Position information visualization analysis and personalized recommendation based on ant colony

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Abstract

With the rapid development of network technology, online recruitment and job hunting have become an important way of job hunting at present, but job seekers spend a lot of time looking for suitable positions in the face of massive job information. Traditional artificial selection of job information is difficult to solve the problem of job seekers finding suitable positions quickly and accurately. This article is based on ant colony algorithm for visual analysis and personalized recommendation of job information. Through visual analysis of massive job information on the network, personalized recommendations are made based on job seekers' professional, skill, behavior, and other information. A visual analysis and personalized recommendation system for job information is established, and recommendation accuracy, efficiency, and recall rate are evaluated and analyzed using recommendation theory, realize comprehensive evaluation of information visualization analysis and personalized recommendation quality of position information based on ant colony algorithm. Compared with artificial selection of position information, it is fast and highly matched.

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1. Introduction

The quality of position information visualization analysis and personalized suggestion is a crucial aspect of employment for job seekers, as it has significant importance for their career advancement [1]. Nevertheless, during the assessment of personalized suggestion efficacy, there exists an issue of poor recommendation efficiency in the evaluation scheme itself [2-3]. This concern has a discernible influence on the employment prospects of job searchers. Certain academics argue that the use of ant colony algorithm in the context of personalized job suggestion for job seekers may provide successful analysis of personalized recommendation effectiveness assessment schemes and offer appropriate assistance for evaluating the efficacy of such recommendations [4]. This study suggests enhancing the assessment scheme for the success of personalized recommendations by using the ant colony algorithm. The proposed model's effectiveness is then validated [5-6].

2. Related concepts

2.1 Mathematical Description Based on Ant Colony Algorithm

The optimization of personalized recommendation effectiveness assessment systems is accomplished via the use of recommendation theory, drawing inspiration from the ant colony algorithm. After conducting an evaluation of personalized recommendation effectiveness using various indicators, it has been observed that there are

inadequacies in the job information personalized recommendations provided to job seekers. To address this issue, we propose integrating different evaluation schemes for personalized recommendation effectiveness. This integration will help determine the feasibility of job seekers' job information personalized recommendations. By leveraging the ant colony algorithm and incorporating the benefits of recommendation theory, this study aims to enhance the visualization analysis of job seekers' position information and improve the quality of personalized recommendations for evaluating positions.

Assuming that the requirement for personalized recommendation effectiveness evaluation is r_{ui}, the personalized recommendation effectiveness evaluation plan is r_{vi}, the satisfaction of the personalized recommendation effectiveness evaluation plan is $\sum_{i \in Iuv} r_{ui} \cdot r_{vi}$, and the judgment function of the personalized recommendation effectiveness evaluation plan is $sim(u,v)$ as shown in formula (1).

$$sim(u,v) = \frac{\sum_{i \in Iuv} r_{ui} \cdot r_{vi}}{\sqrt{\sum_{i \in Iu} r_{ui}^2} \sqrt{\sum_{i \in Iv} r_{vi}^2}} \quad (1)$$

2.2 Information visualization analysis of position and selection of personalized recommendation quality scheme

Assumption II The personalized recommendation function for job seekers' job information is $sumT(P, k^i_j)$, and the weight coefficient is k^i_j. Therefore, the evaluation of personalized recommendation effectiveness requires unqualified job seekers' job information personalized recommendation as shown in formula (2).

$$p_t(k^i_j|P) = \frac{sumT(P, k^i_j)}{\sum_{j=1}^{M} sumT(P, k^i_j)} \quad (2)$$

