Intelligent Integration Method of Innovation and Entrepreneurship Education Management Information Based on ANNS

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Abstract. Because the current information integration method for innovation and entrepreneurship education management cannot analyze different query service contents with the same semantic input and output, it is vulnerable to abnormal information and takes a long time to integrate information. Aiming at the problem, an intelligent integration method of innovation and entrepreneurship education management information based on ANNs is proposed. Based on ANNs, the intelligent integrated index function indicator is set in the search pre order/post order service; Dynamically generate the service chain and build a hierarchical index to provide marks for the implementation of information intelligent integration based on ANNs; The pattern matching algorithm is used to retrieve the matching preamble and follow-up services, analyze the semantically heterogeneous multi data sources, and determine the best integration location; The information intelligent integration structure based on ANNs solves the semantic heterogeneity between multiple data sources; Design the intelligent integration framework of innovation and entrepreneurship education management information, and complete the intelligent integration of information. The experimental results show that the maximum expansion coefficient of this method is 0.98 and the minimum information integration time is 0.98 × 10-3 s, with good information intelligent integration effect.

Keywords: ANNS · Innovation and entrepreneurship education · Management information · Intelligent integration

1 Introduction

Innovation and entrepreneurship education aims to cultivate talents with basic entrepreneurial quality and pioneering personality. Innovation and entrepreneurship education not only cultivates students' entrepreneurial consciousness, innovative spirit and innovative entrepreneurial ability, but also carries out the education of innovative thinking training and entrepreneurial ability training in stages and layers for the entrepreneurial groups of the whole society. In recent years, colleges and universities have vigorously

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strengthened the information construction of innovation and entrepreneurship education management, successively developed some information management systems, carried out corresponding basic information research at the same time, and achieved some results. However, due to the heterogeneity of the establishment time, design mode, application level, data structure and system characteristics of each information management system, the data types and data access modes of each system are quite different, so it is impossible to exchange and share data, forming an information island and not exerting the overall benefits of the information system, This has become a problem to be solved in the process of information construction of educational management in Colleges and universities.

In order to improve the utilization of spatial information service resources, it has become the research trend of information intelligent integration to quickly combine multiple services into a service chain to meet the needs of complex applications. By analyzing the characteristics of existing information systems and combined with existing data integration and exchange technologies, literature [1] puts forward an information data integration scheme. It focuses on the data processing in the process of data integration and exchange, integrates the existing heterogeneous information systems, and eliminates information obstacles, so as to realize the intelligent integration of information. However, this method has the disadvantage that information integration is controlled by business process, and the effect of information integration is poor; By analyzing the requirements of information integration, document [2] proposed a data center achievement cataloging and integration method based on metadata and cataloging mode. The information directory service is developed to complete the integration of heterogeneous information. However, this method needs to complete the mapping between directory coding and information, and the integration efficiency is not high.

Therefore, an intelligent integration method of innovation and entrepreneurship education management information based on ANNs is proposed. Set intelligent integrated index function, dynamically generate service chain and build hierarchical index; The pattern matching algorithm is used to analyze the semantic heterogeneity of multiple data sources and determine the best integration location; Design intelligent integration framework to complete information intelligent integration.

2 Information Intelligent Integration Index Construction Based on ANNS

The basic idea of information intelligence integration index construction based on ANNS is shown in Fig. 1.

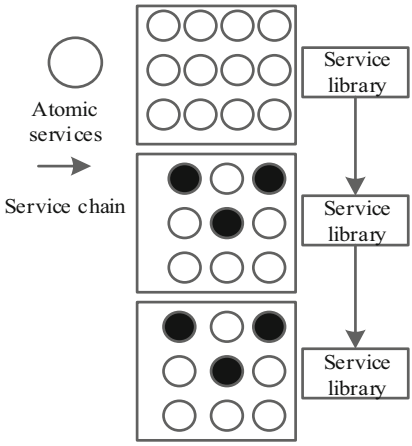

Fig. 1. Information intelligent integration algorithm based on ANNS

As can be seen from Fig. 1, the ANNS-based information intelligence integration algorithm resolves the user semantic description request through a natural language processing software package developed by the company based on the specific user needs, and the user request and the required service mapping part analyzes the UIS semantic corresponding table according to the user request text description.In order to obtain the innovation and entrepreneurship education management information, the abnormal information needs to be screened out, so the hierarchical index [3] should be built.

