Computer-Assisted Predictive Analysis for Fair Human Resource Allocation in Public Health Events using Internet of Things Technology for Medical Diagnosis

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Abstract. In order to improve the fairness of human resource allocation in public health events, this paper combines the Internet of Things technology to carry out the research on the fairness of public health events on human resource allocation, and combines the cyclic convolutional neural network with traditional human resource allocation algorithms. This paper designs a recommendation algorithm for job matching in the field of human resources. Moreover, according to the needs of human resource allocation in public health events, the planning of human resources in this paper is mainly to analyze the personnel structure of the unit, and to sort out the relationship between job requirements and personnel capabilities in detail. In addition, this paper combines simulation experiments and expert evaluation methods to verify the model in this paper. From the experimental research results, it can be seen that the predictive model for the fairness of human resource allocation in public health events based on the Internet of Things technology proposed in this paper has good results.

Keywords: Internet of Things technology; public health events; human resource allocation; fairness; Computer-Assisted Predictive
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1 INTRODUCTION

Emergent events of public health refer to major infectious disease outbreaks, mass diseases of unknown origin, major food and occupational poisonings, and other events that seriously affect public health that occur or may cause serious damage to public health [11]. The emergent events of public health have the following main characteristics [4]. (1) sudden and unexpected. Emergencies events happen suddenly, which is difficult to predict, and some are even unpredictable; (2) Group nature. Emergencies events often affect multiple people or even the entire work or life group at the same time; (3) The seriousness of the harm to society. Because it happened suddenly, affected several people, and suffered huge losses, it often caused public outcry, social panic, and

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serious harm; (4) Comprehensive and systematic processing. Due to the sudden occurrence of emergent events of public health, the on-site rescue, control and transfer treatment, cause investigation and aftermath treatment involve multiple systems and multiple departments, with strong policies, and comprehensive coordination and processing under the leadership of the government can be effective. When entering the 21st century characterized by informatization and globalization, the environment on which mankind depends for survival becomes more complex and changeable [8].

Although China's public health work has made great achievements, due to various reasons, the current public health still faces severe challenges, mainly in: (1) The prevention and control of infectious diseases is still a major public health problem. First, due to the unbalanced economic development among regions, differences in population quality and sanitation conditions are caused. Especially in some underdeveloped regions, infectious diseases, endemic diseases and parasitic diseases are still the main health problems currently facing; In recent years, the mobility of urban and rural populations and the increase in the flow of materials have greatly increased the possibility of outbreaks of various emerging infectious diseases and re-ravaged infectious diseases. Third, the integration of the world economy, China's entry into the WTO, and international exchanges are increasing day by day. It has also accelerated the process of globalization of some infectious diseases, the spread of new infectious diseases has accelerated, and some infectious diseases that have been controlled in the past have resurfaced and spread again. All these pose challenges to the effective control of infectious diseases and increase the difficulty of disease control. (2) Various mass foodborne poisoning poses a serious threat to people's life, property and social stability. In a period of social transformation, various public management may have different degrees of defects; some groups or individuals have weak awareness of hygiene and weak legal concepts; some groups or individuals still maintain backward concepts and customs, and have not developed good hygiene. Habits, lack of basic hygiene knowledge. The above-mentioned reasons can cause various poisoning events, especially food-borne group poisoning, which constitutes a major public health emergency. (3) Occupational chemical poisoning and leakage of radioactive substances cause double harm to workers' health and life and property. In some places, the production enterprises have outdated equipment, backward production technology, and lack of protective facilities. In addition, some managers and operators have weak legal awareness and safety awareness, and occupational workers lack occupational health knowledge and self-protection awareness. Occupational chemical poisoning and leakage of radioactive substances occur frequently in various places, causing great harm to workers' health and social stability. (4) The means of disease control are backward and the emergency response capability is poor. Due to insufficient funds, some advanced disease diagnosis methods and prevention and control measures have not been popularized in a timely manner. The equipment and equipment are simple and the monitoring methods are outdated, which seriously affects the normal development of work and the timely and accurate detection and control of the epidemic. At the same time, there is a lack of a well-trained public health emergency response team and a corresponding guarantee mechanism to deal with public health emergencies in a timely manner. caused certain difficulties.

