

Research Article

The Design of Mathematics Teaching Optimization Scheme Based on Data-Driven Decision-Making Technology

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In order to improve the effect of classroom teaching and realize the improvement of mathematics teaching quality, this article combines data-driven decision-making technology to design a mathematics teaching plan system and applies data-driven decision-making technology to the design of mathematics teaching plan by improving the big data algorithm. In addition, this paper designs a mathematics teaching plan design system based on data-driven decision-making technology. The system learning module displays the knowledge points in a chapter-sequential navigation mode and stores data or information in the nodes, which are connected to form a network structure through chains. Finally, this paper verifies the designed system with experiments. From the results of the experimental research data, it can be seen that the mathematical teaching plan design system based on the data-driven decision-making technology constructed in this article has good practical effects. On this basis, the system constructed in this article can be verified through further practice.

1. Introduction

Big data has already had a significant impact in various fields such as finance, commerce, and medical care. In the financial field, big data technology helps to achieve precision marketing, improve risk control, and improve operations. In the business field, it helps e-commerce companies analyze customer characteristics and achieve personalized recommendations. In the medical field, it improves and optimizes the diagnosis of diseases and the formulation of dynamic treatment plans and promotes precision medicine [1]. Data-driven decision-making has become a development trend in the era of big data, and precision and personalization have become keywords in the era of big data. In the education field, with the continuous integration of information technology and contemporary education, as well as the wide application of various digital intelligent systems and intelligent terminals in educational practice, enormous behavioral data in the education and teaching process can be recorded and saved, including education management data, student basic information data, and learning behavior data. These data are large in quantity and diverse in types, and the temporal and contextual characteristics of education make the data

generated in the education field have natural time characteristics and contextual connotations [2]. Carrying out precision teaching is of great significance. In educational practice, students have different qualifications, cognitive levels, learning styles, and learning motivations. For example, some students are good at verbal expression, some students are good at hands-on operation, some students like to study independently, some students like to learn in groups, some students are more self-conscious and motivated, and some students are relatively passive. Different students respond differently to the teaching plan, and correspondingly there are differences in the teaching effects [3].

This paper combines big data technology to design and research mathematics teaching schemes, builds a corresponding intelligent system, and combines experimental research to verify the system, providing theoretical references for subsequent mathematics teaching reforms.

2. Related Work

In recent years, with the development of the Internet and information technology, data analysis platforms have gradually been enriched and improved. Moreover, teaching

software based on big data is gradually being developed and applied, and teaching software is constantly being developed and improved. At present, they are relatively mature and have exerted a certain effect in actual teaching. In the survey of data, it is concluded that schools use extremely large data extensively, which can play a significant role in assisted teaching [4]. It can play a significant role in test analysis and test paper comment based on big data and can be effectively applied in mathematics, English, and other subjects. Zhixue is also widely used in the teaching of various disciplines, which provides a strong guarantee for the realization of precision teaching and the improvement of teaching effects [5]. The data analysis teaching platform and software have very prominent features. First of all, the application of data analysis software makes it easier for teachers to organize and correct test papers. Without changing the test paper reviewing habits, it can also enter data into the corresponding teaching system. The traces of problem solving and correction retained in the test paper can make students clearer [6]. Secondly, the data analysis teaching software can eliminate teachers' need to spend a lot of time and energy on the examination paper correction and statistics, so the teachers' time and energy are liberated, and the limited time and energy can be devoted to other teaching activities. Furthermore, the application of data analysis teaching platform can improve the promotion and strengthening of data analysis for precision teaching. On the basis of scientific data analysis, teachers can achieve personalized and precise guidance to students, and students can also form more scientific and accurate cognition of themselves [7].