2.1 The Intelligent Integration Index Function Indicates the Service Order

According to the basic structure of information intelligent integration index based on ANNs, the service order is marked by intelligent integration index function. The neural network algorithm is the learning method of forward step-by-step algorithm. The basic structure of the information intelligence integration index of the neural network is that it can adaptively generate the service order and reduce the order error as the exponential rate decreases. The weight of the initialization sample is 1/n. Training service order classifier based on samples and weights; Judge the service order of the sample according to the classifier. If the judgment is correct, the weight of the sample will be reduced. If the judgment is wrong, the weight of the sample will be reduced. At the same time, the weight of the classifier will be calculated according to the recognition rate; The next classifier is trained by the samples whose weights are changed; Circularly get n classifiers and their corresponding weights; The final service order is calibrated based on weighted classifier combination. When searching pre order / post order services, especially when there are multiple core services, the search process is parallel and disordered. In order to execute the discovered service chain orderly in serial or parallel, the intelligent integration index function is used to mark the relevant order of each service. $I =< \alpha, \beta, \chi >$ is composed of three parts: α represents the order of core service, assigned from 1 to n; β represents the forward / back order service of the core service, at 0, the core service, at the value of

1, and at 2, the back order service; χ represents ote the first service [4] starting on the core service.

The discovery rules for forward / backward services are related to the number of core services, using rule one.The initial condition of the interface matching algorithm is the data source, the termination condition is the semantic description of the user demand results, and the semantic search intermediate service [5]. The value of β in $I =< \alpha, \beta, \chi >$ is 0, 1, 2; Use Rule 2, when there are multiple core services.The initial condition for the interface matching algorithm for the first core service is the data source, and the termination condition is the input for the next core service. The value of β in $I =< \alpha, \beta, \chi >$ is 0, 1, 2; The initial condition of the last core service is the output of this core service, and the termination condition is a semantic description of the results of the user requirements. The value of β in $I =< \alpha, \beta, \chi >$ is 0, 2; Constantly find matches, dynamically generate an application-oriented service chain, to provide labels for the execution of the service chain.Build a hierarchical index based on the order of services indicated in the above steps [6].

2.2 Build a Hierarchical Index

To shorten the hierarchical index construction time, the sampling interval was divided into n subtime periods $t_1, t_2, \cdots t_m$, and the dynamic statistical rules were applied to all subtime periods to obtain n statistical results, thus forming the time-domain change relationship of the flow[7]. For the division of subtime periods, it should be as follows: when $t_1 = t_2 = \cdots = t_m$, the statistical results of each subtime period are consistent; when $t_1' = t_2'$, the division results can be quickly obtained, thus shortening the index classification time and achieving the purpose [8] of quickly building the hierarchical index.

The hierarchical index module searches a large number of question banks for innovation and entrepreneurship education management information, and its operation steps are as follows:

Step 1: retrieve index related information by establishing intelligent integrated index function;
Step 2: analyze the data fed back by the user interface, determine the retrieval conditions and transfer the retrieval task;
Step 3: use the elastic search distributed connector to obtain the service link, and use the index library to index again [9];
Step 4: when building a large number of intelligent integrated index function indicators, the name of each column must have an index. Using index names for retrieval can effectively improve the efficiency of retrieval.

Based on this, an inverted index structure is constructed, as shown in Fig. 2.

As can be seen from Fig. 2, inexed at each level of data in the table are marked as different function column names. When querying the information for a period of time, the key information of the index at each level can be determined by the hierarchical index according to the intelligent integration index function labeling.

1，0	1, 1	1, 2	1, 3	…	1, n
2，0	2, 1	2, 2	2, 3	…	2, n
3，0	3, 1	3, 2	3, 3	…	3, n
…					
n，0	n, 1	n, 2	n, 3	…	n, n

Fig. 2. Inverted index structure

When querying the information for a certain period of time, the key information for the index at each level can be determined by the hierarchical index according to the intelligent integration index function marker.