This article combines the Internet of Things technology to conduct predictive research on the fairness of human resource allocation in public health events, promote the response to subsequent public health events, and enhance the society's emergency response capabilities to public health events

2 RELATED WORK

At present, foreign scholars' research and analysis on emergency human resource management in public health emergencies mainly focus on the following aspects: emergency mechanism and emergency management system. Literature [18] analyzes the two-stage planning framework of

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health emergency personnel in the preparation of personnel planning, mainly through the evaluation of the existing emergency response capacity to carry out the corresponding emergency human resource allocation, and to evaluate the rare emergency response capacity. The main focus is on the effectiveness and reliability of existing emergency response systems. Literature [19] believes that ordinary emergencies can be managed by government agencies through human resource allocation according to emergency plans. When a higher-level emergency occurs or an ordinary emergency is transformed into a higher-level emergency, unconventional procedures and specific powers should be used to control the scheduling and management of human resources. The distribution, deployment, management ability training, etc. Literature [1] evaluates the management strategies of emergency human resources and proposes improvement suggestions, eg. Regarding the information coordination and management of health emergency human resources allocation, in order to realize information sharing, information hardware and software resources should be allocated effectively. Literature [5] evaluates emergency human resources. The basic method is to calculate the demand for emergency human resources and potentially dangerous human resources based on statistical data, and formulate a personnel matching model. Literature [6] believes that after meeting some health emergency needs, the usually idle human resources placement and distribution, as well as retraining and reuse issues. Computer-Assisted Medical Diagnosis is in assessing the demand for emergency human resources. Through the analysis of statistical data and the utilization of computational models, the system can accurately calculate the required number of personnel and identify potential risks and vulnerabilities in the workforce.

Literature [13] pointed out that developed countries in Europe and America are the basic structure and operation status of the comprehensive crisis management system of "big city, whole government, whole society". Literature [10] analyzed the construction of health emergency human resource management system from three aspects: decision-making process, organizational behavior and time series. Literature [17] put forward suggestions on emergency human resource management: establish a permanent emergency response agency at the central, local and grassroots levels; formulate corresponding laws and regulations; establish an emergency health emergency human resources management system. Literature [9] believes that the government should have the following powers to dispose of, namely: the power to carry out strategic material reserves and temporary requisitions, the power to declare a state of emergency, the power to guide and supervise news reports on emergencies and their handling, the power to compile and The power to initiate emergency plans, the power to investigate and evaluate emergencies and the emergency management activities themselves, and the power to monitor the entire process of emergency management in real time. Literature [3] discusses the ways and methods of establishing and improving the emergency human resource management system and mechanism for public health emergencies by analyzing the current situation, problems and experiences of public security. Literature [7] researches and develops an intelligent and efficient emergency management human resource information system based on techniques such as rule reasoning and case reasoning. Organization of emergency rescue capabilities, and further promotion; the intelligence and informationization of the health emergency team. Literature [15] divides the overall emergency response plan for public emergencies into four-color early warnings: blue level, yellow level, orange level and red level. At the same time, the emergency plan divides public emergencies into five levels, covering natural disasters, accident disasters, public health events and social security events. Literature [12] analyzes the methods and ideas of classification and classification of emergencies from a system perspective, proposes the idea of dynamic classification and classification, and applies cluster analysis and discriminant analysis to classification and classification of emergencies. Literature [2] uses fuzzy decision theory to dynamically classify emergencies; Literature [14] proposes the concept of "disaster degree" according to the actual situation of natural disasters, and gives a grading method of disaster degree level. Literature [16] analyzes and summarizes the classification and classification system and basic content of emergency response plans.

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3 TEAM HUMAN RESOURCES ASSIGNMENT AND ASSESSMENT MODEL IN PUBLIC HEALTH EVENTS

The human resource management configuration optimization system of the public health event team refers to an organic unity of the interconnected, mutually restrictive, and complementary constituent elements in the human resource management configuration of the public health event team.

The overall principle of optimizing the allocation of human resources of the public health event team is to select the number of public health human resources at all levels suitable for the development of the undergraduate department based on the number of patients and standards in each department of the hospital on the basis of the existing human resources of the public health event team. At the same time, it has introduced different professional titles and different levels of talents to improve the hospital's medical and scientific research capabilities, improve the hospital's comprehensive capabilities, and enhance the hospital's competitiveness. According to the actual human situation of the public health event team, the human resource allocation optimization model of the public health event team is composed of three sub-models: the fixed position model, the existing personnel evaluation model, and the introduced talent evaluation and evaluation model. At present, the personnel assessment model and the introduced talent assessment model are boiled down to personnel assessment. The overall system structure of the human resource management configuration optimization model of the public health event team is shown in Figure 1.

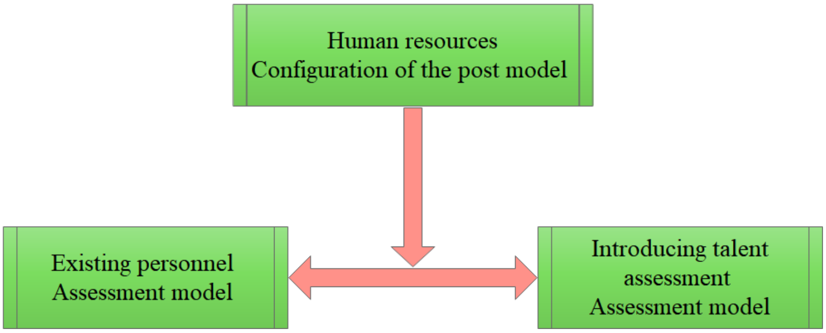

Figure 1: Architecture Diagram of the Optimal Allocation Model of Human Resources for the Public Health Event Team.

