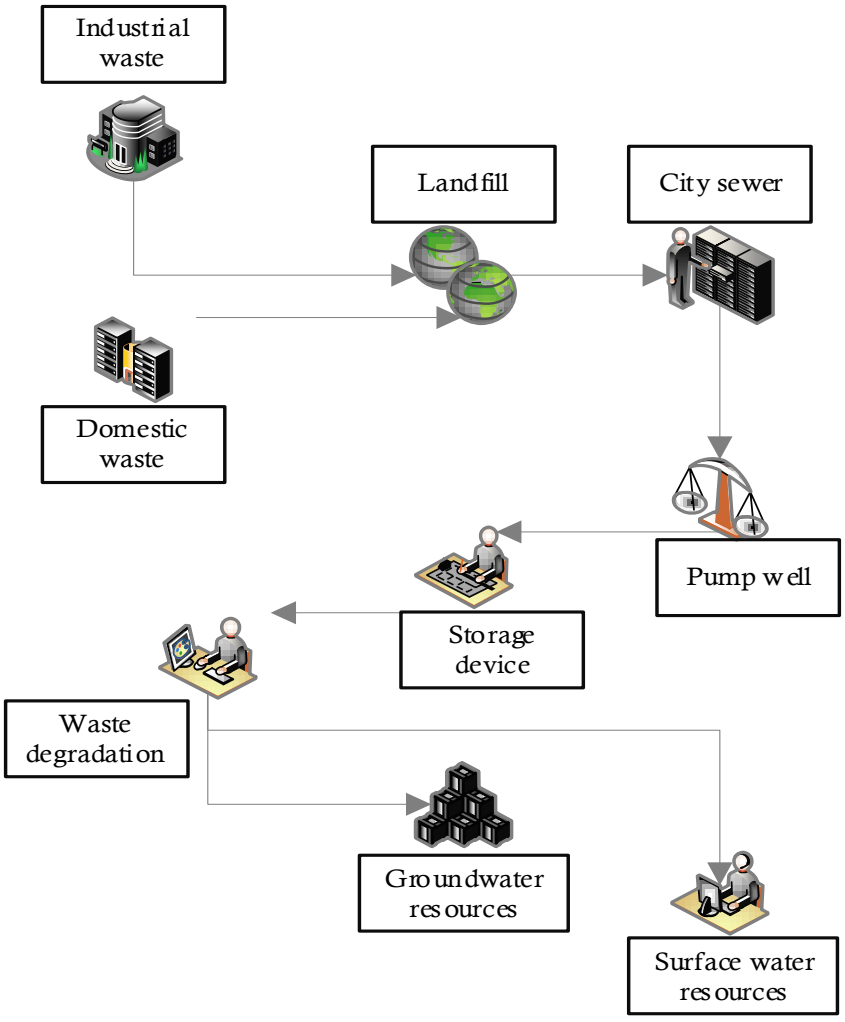


Figure 2. Schematic diagram of the pollution process of water resources

First, intelligent identification equipment is used to analyze pollution sources and pollutant types in different waters. Then, the analysis results of these data are input into the data analysis algorithm of the engineering device for efficient data operation. The result of the calculation is then transmitted back to the intelligent recognition device for technology selection. The whole water

pollution prevention and control engineering device is generally composed of intelligent sensor equipment, execution equipment and data computing center, and these three parts are interconnected to form a complete system. At the same time, this system also combines the advantages of several existing water resources pollution treatment models, and improves the final effect and overall work efficiency of the water resources pollution treatment model to a certain extent. The existing water pollution treatment process is shown in Figure 3.