The big data teaching platform and software can use information technology to automatically form a personalized wrong question bank, which provides a solid foundation for the development of professional and accurate test analysis for teachers. Teachers can use daily teaching big data for later exams and choose error-prone questions, key and difficult points, and other content to organize papers to help them improve the efficiency of proposition papers [8]. The data analysis platform software will be based on the different learning foundations of each student, and the system can also automatically push exercises on the weak points of knowledge to the students to help fill in the gaps. Thus, it contributes to the improvement of test analysis and student evaluation [9].

Big data in the education field can be divided into a broad sense and a narrow sense. The broad sense of education big data generally refers to all human behavior data derived from daily educational activities. Data refers to learner behavior data, which mainly comes from the student management system [10]. In addition, the innovation of big data develops along the direction of "data-big data-data-driven innovation-data analysis and prediction". In this process, big data will inevitably affect education innovation. Moreover, in the process of promoting the continuous digitization of high school mathematics content, it also creates infinite possibilities for content arrangement based on "knowledge chain" and "data chain." In addition, cut-type, play-type, list-type, and mass-customized

mathematical content emerge at the historic moment [11]. Educational big data drives teaching governance. It is difficult for traditional experience-based management methods to achieve high-efficiency teaching goals. By mining and collecting educational big data treasures, a large amount of digital information (such as pictures, audio, and video) generated in teaching is converted into processable data, forming educational big data with valuable reference and analysis [12]. According to literature [13], the normal monitoring of the teaching operation of colleges and universities and the establishment of a national undergraduate database constitute an inevitable trend of education informatization and also an important content of building a higher education teaching quality assurance system. The goal and content of the construction status database are studied, and the in-depth analysis and mining of the basic status data of colleges and universities are proposed to better serve the teaching management of colleges and universities.

3. Improved Algorithm of Teaching System Based on Big Data Technology

Spread routing is the most classic multicopy routing, which mainly spreads message copies rapidly to the network through active delivery. When two nodes meet, they will exchange messages that are not available to each other through the message information summary vector table in each node, and the summary vector table is constantly being updated. The message will spread rapidly throughout the network like a virus to increase the probability of the message reaching the sink node. In this way, we can increase the message delivery rate to some extent [14]. However, because there are too many message copies, they will quickly occupy the limited storage space of all nodes and easily cause network congestion. In addition, frequent message submission between nodes will also accelerate the energy consumption of nodes, increase network bandwidth pressure, and make the overall network overhead rapidly increase. Therefore, we can see that increasing the submission rate in this way does not play a positive role.

Figure 1 shows the routing process of the spread routing algorithm. At time t_1 , the source node S that generates the message meets the node A and the node C. At this moment, node S compares its own summary vector table with node A and node C. We found that node A and node C did not store the message. Therefore, node S submits a copy of the message to nodes A and C. At time t ($t_2 > t_1$), node A meets node B, and node C meets sink node D. Node A will deliver the copy of the message to node B, node C will deliver the copy of the message to the sink node D, and the message transmission is completed at this moment [15].

Considering the huge overhead and caching pressure of sprawl routing, researchers put forward a spread-waiting routing algorithm on this basis. The biggest difference from sprawling routing is the limited number of message copies. By controlling the number of message copies, network overhead and node cache space are alleviated, and the message delivery rate is also significantly improved. The dissemination waiting routing algorithm is usually divided

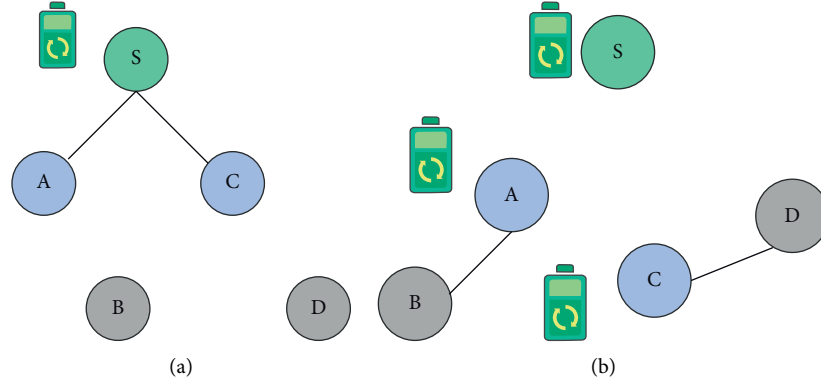


FIGURE 1: Schematic diagram of the spread routing algorithm. (a) t_1 moment. (b) t_2 moment.