There are two important models in the human resource management configuration optimization system of the public health event team, namely: the number of public health human positions model and the human resource assessment model of the public health event team. Moreover, we will discuss them separately below.

As far as the organization level is concerned, the public health event team is composed of different departments, and the departments are a collection of different departments. Different departments have different public health manpower requirements, so the public health event team can be seen as a tree structure from the organizational structure. Moreover, departments can be regarded as tree nodes at different levels.

Decision tree is a tree structure, and each tree node of it can be a leaf node, corresponding to a certain category, or corresponding to a division. Moreover, the sample set corresponding to the node is divided into several subsets, and each subset corresponds to a node. For a classification problem or rule learning problem, the generation of a decision tree is a top-down, divide-and-conquer

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process. The model has the advantages of fast speed, high accuracy, simple generation model and other advantages of classification method.

The number of people in the department's public health manpower system describes the size of the system. The model of the department's public health manpower system size is called the fixed-post model of the department's public health manpower system. Because the staff in the department's public health manpower system are in and out, the size of the department's public health manpower system changes with time. Next, we discuss the model of the number of posts in the department's public health manpower system at time t.

At time t, there are n departments, the number of patients in each department is $k_1(\mathrm{t}),\cdots,\mathrm{k}_n(\mathrm{t}),$, and the doctor-patient ratio of the $i(\mathrm{i}=1,\cdots,\mathrm{n})$ department is Ri, then the number of basic medical personnel in the ith department is (public health manpower base):

$$u_i(\mathrm{t})=\mathrm{k_i}(\mathrm{t})\times R_1 \tag{1}$$

In order to better describe the characteristics of each department, that is, different departments have different development potentials and personalities, we define the development potential of the i-th department as $P_i(\mathrm{t})(>0)$ .Under the premise of considering the development potential of the department, the formula (1) can obviously be extended to:

$$u_i(\mathrm{t})=\mathrm{k_i}(\mathrm{t})\times\mathrm{R_i}\times\mathrm{P_i}(\mathrm{t}) \tag{2}$$

At the same time, taking into account the situation of retirement, transfer, etc., by the time t, the estimated number of people lost in the existing public health manpower is counted as $r_i(\mathrm{t})$. Then at time f, the number of public health manpower required by the $(\mathrm{i}=1,\cdots,n)$ -th department is:

$$u_i(\mathrm{t})=\mathrm{k_i}(\mathrm{t})\times\mathrm{p_i}(\mathrm{t})+\mathrm{r_i}(\mathrm{t}) \tag{3}$$

From the formula (3), it can be concluded that at time t, the manpower assignment model of a certain department is:

$$\begin{cases} U(\mathrm{t})=\sum_{i=1}^{n}u_i(\mathrm{t}); \\ u_1(\mathrm{t})=\mathrm{k}_1(\mathrm{t})\times\mathrm{R}_1\times P_1(\mathrm{t})+\mathrm{r}_1(\mathrm{t}); \\ u_2(\mathrm{t})=\mathrm{k}_2(\mathrm{t})\times\mathrm{R}_2\times P_2(\mathrm{t})+\mathrm{r}_2(\mathrm{t}); \\ \cdots\cdots\cdots; \\ u_n(\mathrm{t})=\mathrm{k}_n(\mathrm{t})\times\mathrm{R}_n\times P_n(\mathrm{t})+\mathrm{r}_n(\mathrm{t}). \end{cases} \tag{4}$$

If $w_i=w_i(\mathrm{t})=k_i(\mathrm{t})\times\mathrm{R_i}(\mathrm{i}=1,\cdots,\mathrm{n}),$, then $U(\mathrm{t})$ is expressed in matrix form as:

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$$U(t) = (w_1(t), w_2(t)) \begin{pmatrix} p_1(t) \\ p_2(t) \\ \vdots \\ p_n(t) \end{pmatrix} + (1,1,\cdots,1) \begin{pmatrix} r_1(t) \\ r_2(t) \\ \vdots \\ r_n(t) \end{pmatrix} \tag{5}$$