3 Intelligent Integration of Innovation and Entrepreneurship Education and Management Information Based on ANNS

According to the index structure constructed above, the mode matching algorithm is used to expand the semantic description as filter conditions; to retrieve the matching preface and subsequent services; to determine the best integration location of individual information; and to index the intelligent integration index function to generate the innovation and entrepreneurship education management information service chain, to build an information intelligent integration framework and complete the intelligent integration of innovation and entrepreneurship education management.

3.1 Mode-matching Algorithm

Pattern matching is a basic operation of string in data structure. Given a substring, it is required to find all substrings that are the same as the substring in a string, which is pattern matching. This paper uses pattern matching algorithm and particle swarm optimization algorithm to match the preamble and follow-up services to match the global optimal location.

Suppose you want to find the position of the substring t = "Google" from the main string s = "goodgoogle", you need the following steps:

Step 1: starting from the first bit of the main string s, the first three characters of S and T are successfully matched, and the fourth character does not match (the vertical line indicates equality, and the lightning bend indicates inequality);
Step 2: starting from the second bit of the main string s, the matching fails;
Step 3: starting from the third bit of the main string s, the matching fails;
Step 4: starting from the 4th bit of the main string s, the matching fails;
Step 5: starting from the 5th bit of the main string s, all 6 characters of S and T are matched successfully;

Start each character of the main string with a substring to match the matching string. Make a large loop on the main string, and make a small loop of T length at the beginning of each character until the matching is successful or all traversals are completed.

According to the above steps, the individual position can be obtained by using particle algorithm, set 0 as the minimum initial value of pheromone, and different particles can follow the change of current population to reach the maximum value of optimal integrated pheromone 1.

Matching the global optimal position according to this pheromone, assuming that the maximum number of iterations of the optimal information integration is $\lambda_{\max}$, and the current number of iterations is λ_c, obtaining the optimal position inertia weight of the whole population is:

$$\omega = \frac{(\omega_s - \omega_e)\lambda_c}{\lambda_{\max}} \tag{1}$$

In formula (1): ω_s is the weight of the maximum iteration of information integration; ω_e is the current iteration.

The pattern matching method can obtain the individual particle n at the integration position, and the initial shape variable of the position at time t + 1 is:

$$\eta_{\mathrm{i}}(t+1) = \eta_{\mathrm{i}}(t) + \mathrm{v}_i(t+1) \tag{2}$$

In formula (2): v_i is the speed of the particle n at time t + 1.

This completes the information integration location calibration, and analyzes the semantic heterogeneity problems between multiple data sources to determine the optimal integration location.

4 Intelligent Integration of Innovation and Entrepreneurship Education and Management Information

The ANNS-based innovation and entrepreneurship education management information intelligent integration system provides users with unified access methods by extracting information and integrating structured, semi-structured and unstructured information resources, and solves the semantic heterogeneity existing between multiple data sources.The system is mainly integrated structured information and the overall structure is shown in Fig. 3.

As can be seen from Fig. 3, the system is divided into three roles from visitors: domain administrator, local administrator and general user. The domain administrator has full responsibility for the maintenance of the system, including service release maintenance and ontology library maintenance. The main function of service publishing maintenance is to locate and publish services, define web services as a collection of endpoints, and receive and process document information or process information; Ontology library maintenance includes the updating of domain ontology, the updating of local ontology and the establishment of mapping relationship between domain ontology and local ontology. In the process of ontology maintenance, domain administrators cooperate with experienced domain knowledge experts to continuously obtain the latest