into two stages, the dissemination phase and the waiting phase. In the dissemination phase, the source node mainly submits a copy of the message to other nodes, while in the waiting phase, all nodes stop distributing copies of the message until a node meets the sink node before submitting the message. According to different distribution methods, it is divided into source spray and wait routing (SSW) and binary spray and wait routing (BSW).

Source dissemination waiting route (SSW): In the initial dissemination stage, the source node copies the initialized message for L ($L > 1$), and the source node carries the message copy to move in the network. When the source node meets other nodes, one copy of the message will be delivered to the other node; at this time, the source node's copies of the message will be reduced by one. In the future, the source node will submit a copy of the message every time it encounters a node, and the number of copies of its own message will be reduced by one. In the dissemination phase, if the source node or another node carrying a copy of the message meets the sink node, the message will be delivered to the sink node to end the message transmission. If none of the nodes carrying messages meet the sink node during the dissemination phase, then when the number of message copies in the source node is reduced to 1, the network will enter the waiting phase, and the L nodes carrying message copies will not report any messages. During the message delivery process, unless one of the nodes encounters the sink node, the message will continue to be delivered until the message transmission is completed [16].

Figure 2 shows the routing process of the source-end dissemination waiting algorithm. At time t , the source node S generates L copies of the message and carries the message in the network. At this time, it belongs to the dissemination phase. At time t_2 ($t_2 > t_1$), node S encounters relay node C and then delivers one copy of the message to it. At this time, the number of message copies in node S becomes $L-1$. After that, the source node S will repeat this process [17]. Unless a certain node meets the sink node during the period and completes the message transmission, it will wait until the number of message copies in the source node becomes 1 and enter the waiting phase; then no nodes will submit the message until they encounter the sink node.

The second distributed waiting route (BSW): The difference between the second distributed waiting route and the

source-end distributed waiting route is mainly concentrated in the dissemination stage. After the source node generates L copies of the message, the source node continues to move with the message. When the source node and the relay node meet, the source node will deliver half of its own messages to the relay node. That is, $L/2$ copies of the message are delivered to the relay node, and the source node itself also has $L/2$ copies of the message left. After that, each of the two nodes carries U_2 packets to continue moving. When the next relay node is encountered, half of its own message copies will be delivered. The message distribution is shown in Figure 3 [18].

In the dissemination phase, if the node carrying the message meets the sink node, the message is delivered to the sink node and the message transmission is completed. If no node meets the sink node in the dissemination phase, all nodes continue to distribute half of their own messages to the meeting nodes. Until the number of message copies of the source node and other nodes becomes 1, it enters the waiting phase. At this time, the routing status is the same as the waiting phase of the source and the waiting for the routing, and the message is not delivered until the sink node is met [19].

Figure 4 shows the routing process of the two distributed waiting algorithms.

Figure 5 shows the routing process of the probabilistic routing algorithm.

When two nodes enter the communication range of each other, this means that the two nodes meet. Due to the exploration interval, node movement rate, buffer space, etc., even if nodes meet, they may not be able to find each other or successfully connect to each other, let alone establishing data communication, as shown in Figure 6 [20].

In the DTN, all nodes have the function of storing and forwarding messages. When a node receives a message as an intermediate node, it will pass the message to the next node. The selection of the next node will directly affect the final delivery of the message. If the probability of the next node meeting the destination node is greater, the probability of the message being successfully delivered is also greater.

