Artificial Intelligence Innovation Service Platform Based on Reverse Thinking

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Abstract: With the continuous development of Artificial Intelligence technology, the reception and processing of massive data have higher requirements on the computing platform and information processing platform, which forces the service platform to increase interaction, user-orientation, and visualization. In order to realize service system innovation, this paper proposes a method of constructing artificial intelligence service platform based on reverse thinking, trying to provide support for improving the intelligence level of service platform.

1. Introduction

Reverse thinking is a way of thinking different from conventional thinking, logical thinking or group thinking, which is one of the important forms of creative thinking; it is an anti-formal, anti-traditional, and anti-positive thinking method, which starts from the result reversely back to the reason; this way of thinking can make people jump out of the mindset of the box and gain the design results of innovation[1]. Since human beings enter the information society, with the rapid development of information technology, the amount of data produced by human society grows; how to turn the complicated data into the knowledge which people easy to accept and understand, is the challenges faced by the human society in the further development process; under this background, the artificial intelligence is causing a chain reaction of scientific breakthroughs, leading a new round of technological revolution and industrial revolution and playing a huge role in practical application. Therefore, this paper tries to use reverse thinking to build an artificial intelligence service platform and to innovate the effective application of big data technology, which not only realize the efficient integration of information, but also transfer information to customers timely, so as to ensure better service for customers.

2. Intelligent application scheme

(1) Arrangement of intelligent business. The basis of intelligent business is to support the corresponding problem relationship, providing a variety of equivalent questions and answers to a problem to solve the simplest problem[2]. Intelligent technology can replace the mechanical human services in the business hall of all walks of life; this is the main entry point of intelligent business hall. Although the existing services use a large number of machinery products, the services will also produce the problem such as consulting, transaction authorization, and authentication, but the combination of intelligent technology with the demand together, can bring revolutionary changes to the scene of this business hall, producing the scene of intelligence business hall with the window service as the core.

(2) Semantic management and control. The context in the communication process of the intelligent system is of practical significance to the solution of the problem, and the intelligent interaction with the same customer should be kept in the same conversation with the contact history. Therefore, when the user asks questions for the same content for many times or the question interval is less than 2 seconds, the intelligent engine will guide the user to ask effective questions according to the strategy of situation. At the same time, in order to avoid malicious attacks on the

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network, conversation log will be recorded according to the user's communication. The introduction of intelligent systems based on the information makes the customer's service experience more natural.

(3) Knowledge superposition and semantic learning. Based on knowledge superposition, phonetic active learning will generate multiple business scenarios to serve online robots, smart business halls and other businesses.

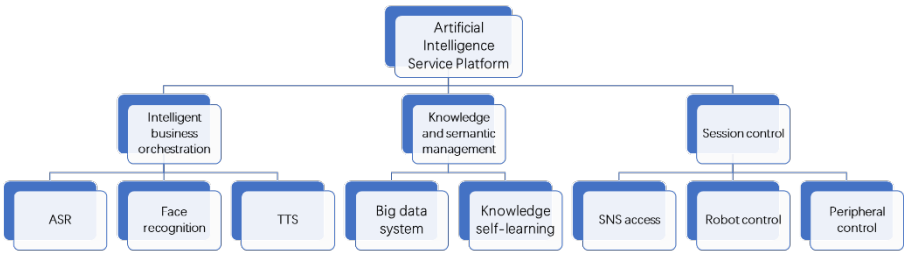

Figure 1 Intelligent application scheme

3. Build the model

By using intelligence analysis of data information, we can realize the effective query of related historical telephone traffic data information, so as to provide more high-quality intelligent services for the development of related business activities. In order to realize the intelligent application scheme, we need to use the big data technology to compare the information among the systems and find out the rules, so as to provide reliable data sources for the improvement and optimization of relevant measures. For example: each system in different periods will have different user consultation, and these periods can be taken as the main reference basis to realize the assessment of the operation performance and risk implementation of all the systems; if the risk value of a system is too big in a certain period, more artificial customer service personnel should be equipped, so it can realize the reasonable allocation of human resources, to ensure the use of human resources advantage into full play and to promote the constant innovation and optimization of enterprise management mode. In addition, through the construction of system models, we can also understand the normal indicators of different systems, which is very necessary to effectively understand the operating efficiency of the system. Through the analysis of the model, the number of users in a certain period of time can be analyzed, and the operating reliability of the system can be tested. In this way, the operation of the system can be judged whether it is convenient and humanized, so as to ensure the full performance of the system.

The application of big data technology not only improves the functions of the artificial intelligence service system, but also provides the system with new computer capabilities and a large amount of data [3]. With the continuous update and improvement of the basic theory of artificial intelligence, it also provides more abundant models and algorithms for the efficient application of big data technology, which improves the operation quality of the whole artificial intelligence customer service system. By using traditional tools and distributed data acquisition components, data information from various businesses can be extracted into the big data platform, so that the big data platform can carry out the corresponding functions of storing, processing and calculating big data information, effectively meeting the functional requirements of artificial intelligence customer service. In addition, through data pre-processing and data modeling, the intelligent customer service system can also realize intelligent analysis of online intelligent customer service and business, and effectively improve the content and algorithm of the entire data model.

4. Algorithm optimization

(1) Define the constraint conditions. The essence of service platform innovation is an objective optimization issue under certain constraints, so it is necessary to specify the objective function and

constraint conditions at the time of constructing the model. This paper adopts reverse thinking to design the system; therefore, as to the subsystem itself, the subsystem's own constraints such as importance, complexity, working time, working environment, cost, technology level and other aspects of the data are taken as constraints.