In actual situations, the development potential pi(t) is often a random variable, and the expected and variance values of fixed-post personnel are:

$$E\left[U(t)\right] = \mu_p(t) = \sum_{i=1}^{n} w_i(t)\,\mathrm{E}\left[p_i(t)\right] + \sum_{i=1}^{n} r_i(t) \tag{6}$$

$$V\left[U(t)\right] = \sigma_p^2 = \sum_{i=1}^{n} w_i^2 V\left[p_i(t)\right] + \sum_{i,j=1 i\neq j}^{n} w_i w_j \operatorname{cov}\left[p_i(t), p_j(t)\right] \tag{7}$$

Due to the needs of actual work, the random variable in the manpower positioning model (A) can only be replaced by its expected value and the maximum value of the number 1. The model (I) is transformed into the following model:

The total number of public health manpower required by the department $U(t)$ and the number of public health manpower required by each department $u_1(t), u_2(t), \cdots, u_n(t)$ are satisfied:

$$\begin{cases} U(t) = \sum_{i=1}^{n} u_i(t); \\ u_1(t) = k_1(t) \times R_1 \times \max\left\{E\left[P_1(t)\right], 1\right\} + r_1(t); \\ u_2(t) = k_2(t) \times R_2 \times \max\left\{E\left[P_2(t)\right], 1\right\} + r_2(t); \\ \cdots\cdots\cdots; \\ u_n(t) = k_n(t) \times R_n \times \max\left\{E\left[P_n(t)\right], 1\right\} + r_n(t). \end{cases} \tag{8}$$

At present, when most public health event teams predict the future talent demand, they often determine the talent demand based on personal subjective experience. In actual work, the demand for talents is often influenced by some major factors, and these factors have a linear relationship with the demand for human resources. Therefore, we can make full use of the multiple linear regression method to predict the human resource requirements of the public health event team.

Multivariate linear analysis is expanded on the basis of univariate linear analysis. It is based on considering the nature of the development and change of the predicted object, and analyzes the correlation form of the dependent variable with the change of an independent variable. Moreover, it uses regression analysis to establish the regression equation of their causal relationship, describe the average change quantity relationship between them, and make predictions or control accordingly.

X1, X2, X3, X4 are the number of professors, associate professors, lecturers, and teaching assistants in the current year, and Y is the public health manpower demand for the following year.

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If it is assumed that there is a linear relationship between the target random variable Y and the four independent variables X1, X2, X3, X4, the linear relationship between the target random variable Y and the independent variables X1, X2, X3, X4 can be expressed as follows:

$$Y = \beta_0 = \beta_2 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \alpha \tag{9}$$

In the above formula, $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ is the parameter and α is the error rate.

The expectations of the least squares method of the one-variable linear equation model is:

$$\sum_{i=1}^{n} e^2 = \sum_{i=1}^{n} (\mathrm{Y} - \widehat{\mathrm{Y}})^2 = \sum_{i=1}^{n} \left[Y^2 - (\mathrm{b} + \mathrm{ax}) \right]^2 \tag{10}$$

From the above formula, a multiple linear expectation model can be derived. It is assumed that the errors of the multiple linear regression model satisfy normality, unbiasedness and independence, and they all conform to the normal distribution.

Generally speaking, the parameter $\beta = (\beta_0, \beta_1, \beta_2, \beta_3, \beta_4)$ of the multiple linear regression model is unknown, and the target parameter Y is known. We can use the "least squares method" principle of the multiple linear regression model to obtain the parameter value $\beta = (\beta_0, \beta_1, \beta_2, \beta_3, \beta_4)$ according to the sample value $(\mathrm{y}_1, \cdots, \mathrm{y}_\mathrm{n})$ of the target Y and the sample value $(\mathrm{x}_{1\mathrm{j}}, \cdots, \mathrm{x}_{\mathrm{nj}})$ of the independent variable $X_j (1 \le \mathrm{j} \le 4)$.

According to the formula of the sample residual sum of squares $\sum (\mathrm{Y_i} - \widehat{Y_i})^2$, we get:

$$Q(\beta_0, \beta_1, \beta_2, \beta_3, \beta_4) = \sum_{i=1}^{n} (\mathrm{y_i} - \beta_0 - \beta_1 \mathrm{x_{i1}} - \cdots - \beta_4 \mathrm{x_{i4}})^2 \tag{11}$$

By using the method of least squares, $Q(\beta_0, \beta_1, \beta_2, \beta_3, \beta_4)$ is minimized.