In DTN, each node stores a two-dimensional table, which is used to record the probability of encountering other nodes in the network. In the DTN, time is divided into several time slices, and the size of each time slice is called the

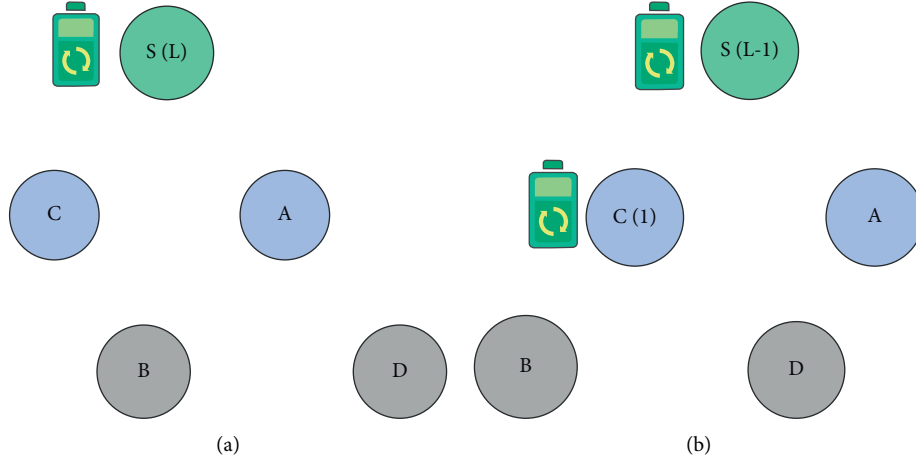


FIGURE 2: Schematic diagram of source RF routing. (a) t_1 time. (b) t_2 time.

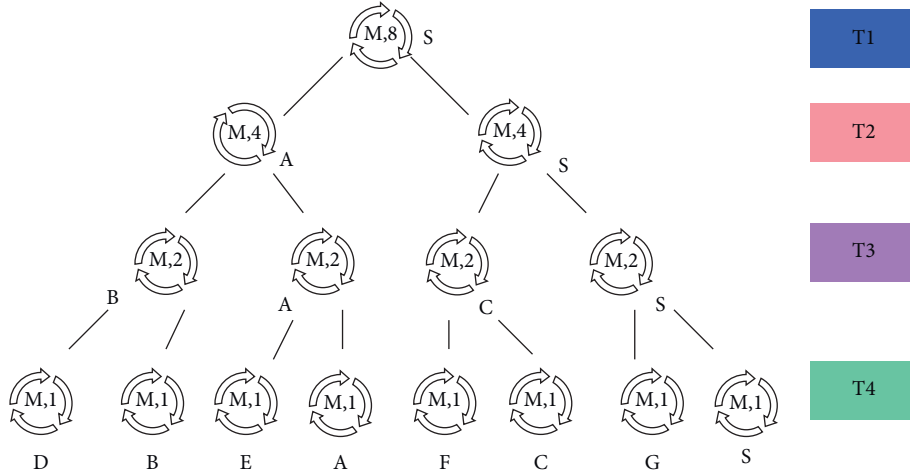


FIGURE 3: Dichotomy of the distribution of the number of copies waiting for routing.

time period of node movement, which is also called the period of the two-dimensional table of node update probability. In different periods, the values of the two-dimensional probability table maintained by each node are different, and the values in the two-dimensional table will dynamically change as the network layout changes.

In the DTN, each type of node has its own transmission range.

In a certain period, the node will automatically scan other nodes within its transmission range after moving to a certain position. For the situation in the figure, when node A scans for node B and node C within its transmission range, node A can pass the message it carries to node B and node C at this time. In this case, it is called node A and node B “meeting,” and node A and node C “meeting.” The encounter here does not mean a real encounter, but the two nodes are within each other’s transmission range.

In the DTN, the lifetime of the message is set. The length of the message lifetime can be set according to the importance of the message. If the message has not been forwarded when the lifetime expires, the node that carries the message will automatically delete the message.