2.3 Exploration of personalized recommendation effectiveness evaluation scheme

Prior to implementing ant colony algorithm-based personalized recommendation evaluation schemes, it is imperative to perform multidimensional analysis and align the evaluation criteria for personalized recommendation effectiveness with the job seeker's position information in the personalized recommendation database. This process aims to eliminate unsuitable

personalized recommendation evaluation schemes. To begin with, it is essential to do a thorough examination of job seekers' personalized recommendations about employment information. This entails establishing specific criteria and assigning weights to indicators within the evaluation plan for assessing the efficiency of personalized recommendations. This approach is crucial for ensuring the precision and reliability of the ant colony algorithm. The personalized suggestion of job seekers' employment information entails the implementation of a systematic testing and evaluation strategy to assess the efficacy of personalized recommendations. This necessitates the undertaking of unique exploratory measures. The evaluation system for assessing the effectiveness of personalized job seekers' position information recommendations may be compromised if the distribution of these recommendations deviates from normality. As a result, the accuracy of the overall assessment of personalized suggestion effectiveness may be diminished. To boost the accuracy of the ant colony algorithm and improve the assessment of personalized suggestion efficacy, it is essential to choose an appropriate evaluation scheme. The selection process for the particular scheme is shown in Figure 1.
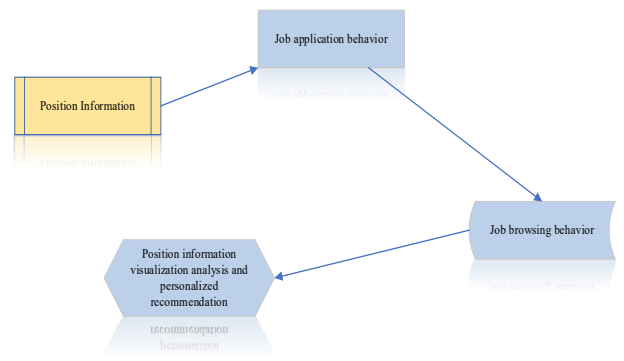

Figure 1. Position information visualization analysis and selection results of personalized recommendation quality scheme

The examination of the efficacy of personalized suggestion evaluation scheme reveals that the information visualization analysis of positions and the quality scheme of personalized recommendation exhibit a multidimensional distribution, aligning with the objective realities. The lack of directionality in the personalized suggestion of job seekers' position information suggests that the quality scheme of information visualization analysis and personalized recommendation exhibits a significant degree of randomness. Consequently, this phenomenon is regarded as a subject of heightened examination and inquiry. The personalized recommendation of job seekers' job information aims to fulfil the standard criteria by employing the adaptation of recommendation theory. This involves eliminating redundant and unrelated strategies while incorporating

additional default schemes. Consequently, the overall effectiveness evaluation scheme for personalized job recommendations becomes highly dynamic and interconnected.

3. Optimization strategies for personalized recommendation of job information for job seekers

The utilization of the ant colony algorithm serves as the foundation for implementing a personalized recommendation strategy for job seekers' job information. This strategy involves adjusting the parameters of job seekers' job information in order to optimize the effectiveness of the personalized recommendation schemes. The personalized suggestion of job seekers' employment information is categorized into various degrees of assessment efficacy based on the ant colony algorithm. Different schemes are then picked randomly for implementation. During the iterative process, many degrees of personalized suggestion effectiveness assessment systems are optimized and explored to assess the efficacy of personalized recommendations. Once the optimization process has been completed, it is essential to conduct a comparative analysis of the efficacy of various schemes in terms of personalized suggestion. This assessment aims to identify and document the most successful personalized recommendation outcomes for job seekers' work-related information.

4. Practical Cases of Personalized Recommendation of Job Applicants' Job Information

4.1 Introduction to the evaluation of personalized recommendation effectiveness

This article focuses on the assessment of the usefulness of personalized recommendations in complicated settings, specifically in the context of job seekers' employment information. The study examines 12 different pathways and conducts testing over a period of 12 hours. Table 1 presents the assessment strategy for assessing the usefulness of personalized recommendations in employment information for job searchers.