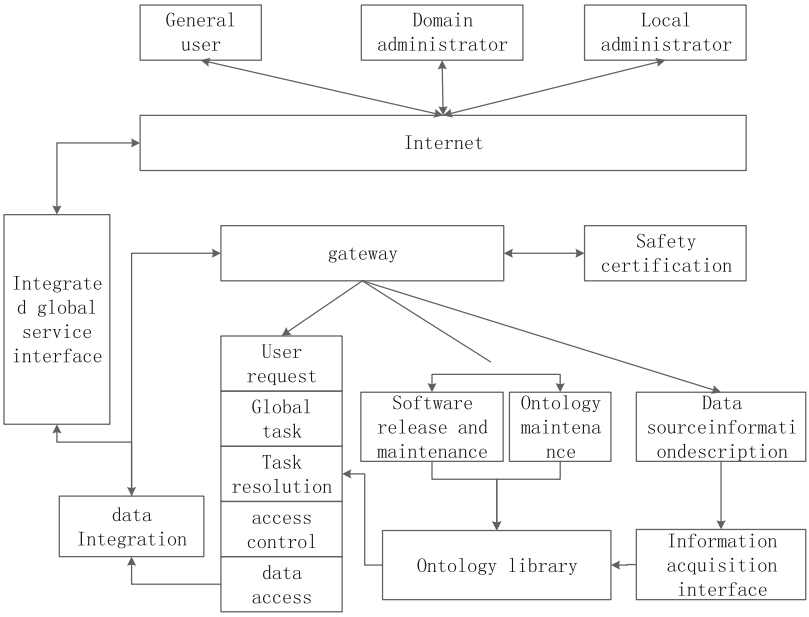

Fig. 3. Intelligent integration framework of information on innovation and entrepreneurship education and management

and most accurate concepts in the field, that is, maintain the global ontology through professional mode and increase the self-learning ability of ontology.

The local administrator is mainly responsible for the description and packaging of the service and the description of the local data source information. The service description and packaging is to submit the service port, access user name, access password, service address and other information of the local data source in the form of XML document to ensure that the service can be called normally; The description of local data source information mainly describes the structure information in the data source to generate the local ontology file corresponding to the data source.

The intelligent integration process of innovation and entrepreneurship education management information based on ANNs is as follows:

Step 1: when the user makes a request, it is authenticated to provide corresponding user access rights and functions;
Step 2: if the role of authentication is local administrator, go to step 3. If the role of authentication is domain administrator, step 4. Assuming that the role of verification is a general user, provide the page of user requirements description, and go to step 5;
Step 3: call the local administrator's access interface. The functions provided mainly include service description, service packaging, data source structure information description and viewing global ontology files. According to the operation of the local administrator, obtain the corresponding local data source information and store it in UDDI and WSDL libraries;

Step 4: call the domain administrator's access interface. The functions provided mainly include viewing feedback opinions and services: Publishing maintenance, ontology library maintenance and user management. Carry out corresponding operations according to the domain administrator's selection;
Step 5: call the general user's access interface. If the user or interface accesses a single service, call the service directly; If the user or interface needs to view all the data, the global task is automatically generated according to the user requirements and the global ontology description;
Step 6: obtain the attributes and types in the global task by parsing the global task. For example, suppose that the generated global query task (for ease of understanding, it is described in SQL server language. In the implementation of this system, rdql query language is actually used).
Step 7: access the ontology library, WSDL and UDDI to obtain the global attribute, the local attribute corresponding to the class, the local class and its data source service address;
Step 8: automatically generate the query task of each data source according to the existing data source, the attributes and classes corresponding to the data source;
Step 9: access control, that is, control the query task of local data source, generate access sequence and handle exceptions;
Step 10: data access, execute the local query command, extract data from the service described by the corresponding local data source, and handle exceptions;
Step 11: result processing: preprocess the data inconsistency in the data. In this process, assuming that the accessed user is people-centered, the processed data results are encapsulated and presented to the user through the task return interface; Assuming that the accessed user is an agent type interface, the API for data integration is returned.

5 Experiment

5.1 Experimental Data Source

In order to verify the rationality of the intelligent integration method of innovation and entrepreneurship education management information based on ANNs, information retrieval was carried out with the theme of "entrepreneurship education evaluation" on China knowledge network. A total of 1976 documents were retrieved (as of December 17, 2017), and the overall length and quantity showed an upward trend (see Table 1). Among them, there are 20 CSSCI journals and 49 core journals, including 1 doctoral thesis, 23 master's papers and 5 conference papers with the keyword "entrepreneurship education evaluation".