In DTN, as the node moves, the probability of any two nodes retreating will change. Each node in the network dynamically maintains a two-dimensional table to record the probability of being transparent to other nodes in the network. As the cycle changes, each node will dynamically update the value of its two-dimensional table. We assume that the probability of node A and node B meeting is $P_{(A,B)}, P_{(A,B)} \in [0, 1]$. When node A and node B meet, they can send messages to each other. $P_{(A,B)}$ is called the expected value of node A’s message to node B. As the layout of nodes in the network changes, the value of $P_{(A,B)}$ will change dynamically. The calculation of the probability value is divided into the following three cases:

- ① When node A and node B meet, the probability of their meeting will increase. At this time, the corresponding values in the probability tables of node A and node B need to be updated. In this case, (1) is required for calculation.

$$P_{(A,B)} = P_{(A,B)} = P_{(A,B)\text{old}} + (1 - P_{(A,B)\text{old}}) \times P_{\text{init}} \quad (1)$$

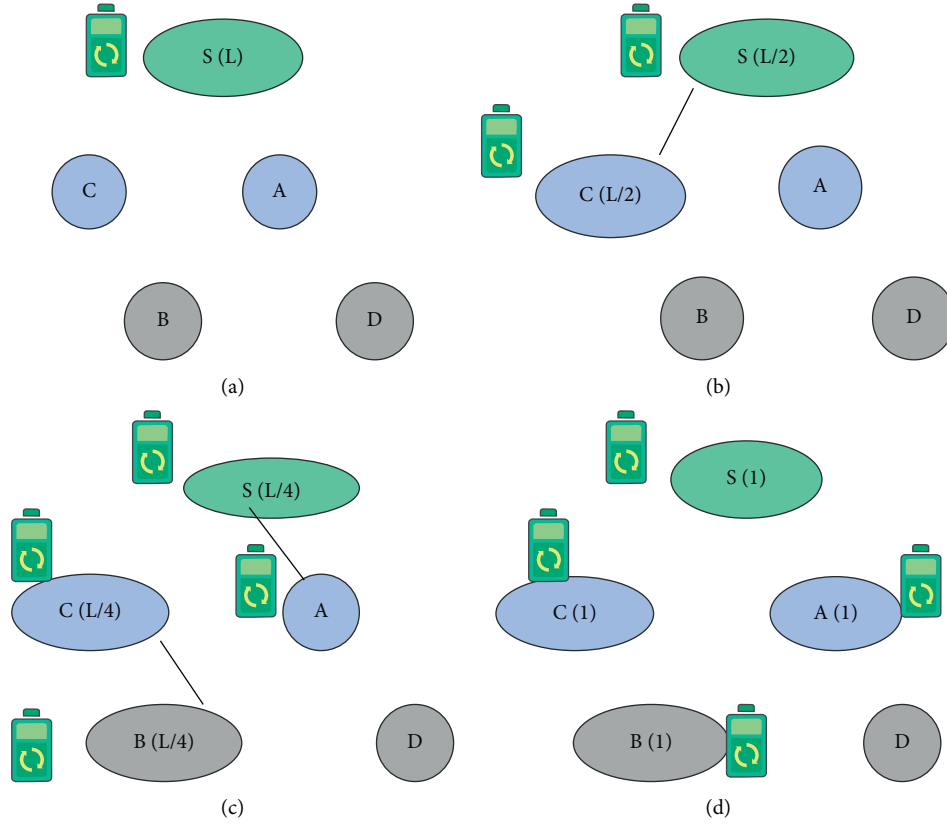


FIGURE 4: Schematic diagram of the second distributed waiting route. (a) t_1 time. (b) t_2 time. (c) t_3 time. (d) t_4 time.