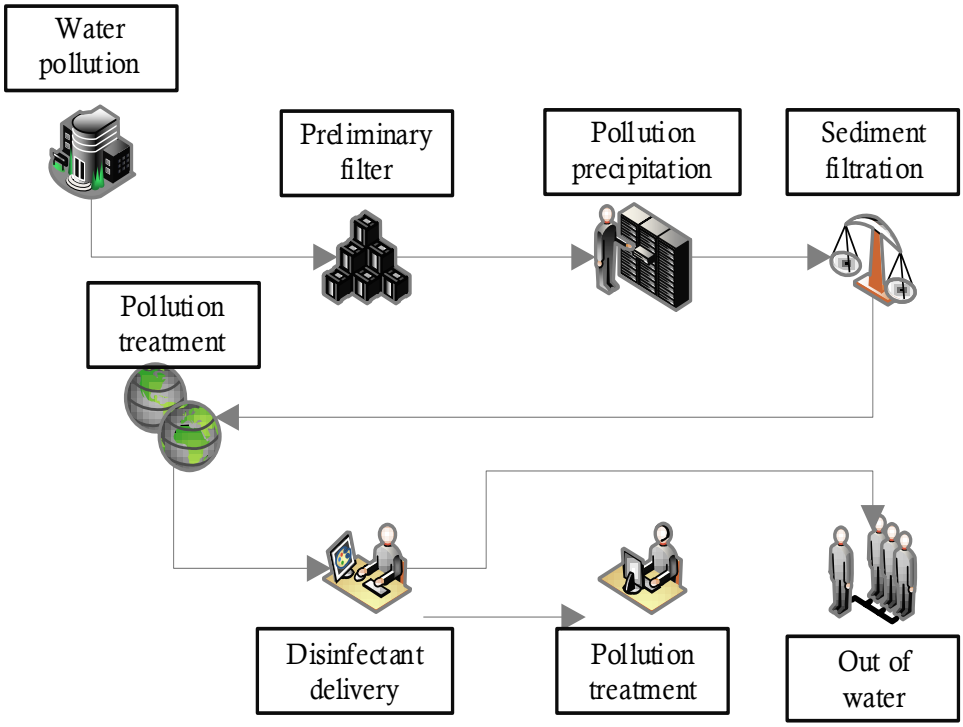


Figure 3. Schematic diagram of the pollution treatment process of water resources

4. Intelligent Recognition Technology and AHP Algorithm

In today's society, no individual can survive without pure water resources. However, with the gradual development of social industry, the difficulty of obtaining this pure water resource is also increasing rapidly. The main reason is that people's awareness of water environment protection is weak, and a variety of wastes are randomly disposed in daily life and industrial production, which further increases the types and content of pollutants in water resources. The increase in the category and content of pollutants in this water resource has made the difficulty and cost of water quality purification rise linearly. Therefore, the efficiency and performance of the existing water pollution control and prevention work have been greatly reduced, which can not meet the needs of society. In this paper, through the analysis of intelligent identification technology and AHP algorithm, the role of intelligent identification technology and AHP in the analysis and classification of water pollutants is determined. In addition, based on intelligent recognition technology, a water pollution prevention and control engineering device is proposed. This device mainly analyzes the pollutants in water resources through AHP algorithm.

In the construction process of this prevention and control engineering device, it is not only necessary to use intelligent identification technology to collect and identify water resources, but also need a variety of data analysis algorithms to analyze and classify pollutants in detail and efficiently. First, the collected pollutant data needs to be normalized, as shown in Formula (1).

$$C = \frac{\gamma - n}{n - 1} \tag{1}$$

Among them, n mainly represents the characteristic value of the data, and γ represents the weight value of the sample data. Then, the consistency index is introduced to measure the normalized result, as shown in Formula (2).

$$R = \frac{C}{x_i} \tag{2}$$

Among them, x_i represents the ith characteristic data. Finally, the combined weight vector of the data set is combined to analyze the data category, and its operation formula is shown in Formula (3).

$$F = \sum_{i=1}^{n} a_i R \tag{3}$$

The addition of the appeal algorithm formula can not only improve the efficiency of the analysis of the categories of pollutants in water resources, but also improve the accuracy of the analysis of the categories of pollutants in water resources, so as to select the appropriate water pollution treatment technology and provide a better role for the development of society.

5. Experiment of New Water Pollution Prevention Project

At present, the rapid development of social economy and regional economy has made the productivity and economic strength of different cities increase rapidly to a certain extent, which has also brought about the rapid growth of urban population. Although this situation can theoretically promote the economic strength of the city, the reality is that the growth rate of the city's financial and other economic sectors has begun to slow down. The main reason is that the growth of urban population and the brutal development of industry have caused great damage to the surrounding water environment, which has caused a large area of water pollution. Water resources have always been a basic resource on which people live. With the deepening of water pollution, people in the region began to face problems such as the depletion of water resources and the rapid increase in the cost of purified water, which also slowed the development of related fields. Therefore, at present, many regions have begun to attach importance to the prevention and treatment of water pollution. The existing water resources pollution control work generally uses artificial methods to sample and analyze the water resources in different regions to identify the pollutants in water resources, so as to use appropriate pollution treatment technology to treat the pollutants in water resources. However, this mode is relatively inefficient and cannot meet the needs of society. This paper proposes a water pollution prevention project based on intelligent recognition to improve its work efficiency.

First of all, the types of pollutants contained in the current waters of a certain region and the quality of different waters containing these pollutants were analyzed, as shown in Table 1.