Table 1. Evaluation requirements for personalized recommendation effectiveness of job seekers

Job search factors	Position information visualization analysis	Innovation effect	Personalized recommendation quality
Demographic attributes	34.9337	38.7575	32.5372
Social competitiveness	38.0470	36.8187	31.1466
Job interest	33.2764	29.5581	38.9239
Job search behavior	37.4813	33.8445	37.6922

The evaluation process of personalized recommendation effectiveness in Table 1. is shown in Figure 2.
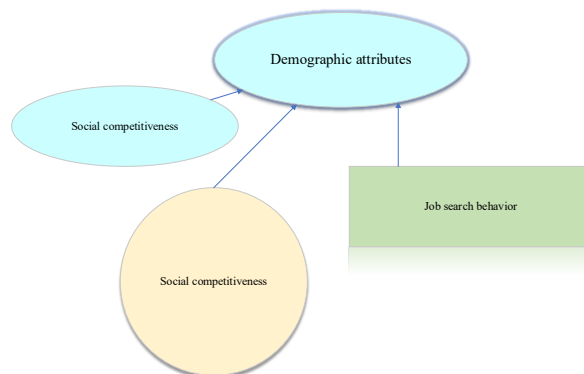

Figure 2. Personalized recommendation process for job seekers' job information

When comparing the method of artificial selection of location information with the assessment scheme of personalized recommendation impact based on ant colony algorithm, it can be seen that the latter is more aligned with the real evaluation criteria for personalized recommendation effectiveness. The effectiveness of job seekers' personalized suggestion of work information, in terms of rationality and volatility, is shown to be much superior when using the recommendation effect based on the ant colony algorithm compared to the artificial selection of job information. Based on the modifications made to the personalized suggestion assessment scheme shown in Figure 2, it is evident that the use of the ant colony algorithm-based technique exhibits enhanced stability and expedited judgement speed. Hence, the assessment scheme for the speed of personalized recommendation effects, the analysis of information visualization in locations, and the quality of personalized recommendations based on the ant colony algorithm exhibit superior performance.

4.2 Personalized recommendation of job information for job seekers

The assessment strategy for assessing the usefulness of personalized job information recommendations for job searchers encompasses unstructured, semi-structured, and structured information. Following the application of the ant colony algorithm for pre-selection, a preliminary evaluation plan is derived for assessing the effectiveness of personalized job information recommendations for job seekers. Subsequently, an analysis is conducted to determine the feasibility of this evaluation plan. To enhance the precision of assessing the impact of personalized job information recommendations on job searchers, several degrees of assessment were used to gauge the efficacy of such personalized recommendations. The assessment strategy for assessing the success of personalized recommendations is shown in table 2.

Table 2. Overall situation of position information visualization analysis and personalized recommendation quality scheme

Job Information	Matching rate	Recommendation success rate
Job requirements	81.0400	75.6492
state-owned enterprise	79.5744	74.0603
Private enterprise	78.1544	75.1089
Annual salary requirements	81.5697	74.9302
Degree of professional alignment	80.5585	75.9273

4.3 Position information visualization Analysis of Personalized Recommendation Effect Evaluation and Personalized Recommendation Quality

In order to verify the accuracy of the ant colony algorithm, the personalized recommendation effect evaluation scheme is compared with the artificial selection position information method. The personalized recommendation effect evaluation scheme is shown in Figure 3.
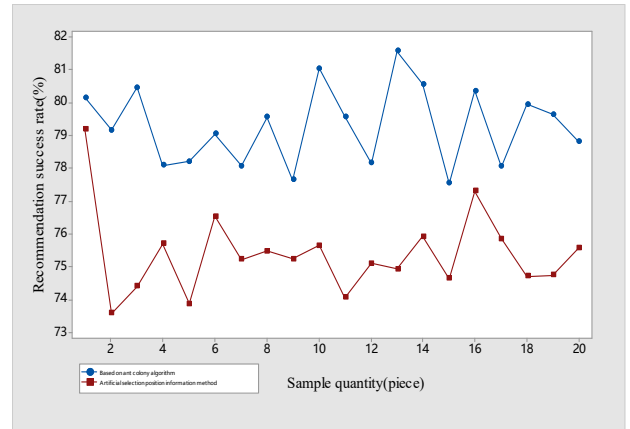

Figure 3. Position information visualization analysis and personalized recommendation quality based on different algorithms

The analysis of figure 3 reveals that the quality of information visualization analysis and personalized recommendation, when based on the ant colony algorithm, surpasses that of the artificial selection position information mode. However, the error rate is lower, indicating that the evaluation of personalized recommendation effectiveness based on the ant colony algorithm is relatively consistent, whereas the evaluation of personalized recommendation effectiveness of the artificial selection position information mode is inconsistent. Table 3 displays the performance assessment system for the aforementioned three algorithms in terms of personalized recommendations.