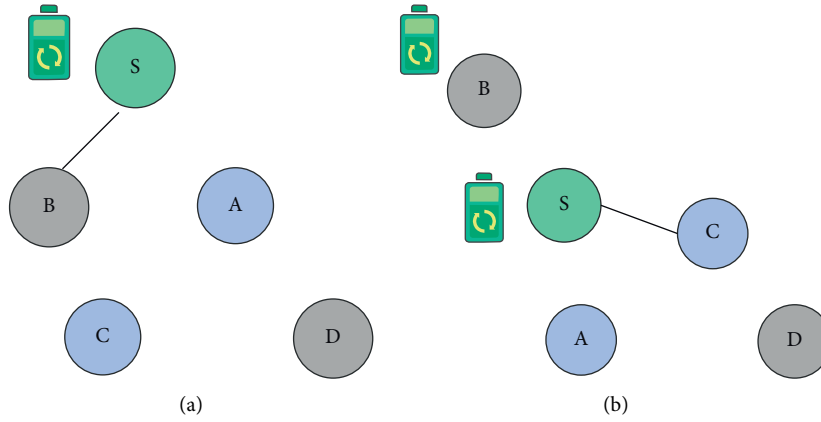


FIGURE 5: Schematic diagram of probabilistic routing algorithm. (a) t_1 time. (b) t_2 time.

Among them, $P_{\text{init}} \in [0, 1]$ is an initial constant. $P_{(A,B)\text{old}}$ is the delivery probability value of the message delivered by node A to node B in the previous cycle. After calculation, the value of $P_{(A,B)}$ will increase.

- ② When node A and node B have not met within k cycles, this means that the possibility of node A transmitting messages to node B is getting smaller and smaller, so the expected value will continue to decrease. At this time, (2) is needed for calculation.

$$P_{(B,A)} = P_{(A,B)} = P_{(A,B)\text{old}} \times \gamma^k. \quad (2)$$

Among them, $\gamma \in [0, 1]$ is the attenuation factor. k is the time period between the last calculation of $P_{(A,B)}$ and this calculation.

- ③ If node A and node B frequently meet, and node B and node C frequently meet, then node C can be regarded as a good message forwarding node between node A and node B. In this case, node A can deliver messages to node C through node B, and the expected value $P_{(A,C)}$ of messages delivered by node A to node C increases, which is calculated by the following formula:

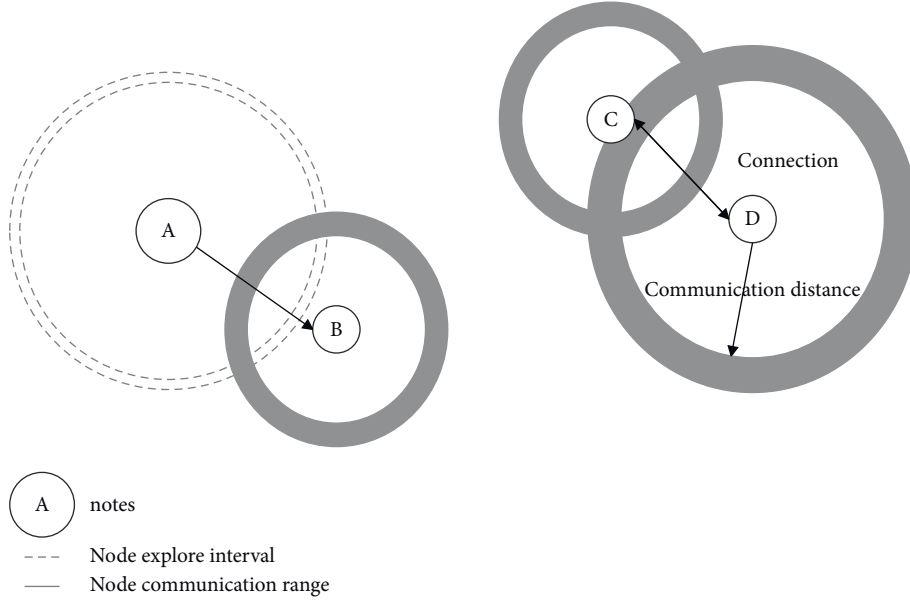


FIGURE 6: Schematic diagram of node connection.

$$P_{(A,C)} = P_{(A,C)\text{old}} + (1 - P_{(A,B)\text{old}}) \times P_{(A,B)} \times P_{(B,C)} \times \beta. \quad (3)$$

Among them, $\beta \in [0, 1]$ is the scaling factor, which is used to indicate the degree of the message delivery.