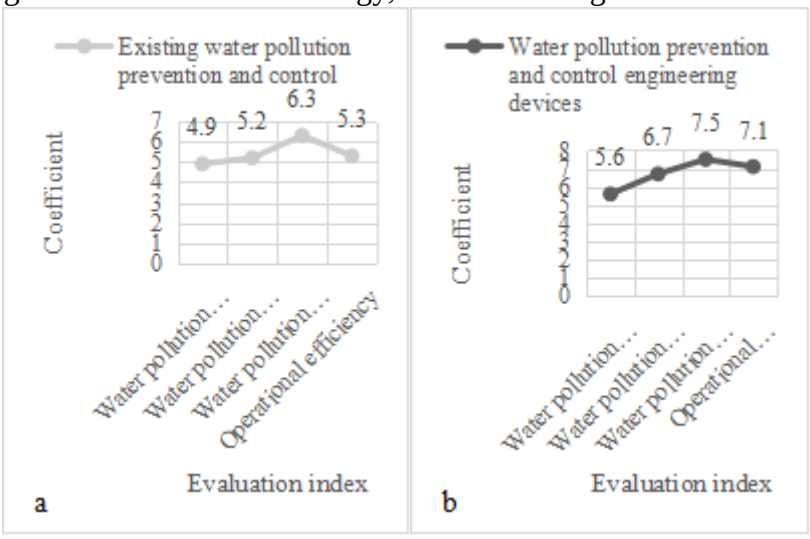
Table 1. Effects of the content of different pollutants on water quality

	Content	Water quality
Colloidal suspension	4.5	6
Carcinogenic inorganic substances	3.7	5.9
Synthetic organic matter	4.9	4.7

At present, due to the difference of industrial enterprises in different regions, the content of

different pollutants in the waters in these regions is also different, which also makes the quality of the waters take on various forms. The pollutants in the water area are mainly colloidal suspended solids, carcinogenic inorganic substances and some synthetic organic substances, which have a great impact on the quality of the water area. Through the analysis of the contents of different pollutants in Table 1 and the overall quality of the water area, it is determined that the contents of synthetic organic compounds in the water pollution have a great impact on the overall quality of the water area. This is mainly due to the complexity of the types of synthetic organic compounds of modern industrial species, and most of them are toxic organic compounds that can cause harm to human body. In addition, some synthetic organic substances in the water can also react with disinfectants in various pollution treatment technologies to generate new pollutants, which creates great difficulties for the treatment of water pollution.

Then, this paper analyzes the performance of multiple assessment types between a water source pollution control and prevention engineering device and the existing water pollution control model proposed by intelligent identification technology, as shown in Figure 4.



a. Schematic diagram of the performance of existing water pollution prevention and control models

b. Schematic diagram of water pollution prevention and control engineering device performance

Figure 4. Schematic diagram of the performance of existing water pollution control and pollution prevention and control devices combined with intelligent identification technology

The current pollution level of water resources is affected by a variety of sewage discharges generated in the process of urbanization, resulting in the increasing pollution level of water resources. With the development of information technology and society, the society began to pay more attention to the treatment and prevention of water resources pollution, which also made the performance of the existing water resources pollution treatment model unable to meet the needs of economic development and daily life of residents. Therefore, a new type of water resource pollution control device is urgently needed to control the pollution of water sources in different regions. First of all, after analyzing the performance of the existing water resources pollution prevention and treatment model in many aspects in Figure 4a, it is determined that it only has a good performance in the process of pollution treatment, and needs to be continuously optimized and updated in the other three aspects. On the other hand, after analyzing the performance of the water pollution prevention engineering device combined with intelligent identification technology in Figure 4b in many aspects, it is determined that the performance of this engineering device has been greatly

improved in many aspects. In addition, the performance of this engineering device has increased by about 24% on average compared with the existing control mode.

6. Conclusion

The prevention and treatment of water pollution has always been the focus of attention in the rapid development of economy and industry in the current society. At the same time, with the deepening of the pollution of the current ecological environment, the pollution of water resources is also deepening, and the deepening of the pollution has also caused a greater impact on the daily life and social development of the surrounding residents. Among them, the pollution of water resources and environment is further deepened. On the one hand, it is caused by the disorderly disposal of wastes in the process of social and industrial development. This pollutant has greatly affected the water sources near the industrial parks in many regions. On the other hand, many kinds of pollutants produced by residents in urban and rural areas in their daily life are discharged into the water without treatment, which also makes the categories of pollutants in the water rapidly increase, and the difficulty of purifying water pollution is rapidly increasing. Therefore, in the current era, the treatment of water pollution has always covered a huge and complex process. The knowledge of many disciplines is intertwined. This multi-disciplinary crisscross can make the treatment performance of water resources pollution better, but also greatly reduce the efficiency of water resources pollution treatment. At present, there are various kinds of pollution or eutrophication problems in many waters, among which the eutrophication problem is more difficult to deal with, and it also causes destructive damage to many kinds of organisms in the waters. Therefore, based on intelligent recognition technology and multi-class analysis algorithm, this paper proposed a water pollution control and prevention engineering device. This new type of pollution treatment engineering device can analyze water pollutants according to relevant data analysis algorithms, and select the most appropriate pollution treatment technology.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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