The Application of Data Technology Tree in Computer Software

Limei Wang[1,*]

[1]Dongying Vocational Institute, Dongying, Shandong, 257091, China

*Corresponding author e-mail: wanglimei290@dyxy.edu.cn

Abstract. With the development of science and technology and the arrival of the Internet era, the information base and database in work and life are becoming more and more complex. This puts forward higher requirements to the storage and processing of data and information in computer software. Tree is an important and commonly used nonlinear storage structure in the data structure of computer. It plays a significant role in storing massive data and querying it, data compression or batch processing of dynamic data. This paper analyzes the operation principle of data technology tree and the needs of computer software work, explores the practical application of data technology tree in computer software at present, and puts forward the corresponding improvement suggestions and measures.

Keywords: Data Technology Tree, Data Processing, Computer, Software Engineering, Application

1. Introduction

At present, in the field of computer, the data accurate search and processing of this work is relatively high requirements, search and processing data efficiency, correctness, whether can solve the problem to put forward a better plan, these are the important factors that affect the efficiency and competitiveness of computer software. For data technology tree, based on the construction of binary tree, it not only has an efficient way to find information, but also can quickly insert and delete data, as well as sort, compress and a series of operations during data storage. This undoubtedly brings great convenience for data processing. Because of this, data technology tree algorithm has been widely used in the workflow of computer software.

2. 2. The operation principle of data technology tree

The operation of the data technology tree is based on the data structure and algorithm of the binary tree. Its main applications in computer science and technology are as follows:

2.1. Huffman coding

This is a data compression method that uses a Huffman tree (essentially a tree) to compress a set of data.In computer data processing, Huffman encoding to use variable ChangBian clock to the source symbol (such as the one letter in a file for encoding, which become ChangBian clock is through a method

of evaluating source symbols appear probability, a high probability of letters using short code, whereas appear less likely to use the long coding, this makes the average length of the string after coding, expectations are low, so as to achieve the goal of lossless data.
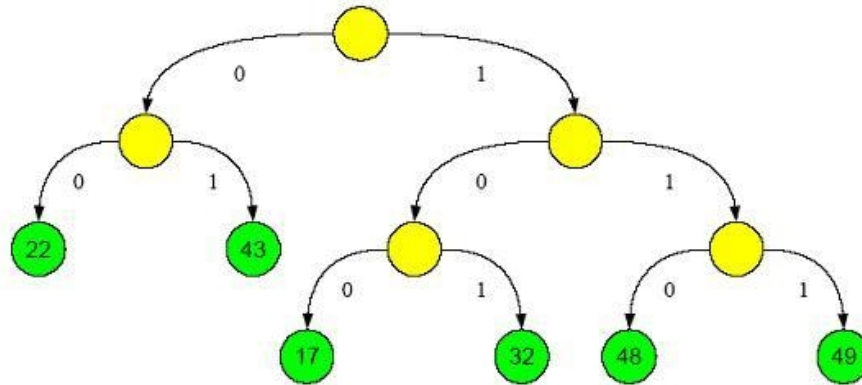

Figure 1. An example Huffman tree

2.2. Priority queue
It uses a binary tree to record the priority of the elements in the set and order them, providing a better solution to the problem. A priority queue is a common data structure that allows new elements to be added, old elements to be removed, and element values to be viewed.

Since this is a queue, you are only allowed to add elements to the bottom and remove elements from the top.

But the elements in the priority queue are not in the order in which they are pushed into the queue. Instead, they are automatically arranged according to the weight of the elements. The one with the highest weight comes first.

2.3. Event scheduling
Binary search tree, as a classic data structure, not only has the characteristics of fast insertion and deletion of linked lists, but also has the advantages of fast array search; Therefore, it is widely used. For example, in file system and database system, this kind of data structure is generally used for efficient sorting and retrieval operations. Therefore, binary search tree is mainly used in event scheduling, which can make finding information more efficient.

2.4. Database system
B-trees are mainly used in file systems, in order to store large database files on the hard disk and reduce the number of times to visit the hard disk, this paper proposes a balanced multi-path search tree -- B tree structure. From its performance analysis, it can be seen that its retrieval efficiency is quite high. In order to improve the performance of B tree, there are many varieties of B tree, trying to improve the B tree.