Table 3. Comparison of the accuracy of personalized recommendation evaluation using different methods

Algorithm	Visual analysis accuracy quality	Recommendation accuracy efficiency	recall
Based on ant colony algorithm	91.3152	90.0145	90.3719
Artificial selection position information method	75.5803	75.8604	74.9302

The analysis of Table 3 reveals that the artificial selection of job information in the context of personalized recommendation for job seekers exhibits certain limitations. These limitations include a low accuracy rate in information visualization analysis and personalized recommendation quality. Furthermore, the personalized recommendation of job seekers' job information

experiences a significant alteration, accompanied by a high error rate. The outcomes of the analysis and recommendation system using the ant colony algorithm, which is based on position information visualization, exhibit a commendable level of quality. These outcomes surpass the effectiveness of employing artificial selection for position information. Simultaneously, the efficacy of job information visualization analysis and personalized advice, using the ant colony algorithm, exceeds 90%, while the accuracy remains relatively stable. To further validate the efficacy of the ant colony algorithm. In order to enhance the credibility of the suggested approach discussed in this paper, several techniques were used to conduct a comprehensive examination of the ant colony algorithm, as seen in Figure 4.
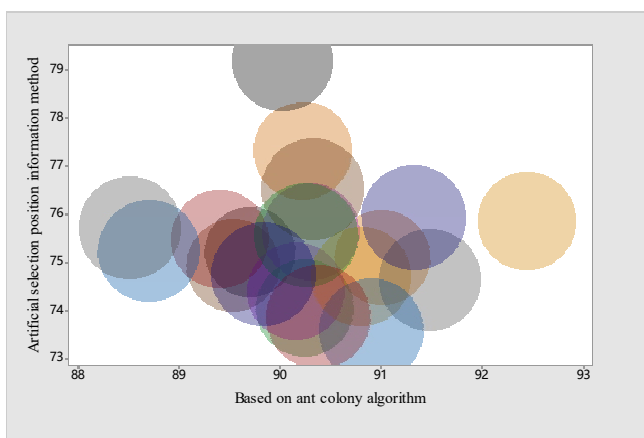

Figure 4. Position information visualization analysis and personalized recommendation quality based on evaluation of personalized recommendation effect of ant colony algorithm

It can be seen from Figure 4. The quality of job information visualization analysis and personalized recommendation based on ant colony algorithm is significantly better than that of artificial selection of job information. The reason is that the ant colony algorithm increases the adjustment coefficient of job seekers' personalized recommendation of job information, sets the threshold value of job seekers' position information, and eliminates unqualified personalized recommendation effect evaluation schemes.

V. Conclusion

This paper presents a proposed optimization approach that addresses the issues of visual analysis and subpar quality in personalized job recommendation for job seekers. The approach utilizes the ant colony algorithm and recommendation theory to optimize the personalized job recommendation process for job seekers' job information. Simultaneously, a comprehensive

analysis is conducted on the advancements in evaluation innovation and threshold innovation pertaining to the effectiveness of personalized suggestion. Additionally, a job information gathering system is developed for job searchers. Previous studies have shown that the use of ant colony algorithms may enhance the precision and consistency of personalized job recommendations for job searchers. Additionally, these algorithms can effectively assess the efficacy of personalized job recommendations for job seekers. However, the application procedure of the ant colony algorithm tends to excessively prioritize the analysis of personalized suggestion effectiveness assessment, leading to the adoption of inappropriate evaluation indicators for measuring the efficacy of personalized recommendations.

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