Table 1. Number of annual literature retrieved on the topic of "Entrepreneurship education evaluation"

Years limit/year	Published amount/piece
2000	20
2002	50
2005	110
2007	150
2008	200
2010	230
2013	250
2015	300
2017	340

Combined with Table 1, build innovation and entrepreneurship education management information and establish quadrant, as shown in Fig. 4.

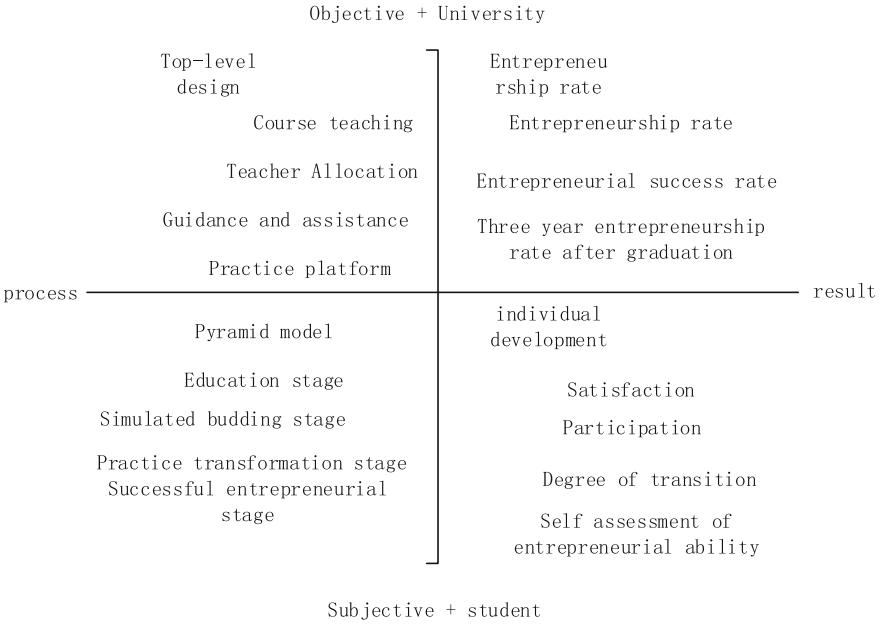

Fig. 4. Quadrant diagram

It can be seen from Fig. 4 that for the evaluation of innovation and entrepreneurship education in Colleges and universities, the contents of organization and management, curriculum and time arrangement of the school are mostly presented in the form of data

text, which are objective indicators. However, in the evaluation, we should also pay attention to the presentation of entrepreneurship, entrepreneurial intention and entrepreneurial status at the main level, Obtain information about the school's goal setting and the acceptance of student groups.

5.2 Analysis of Information Retrieval Indicators

For innovation and entrepreneurship education management information, the more index information, the larger the ratio of the size of the constructed index information to the size of all information, that is, the larger the expansion coefficient, indicating that the faster the retrieval speed.

The index expansion coefficient formula can be expressed as:

$$\xi = \frac{I}{J} \tag{3}$$

In formula (3), I indicates the index data size; J indicates the full data size.

Based on this index, the ANNS-based integration method of literature [1] method, literature [2] method and this paper method are used, respectively, and the comparison results are shown in Fig. 5. In the experiment, the experimental environment of the three methods was consistent.

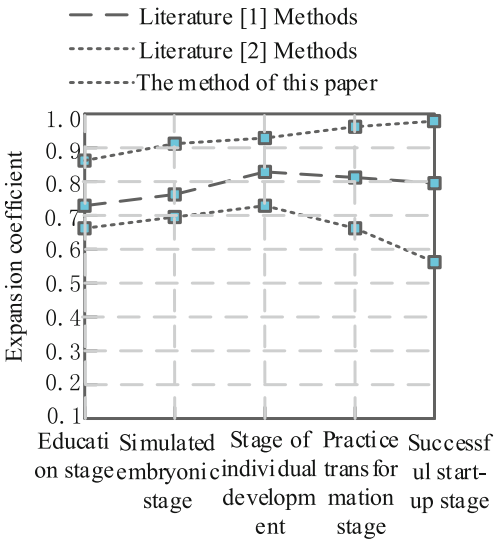

Fig. 5. The retrieval speed comparison of the three methods

As can be seen from Fig. 5, using the information integration method based on network service composition modeling, the expansion coefficient in the individual development stage is the largest, which can reach 0.81, and the expansion coefficient in the education stage is the smallest, which is 0.75; Using the information integration method