2.5. User Interface
In the graphical user interface, Windows are organized in a tree structure, such as Windows system.

2.6. File system
Files are organized in a tree structure, such as tree folders in Windows system. Tree folder, is a display mode, that is, using SWT to achieve the system folder tree structure display, and read the folder directory file size (formatted display), realize the choice of folder, print folder name, folder absolute path, display selected file where the path, do not show the hidden path. Convenient to a large number of documents for organized storage and search.

2.7. Artificial Intelligence

Decision tree is a tree structure of classification algorithm model. This structure is similar to flow chart, with intuitive form and easy to be understood by people. Decision tree is a decision analysis method that obtains the probability that the expected value of net present value is greater than or equal to zero, evaluates the project risk and judges its feasibility on the basis of the known probability of occurrence of various situations and forms a decision tree. It is a graphical method of intuitive use of probability analysis. In logical games such as board, the steps can be generated into a decision tree.
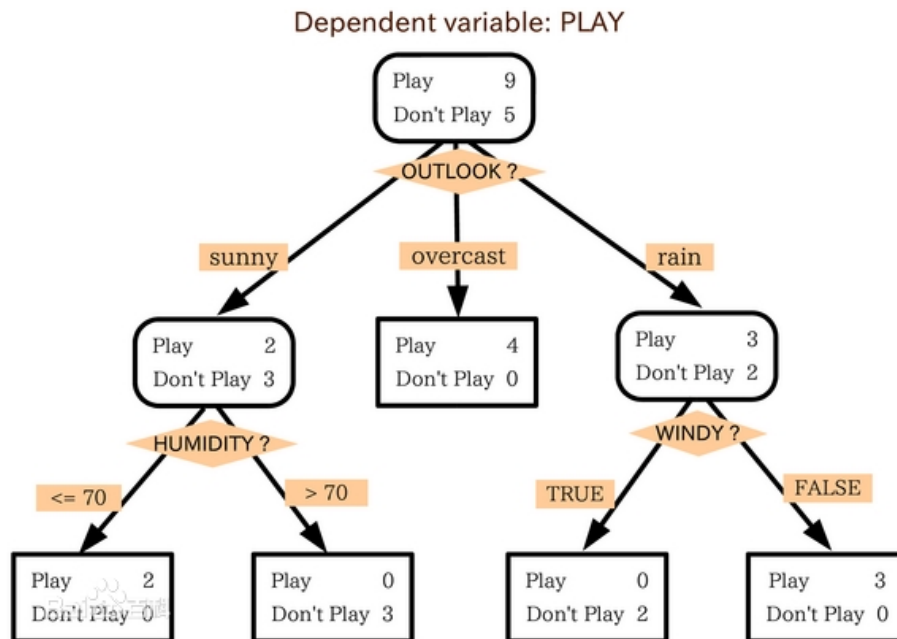

Figure 2. Example Decision tree

3. The application of computer software containing data technology tree in real life

Data technology tree in computer software has a wide range of industry application value. In the aspect of production and business, it is used to analyze the market environment, formulate reasonable sales strategies, and improve the competitive advantage of enterprises. With the development of The Times, including financial industry, transportation industry, communication industry, biomedicine, etc., have begun to widely use the computer software using data technology tree.

3.1. Application in medical industry

With the continuous improvement of China's medical system, as well as the continuous improvement of information technology means, how to effectively analyze medical data information, accurate diagnosis and decision-making, prediction and prevention, improve the quality of medical service and hospital management, has become the general trend of the development of medical data processing.In addition, due to the complexity and particularity of medical data, medical information includes not only conventional and easily processed data such as words and numbers, but also waveform signals, images, audio and video signals, etc. This requires medical data processing to have higher technical requirements to clean up and analyze different attributes of data processing. In medical data processing methods, the more common algorithms mainly include decision tree, artificial neural network, support vector machine, fuzzy logic, etc., these intelligent algorithms have shown great advantages in medical data processing, and has been widely used.