(2) Function approximation. The sample of training data can be expressed as (xi,yi) ， xi∈Rn，yi∈R. Where: yi is the output vector, xi is the input vector, and the optimization problem approximated by the function of structural risk minimization principle is

$$\min_{\omega,b,e} j(\omega,e) = \frac{1}{2}\omega^T\omega + \gamma\frac{1}{2}\sum_{i=1}^{l} e_i^2$$

Where: ω is the weight vector; γ is the regularization parameter; ei is the error vector; b is the offset.

Since under any constraint, all the optimization problems must satisfy the KKT conditions; $\frac{\delta L}{\delta\omega}=0, \frac{\delta L}{\delta b}=0, \frac{\delta L}{\delta e_i}=0, \frac{\delta L}{\delta\alpha_i}=0$ can be obtained. Cross out ω and e, we obtain $\begin{bmatrix} 0 & I^T \\ I & ZZ^T+\gamma^{-1}E \end{bmatrix}\begin{bmatrix} b \\ \alpha \end{bmatrix} = \begin{bmatrix} 0 \\ y \end{bmatrix}$.

Among which: y=[y1, y2,…,yl]T， I=[l,…,1]T， $\alpha = [\alpha_1, \alpha_2, \ldots, \alpha_l]^T$， E is the unit matrix of l×l , Z =［φ(x1),φ(x2),…,φ(xl)］T; kernel function matrix is Ω = ZZT; then Ωkl = K(xk,xl) = φ(xk) Tφ(xl) ; kernel function K(xk, xl) is a symmetric function satisfying Mercer condition. The predictive function is

$y(x)=\sum_{i=1}^{l} \alpha_i K(x, xi)+b$。

(3) Method design. It is necessary to determine the input and output vectors of the model; as the basic idea of this paper is to determine the weight of the subsystem in the reliability distribution through the variation degree of system reliability caused by the change of constraint conditions of each subsystem on the basis of reliability prediction. Set the input vector as: the system reliability and all self-constraint conditions of each subsystem, then the output vector is the ratio of the reliability of each subsystem. The constraints of the corresponding subsystems must be consistent. As the data units collected are not consistent, normalization processing is required before data input, while inverse normalization processing is required after data output.

(4) Improve the accuracy. The reliability prediction results are fuzzy treated, and the triangular fuzzy numbers is $p(k)=(l_{ij}^{(k)}, m_{ij}^{(k)}, u_{ij}^{(k)})$, $l_{ij}^{(k)}=m_{ij}^{(k)}-0.1\lambda$, $u_{ij}^{(k)}=m_{ij}^{(k)}+0.1\lambda$.

Where: λ is the ambiguity level, the specific steps are as follows:

1) Conduct preliminary processing of the collected data, such as normalization processing;

2) Initialization of genetic algorithm, population size M=100, termination of evolutionary algebra T=500; set the initial value of regularization parameter γ and kernel function width σ as (1,0.01), and the adaptive parameter is k1 = k2 = 0.5， k3= k4=0.02.

3) Establish the LS-SVM model based on the normalized training data, and optimize the parameters of the LS-SVM model with the genetic algorithm according to the operation parameters. To determine whether the termination condition is satisfied; if not, use crossover and mutation to produce new individuals, and then re-encode the generated initial population. Otherwise terminate to get the optimal solution of the parameter.

4) Establish the distribution model according to the optimized parameters, calculate the samples to be distributed, and get the predicted results by de-normalization.

5) Fuzzy processing is carried out on the predicted results. The fuzzy grade λ = 1 is taken, and the predicted results are converted into triangular fuzzy numbers; from

$ui=(\sum_{j=1}^{n} l_{ij}, \sum_{j=1}^{n} m_{ij}, \sum_{j=1}^{n} u_{ij}) \otimes \sum_{i=1}^{n}\sum_{j=1}^{n} l_{ij}, \sum_{i=1}^{n}\sum_{j=1}^{n} m_{ij}, \sum_{i=1}^{n}\sum_{j=1}^{n} u_{ij}, \approx$

$\frac{\sum_{j=1}^{n} l_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{n} u_{ij}}, \frac{\sum_{j=1}^{n} m_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{n} m_{ij}}, \frac{\sum_{j=1}^{n} u_{ij}}{\sum_{i=1}^{n}\sum_{j=1}^{n} u_{ij}}$, fuzzy predicted value ui can be got; take optimistic, pessimistic coefficient η = 0.5, and the expected values of ui is I(ui) = (li + 2mi + ui) /4.

6) From expected I(ui) of the fuzzy predicted value, the subsystem weight $\omega i = I(ui) / \sum_{j=1}^{n} u_i$ can be obtained.

7) The reliability of each subsystem can be calculated according to the reliability distribution formula and the weight obtained. If it meets the requirement, it will be terminated, otherwise it will be recalculated.

5. Conclusions

Continuous upgrading and optimizing the artificial intelligence service platform plays a crucial role in effectively relieving the pressure of artificial customer service, providing users with more high-quality services and promoting intelligent development. Therefore, we use reverse thinking to build artificial intelligence service platform; firstly design artificial intelligence platform based on big data design scheme, and construct analysis model; then, optimize algorithm for implementing effective integration between big data technology and artificial intelligence service system, to ensure the full play of the big data technology application performance and to improve the service level of the enterprise intelligence, in order to improve the management level and promote long-term stable development of artificial intelligence.

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