based on real-time task solving, the expansion coefficient in the individual development stage is the largest, which can reach 0.71, and the expansion coefficient in the education stage is the smallest, which is 0.66; Using the integration method based on ANNs, the expansion coefficient in the practical transformation stage is the largest, which can reach 0.98, and the expansion coefficient in the education stage is the smallest, with a minimum value of 0.87, which has a rapid retrieval effect.

5.3 Analysis of Information Integration Time Index

Taking course teaching, collective entrepreneurship and individual development as indicators, the information integration method based on network service composition modeling, the information integration method based on real-time task solving and the integration method based on ANNs are used to compare and analyze the course teaching information integration time. The comparison results are shown in Table 2.

Table 2. Comparison of teaching information of the three methods/10-3s

Information size/KB	Network service portfolio modeling	Instant task solution	ANNS
1	1.00	1.00	0.98
3	2.58	2.96	2.42
5	4.52	4.33	4.01
10	10.01	10.34	9.61
50	30.14	32.45	28.17
100	65.40	67.68	55.30
200	88.19	83.05	75.22

It can be seen from Table 2 that using the information integration method based on network service composition modeling, the information integration time increases with the increase of information size, up to 88.19 kb; Using the information integration method based on real-time task solving, the information integration time is also proportional to the information size, with a maximum of 83.05 kb; Using the integration method based on ANNs, the information integration time is directly proportional to the information size, with a maximum of 75.22 kb.

The integration time of collective entrepreneurship information of the three methods is shown in Table 3.

As shown in Table 3, the information integration method based on network service combination modeling and real-of-time task solution all take longer than the ANNS-based integration method, with a maximum time difference of 0.9810−3 s and 3.9410−3 s, respectively.

Table 3. Comparison of collective entrepreneurship information integration time between the three methods/10^{-3}s

Information size/KB	Network service portfolio modeling	Instant task solution	ANNS
1	1.05	1.08	1.00
3	1.58	1.97	1.40
5	3.41	3.30	3.05
10	8.22	8.45	8.09
50	24.45	25.48	20.16
100	55.40	56.42	58.21
200	70.18	73.14	69.20

The three methods individually develop the information integration time, and the comparison results are shown in Table 4.

Table 4. Comparison of individual development information integration time/10^{-3}s

Information size/KB	Network service portfolio modeling	Instant task solution	ANNS
10	7.10	7.48	7.08
30	20.78	21.32	19.15
50	49.80	50.13	45.20
100	69.10	72.15	65.17
500	86.13	92.15	75.22
1000	109.33	112.15	84.35
2000	124.10	132.15	99.02

As shown in Table 4, the information integration method based on network service combination modeling and real-of-time task solution all take longer than the ANNS-based integration methods. The information integration time of ANNs based integration methods is less than $100*10^{-3}$s.

The above experimental results show that compared with the current mainstream methods, this method has advantages in retrieval effect, information integration time and information integration time. This is because the method in this paper is based on the semantic description of the service and executes the query service through the pattern matching algorithm. The pattern matching algorithm combines the interface and function semantic description to avoid the disadvantage of low search reliability caused by different services with the same semantic input and output.

6 Conclusion

An intelligent integration method of innovation and entrepreneurship education management information based on ANNs is proposed. This method is based on the semantic description of services, finds services through pattern matching algorithm, and finally ACI links the required services, executes the service chain and completes the user's request. The pattern matching algorithm combines the interface and functional semantic description to avoid the disadvantage of low search reliability caused by different services having the same input and output. The disadvantage of this method is that in the process of service chain instantiation, the data flow enters from the beginning of the service chain to the end of the output, without considering the situation that some atomic services in the middle of the service chain need to input data from the outside, which is also an important content of further research.

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