3.2. Massive 3D data processing

With the rapid development of computer graphics, volume rendering technology has been greatly developed. At present, the demand for data resolution is getting higher and higher, and the data scale of volume data is getting larger and larger. At the same time, the development speed of computer hardware can not meet the increasing demand of data volume. In this case, for example, large-scale 3D seismic data, the spatial index method of binary tree can be used to segment seismic data, so as to improve the volume rendering speed, and multi-resolution data interaction is used in volume rendering. This method can be used to render large scale 3D seismic data without affecting the accuracy of seismic data and satisfying the storage capacity of computer.

3.3. Applications in the financial industry

Binary tree model can be used to price the current convertible bonds in the convertible bond market. Binary tree option pricing model was proposed by Cox, Ross and Rubinstein in 1979, which is mainly used to calculate the value of American options. Binary tree option pricing model assumes that stock price fluctuations are only up and down two directions, and the probability and amplitude of each upward (or downward) fluctuation of stock price remain unchanged during the whole validity period.Model validity can be divided into N interval Δt, simulate the shares according to the history of stock volatility throughout the duration of all possible development path, and every node calculation for each path warrants exercise benefits and with the discount method to calculate the price of warrants. For the American warrants, because you can exercise the right ahead of time, the theoretical price of the warrants on each node should be the greater one in the price of the warrants calculated by the benefits of the warrants and the discount.
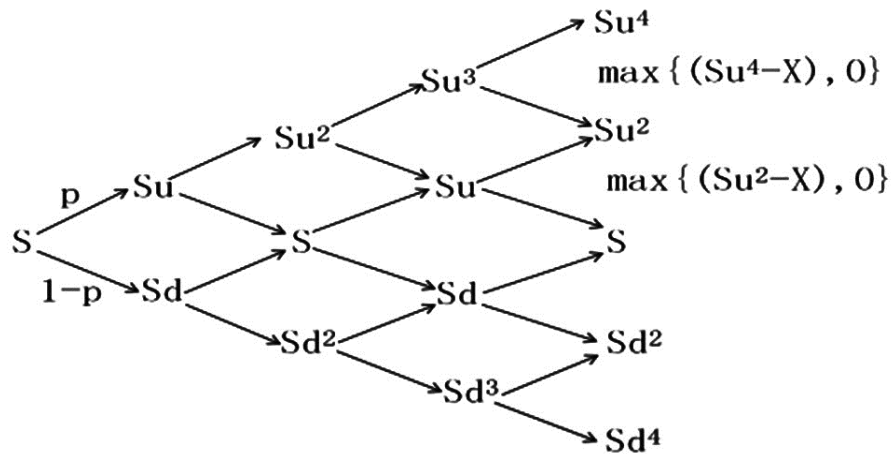

Figure 3. American option binary tree with no additional terms

3.4. Applications in the communication industry

At present, the product and technology update in the communication industry are quite fast. On average, there will be a big change every three years, accompanied by the fierce competition between industries. The research and development of new products and new technologies has become the core competitiveness of the company.

Real option theory redefines and quantifies the unknown risks in the project, so that the company can grasp the opportunity of research and development in the complex and changeable communication field, and improve the core competitiveness. According to the characteristics of communication R&D projects, this paper puts forward the process of quickly judging the R&D projects and model selection suitable for the real option method in the enterprise, and the option model based on the binary tree model and B-S model can calculate the option value of communication R&D projects respectively, and then compare the result with the project value obtained by the traditional NPV evaluation method.Finally, combining with the actual case of the company, we use the binary tree option model and the traditional

NPV method to quantitatively evaluate the value of the communication FTTH fast connector project, so as to verify the advantages of the real option method in the communication R&D project evaluation.

4. Conclusion

With the development of network technology and the increasing demands of industry work, data technology tree, as an intelligent way of information and data processing, has been applied more and more widely. While enjoying the convenience brought to people in the field of computer software data processing, we can not ignore that this technology still has aspects to be improved. There is room for improvement in optimization of data tree algorithm, standardization of algorithm language, visualization of data and efficient processing of massive complex data. At the same time, in the process of data processing, we should also pay attention to the confidentiality of data, strengthen the security protection of the database, to prevent data leakage and embezzlement, these are a series of aspects to be strengthened in the process of application of the technology.

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