From $\frac{\partial Q}{\partial \beta_o} = 0$, we get:

$$\sum_{i=1}^{n} (\mathrm{y_i} - \beta_0 - \beta_1 \mathrm{x_{i1}} - \cdots - \beta_4 \mathrm{x_{i4}}) = 0$$

$$\text{That is, } \beta_o = \overline{y} - \beta_1 \overline{x}_{i1} - \cdots - \beta_4 \overline{x}_4 \tag{12}$$

Among them, $\begin{cases} \overline{x}_j = \frac{1}{n} \sum_{i=1}^{n} x_{ij} \\ \overline{y} = \frac{1}{n} \sum_{i=1}^{n} y_i \end{cases}, j = 1, 2, 3, 4$

By substituting formula (12) into formula (11), we get:

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$$\begin{cases} \overline{x}ij = xi_j - x_j; \\ \overline{y}_i = y_i - \overline{y}. \end{cases}$$

Thus, we get:

$$Q = \sum_{i=1}^{n} (\overline{\mathrm{y}}_{\mathrm{i}} - \beta_1 \overline{\mathrm{x}}_{\mathrm{i}1} - \cdots - \beta_s \overline{\mathrm{x}}_{\mathrm{i}4})^2 \tag{13}$$

Thus, we get:

$$\begin{cases} \dfrac{\partial Q}{\partial \beta_1} = 2\sum_{i=1}^{n} (\overline{\mathrm{y}}_{\mathrm{i}} - \beta_1 \overline{\mathrm{x}}_{\mathrm{i}1} - \beta_2 \overline{\mathrm{x}}_{\mathrm{i}2} - \beta_3 \overline{\mathrm{x}}_{\mathrm{i}3} - \beta_4 \overline{\mathrm{x}}_{\mathrm{i}4})(-\overline{\mathrm{x}}_{\mathrm{i}1}) = 0 \\ \vdots \\ \dfrac{\partial Q}{\partial \beta_4} = 2\sum_{i=1}^{n} (\overline{\mathrm{y}}_{\mathrm{i}} - \beta_1 \overline{\mathrm{x}}_{\mathrm{i}1} - \beta_2 \overline{\mathrm{x}}_{\mathrm{i}2} - \beta_3 \overline{\mathrm{x}}_{\mathrm{i}3} - \beta_4 \overline{\mathrm{x}}_{\mathrm{i}4})(-\overline{\mathrm{x}}_{\mathrm{i}4}) = 0 \end{cases} \tag{14}$$

After sorting out, we introduce the mark:

$$\begin{cases} H_{jk} = H_{kj} = \sum_{i=1}^{n} \overline{x}_{ij} \overline{x}_{ik} \\ H_j = \sum_{i=1}^{n} \overline{x}_{ij} \overline{y}_i \end{cases} \tag{15}$$

In the formula, $k, j = 1,2,3,4$.

Thus, formula (14) turns into:

$$\begin{cases} H_{11}\beta_1 + H_{12}\beta_2 + H_{13}\beta_3 + H_{14}\beta_4 = H_1; \\ \vdots \\ H_{41}\beta_1 + H_{42}\beta_2 + H_{43}\beta_3 + H_{44}\beta_4 = H_4 \end{cases} \tag{16}$$

When the observation data is given, H_{jk} is calculated by formula (16). In this way, formula (17) is a 4-element linear equation system with $\beta 1, \beta 2, \beta 3, \beta 4$ as an unknown quantity. When the determinant of matrix $H = (\mathrm{H}_{\mathrm{kj}})_{4\times4}$ is not zero, using advanced algebra knowledge, a unique set of solutions can be obtained from formula (17): $(\beta_1, \beta_2, \beta_3, \beta_4)^{\mathrm{T}}$. When $\beta_J, (\mathrm{j} = 1,2,3,4)$ is substituted into formula (13), β_0 is obtained.

$$\begin{aligned} \widehat{Y} &= E(\mathrm{Y}) = \mathrm{E}(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \alpha) \\ &= \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \end{aligned} \tag{17}$$

Among them, $(\beta 1, \beta 2, \beta 3, \beta 4)$ is the solution of the system of equations, and β_0 is determined by formula (11).

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$$\hat{Y} = E(Y) = E(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \alpha) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \quad (18)$$

We assume that X1 represents the change in the number of professors, X2 represents the change in the number of associate professors, X3 represents the change in the number of lecturers, X4 represents the change in the number of assistants, and Y represents the change in the total number of teachers. A multiple linear regression model was established.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \quad (19)$$

The 21st century is the era of knowledge explosion. The public health event team is a place for training talents, and it is also a place for high-tech talents. How the existing human resources of the public health event team can keep up with the update of knowledge, how to effectively plan the development of existing human resources, improve their own capabilities, rationally use existing faculty and staff, and how to effectively evaluate the existing public health manpower is a relatively important issue. Therefore, it is necessary to establish an effective evaluation model of the existing human resources of the public health event team, and use scientific methods to conduct fair and just evaluation of the existing public health human resources. We use the AHP method (Analytic Hierarchy Process) to establish a public health manpower assessment model for the public health event team. The model system structure is as follows.

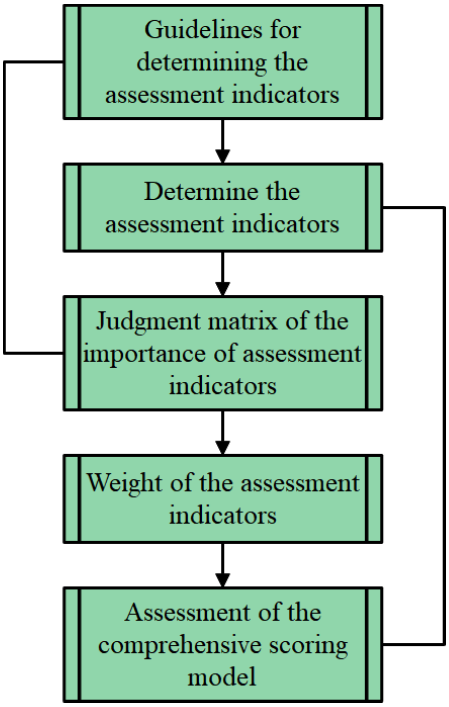

Figure 2: The System Structure of the Public Health Manpower Assessment Model of The Public Health Event Team.

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It is necessary to effectively evaluate the existing human resources of the public health event team, based on the specific individual's special circumstances and the expected development goals. At the same time, it is necessary to train existing manpower and further education to create a good atmosphere, truly optimize the allocation of input resources, save the cost of talent use, and improve the efficiency of talent use. According to the special circumstances of the public health event team, the existing public health manpower assessment indicators can be determined by the following three criteria:

1 Personal positioning and development compatibility: For an individual, whether the target value positioning and value body reflect whether they meet the individual's expected development requirements is the key to determining whether the talent is truly used.

2 Target job matching: At the same time, it is necessary to consider matching with the individual's target needs to provide specific development space for existing talents.

Personal ability matching: Due to the particularity of talents, this requires the public health event team to pay attention to the special circumstances and needs of talents in the process of talent training and use.

From the above three criteria, we can get the following nine evaluation indicators for public health manpower evaluation indicators: development potential (x1), medical ability (x2), scientific research ability (x3), academic level (x4), professional title (x5), working experience (x6), age (x7), logical thinking ability (x8), medical ethics (x9).

The above nine evaluation indicators can be obtained through questionnaire surveys and historical statistical data. Since the above-mentioned indicators have different degrees of importance in the contribution of public health manpower, the comprehensive evaluation of the existing public health manpower is the weighted average of the above nine evaluation indicators x, namely:

$$X = \delta_1 x_1 + \delta_2 x_2 + \cdots + \delta_9 x_9 \tag{20}$$

The weight $\delta i (1 \leq \mathrm{i} \leq 9)$ of each evaluation index is determined by the AHP method (Analytic Hierarchy Process).

4 PREDICTIVE RESEARCH ON THE FAIRNESS OF HUMAN RESOURCE ALLOCATION IN PUBLIC HEALTH EVENTS BASED ON INTERNET OF THINGS TECHNOLOGY

The use of Agent technology can effectively solve the problems of "things" access and "people" positioning. These two problems are the most basic of the problems raised in the previous section. Their solutions can bring corresponding solutions to the remaining problems, which will be introduced in detail later. The IoT model using Agent technology is shown in Figure 3. The structure of the service platform is shown in Figure 4.

The infrastructure layer includes the most basic service facilities such as web servers, file servers, and database servers. On top of this, there are encapsulated functional modules, such as user authentication, data encryption and decryption, search, monitoring, backup modules, and communication modules for SMS communication with mobile readers. The data related to communication with the reader is processed and transmitted through the Internet of Things middleware.

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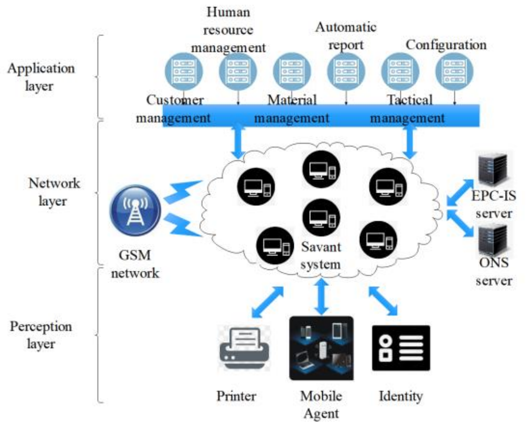

Figure 3: The Structure Diagram of the Internet of Things Model.

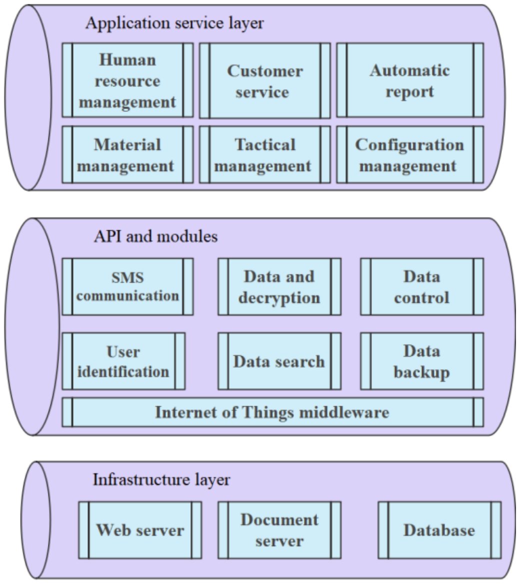

Figure 4: Service Platform Structure.

Figure 5 shows the mobile terminal structure design. The top level is the short message interface module. This part is mainly responsible for the communication with the management terminal program through short messages. The mobile terminal software works in two modes: Pull mode and Push mode. In Pull mode, the reader receives commands from the management center to perform corresponding operations and transmits the results back to the management center. In Push mode, the engineer manually reads the RFID tag data and pushes it to the management center. The human-computer interaction interface has two main functions. One is to display the read equipment information and equipment maintenance information on the LCD screen. The second is to provide a friendly operation interface so that the engineer can edit the record information of the maintenance operation and write it into the label on the device after completing the maintenance operation on

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the device. At the bottom layer is the reader interface module. The interface module separates the upper application module from the specific RFID chip hardware details and focuses on logic design.

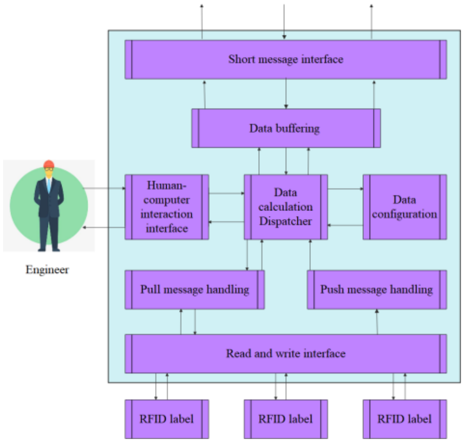

Figure 5: Structure Diagram of a Mobile Terminal.

According to the human resource allocation requirements of public health events, the planning of human resources is mainly to analyze the personnel structure of the unit, and to sort out the relationship between job requirements and personnel capabilities in detail. Personnel ability includes a variety of elements, and the weighted summation of these elements is used to judge the quality score of personnel. The traditional human resource scoring process of public health events is shown in Figure 6.

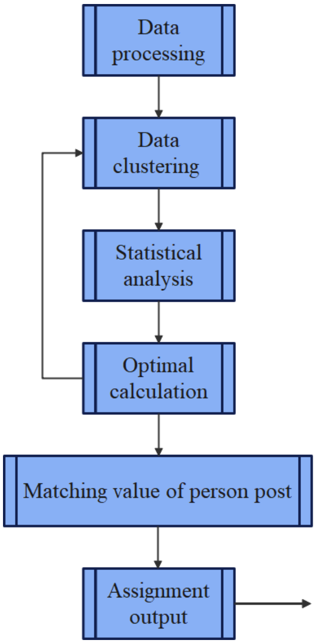

Figure 6: Human Resources Scoring Process.

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In this paper, the basic neural network is improved, and the hybrid recurrent neural network model is used. Moreover, this paper uses the combination of global model and local model to output the data characteristics of the model after hierarchical operation as the network output, and then realize the data processing. Then, this paper uses a hierarchical model structure to build the network, and then realizes the recommendation of person-post matching. The hybrid recurrent network model is shown in Figure 7.

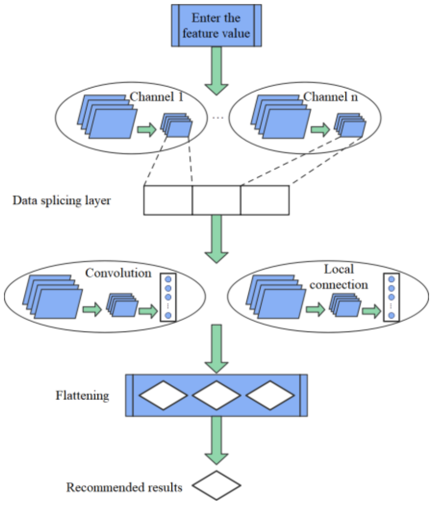

Figure 7: Hybrid Recurrent Network Model.

In this paper, recurrent convolutional neural network and traditional human resource allocation algorithm are combined to design a person-post matching recommendation algorithm suitable for human resources field. This algorithm not only improves the problem of low data training quality of traditional algorithms, but also effectively improves the efficiency of data calculation through the use of recurrent neural networks. The core idea of the algorithm is to first extract the original features in the data. The original features are consistent with those required by traditional human resources, including the staff evaluation matrix and the staff ability matrix. The data enters the encoder for encoding, and then the encoding features are input to the data input layer of the recurrent neural network as data input items. After that, it uses the cyclic convolutional layer to process the data, and then obtains the result of person-post matching. The algorithm flow is shown in Figure 8.

This paper verifies the model in this paper, and obtains the simulation results shown in Figure 9 below. Moreover, this paper conducts a total of 100 sets of simulations to analyze and predict the fairness of human resource allocation in the final public health event. After verifying the method proposed in this paper through simulation, this paper evaluates the effectiveness of the system proposed in this paper through manual evaluation by multiple experts, and the results shown in Table 1 are obtained.

5 CONCLUSION

How to do a good job in nursing organization and management under emergency conditions after public emergencies, scientifically and rationally use the nursing human resource reserve, and

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dispatch nursing manpower to meet the needs of epidemic treatment are the key issues faced by nursing managers in medical institutions.

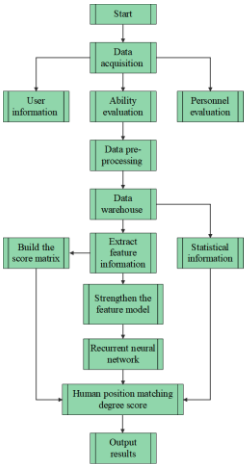

Figure 8: The Implementation Process of the Predictive Model for the Fairness of Human Resource Allocation in Public Health Events Based on the Internet of Things Technology.

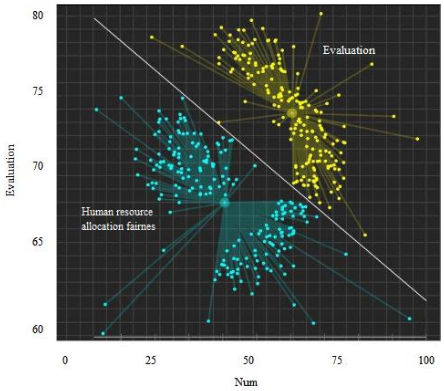

Figure 9: Analysis and Prediction of the Fairness of Human Resource Allocation in Public Health Events.

Num	*Expert evaluation*	*Num*	*Expert evaluation*	*Num*	*Expert evaluation*
1	*82.56*	*31*	*67.23*	*61*	*66.95*
2	*70.87*	*32*	*71.52*	*62*	*68.11*
3	*67.27*	*33*	*74.95*	*63*	*83.88*
4	*68.58*	*34*	*72.57*	*64*	*73.46*

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5	69.82	35	82.17	65	66.10
6	77.00	36	73.72	66	67.29
7	83.91	37	69.24	67	77.63
8	72.61	38	69.93	68	82.49
9	66.60	39	80.06	69	80.44
10	82.10	40	85.96	70	84.40
11	67.52	41	75.11	71	77.63
12	80.02	42	68.94	72	80.62
13	65.64	43	70.64	73	67.00
14	71.62	44	83.74	74	71.15
15	71.41	45	67.89	75	72.48
16	76.65	46	65.59	76	71.64
17	68.12	47	82.50	77	68.70
18	69.00	48	70.65	78	67.66
19	77.43	49	70.39	79	75.60
20	75.68	50	74.07	80	67.81
21	80.19	51	72.29	81	83.02
22	66.37	52	81.96	82	84.58
23	67.01	53	75.93	83	65.73
24	69.16	54	82.77	84	72.96
25	80.16	55	72.04	85	72.80
26	69.30	56	84.96	86	77.61
27	85.86	57	79.65	87	80.11
28	71.47	58	74.70	88	67.71

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29	*66.18*	*59*	*66.14*	*89*	*70.48*
30	*67.85*	*60*	*74.40*	*90*	*70.14*

Table 1: Statistical Table of Expert Evaluation Results.

From the above research, we can see that the predictive model for the fairness of human resource allocation in public health events based on the Internet of Things technology proposed in this paper has good results.

This article combines the Internet of Things technology to carry out the research on the fairness of human resource allocation in public health events, promotes the response effect of follow-up public health events, and enhances the emergency response ability of the society in response to public health events. Moreover, this paper combines the recurrent convolutional neural network and the traditional human resource allocation algorithm to design a human-post matching recommendation algorithm suitable for the human resources field. After obtaining the intelligent analysis system, this paper verifies the model in this paper with simulation test and expert evaluation. From the experimental research, we can see that the predictive model for the fairness of human resource allocation in public health events based on the Internet of Things technology proposed in this paper has good results.

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