These three situations are the changes in the transfer probability during the movement of the node, which in turn are the update of the probability of the node transferring the message, the attenuation of the probability of transferring the message between the nodes, and the transfer of the message between the nodes.

The PPT routing algorithm is similar to the EDC routing algorithm. When any two nodes in the network meet, they will exchange each other's SV value, including the probability value of the node meeting the destination node, that is, the delivery probability value of the message. Furthermore, the corresponding value in the two-dimensional table of probability maintained by the node is updated by (1)–(3).

We assume that $P_{(A,D)}$ represents the delivery probability value of the message from node A to node D, that is, the probability of the message being delivered from the intermediate node A to the destination node D. Based on the above analysis, the delivery probability value of the message is determined by two factors: the probability of the historical encounter of the node and the duration of the historical encounter of the node. $P_{(A,D)\text{old}}$ is the probability of historical encounter between node A and node D, $T_{(A,D)\text{old}}$ is the historical encounter duration of node A and node D, and $T_{U(A,D)\text{old}}$ is the duration of historical link disconnection between node A and node D. Each node in the network maintains a two-dimensional table, and the structure of the two-dimensional table maintained by node A is shown in Table 1.

If it is assumed that the current time is the m th meeting of node A and node D, the historical meeting duration of the node is $T_{(A,D)\text{old}} = \sum_{i=1}^{m-1} (T_{(A,D)\text{start}}^{i+1} - T_{(A,D)\text{start}}^i)$. Among them, $T_{(A,D)\text{start}}^i$ is the start time of node A and node D's i th encounter, and $T_{(A,D)\text{end}}^i$ is the disconnection time of node A and node D's i th encounter. The historical disconnection duration of the node is $T_{U(A,D)\text{old}} = \sum_{i=1}^{m-1} (T_{(A,D)\text{start}}^{i+1} - T_{(A,D)\text{end}}^i)$.

When two nodes A encounter node D, they calculate and update the node message delivery probability value according to (4) and update the two-dimensional table of node A's delivery probability value at the same time.

$$P_{(A,D)} = P_{(A,D)\text{old}} + (1 - P_{(A,D)\text{old}}) \times P_{\text{init}} \times C^{T_{(A,D)\text{old}}/T_{(A,D)\text{old}} + T_{U(A,D)\text{old}}}, \quad (4)$$

where $P_{\text{init}} \times C \in (0, 1]$ is the initialization constant and $C > 1$ is the influence factor of the connection time on the delivery probability value. When two nodes have not met for a long time or two nodes frequently meet a certain node, the two-dimensional table of probability values is updated according to (2) and (3).

Through the process of updating, attenuating, and transmitting the expected value of message delivery, each node dynamically maintains its own message delivery expectation table.

The forwarding strategy in the improved PPT routing algorithm is the same as the original algorithm. One method is to set a fixed value first and forward the message to the node that delivers the expected value greater than the fixed value. Another method is to forward the message to a node whose delivery expected value is greater than the current node's delivery expected value.

If it is assumed that, at this time, only the probability value $P_{(B,G)}$ of node B meeting node G is greater than the probability value $P_{(A,G)}$ of node A meeting node G, then only

TABLE 1: Two-dimensional table of probability maintained by nodes.

Current node	Destination node	Probability value of historical message delivery	Node's historical encounter duration	Node's historical disconnection duration
A	B	$P_{(A,B)old}$	$T_{(A,B)old}$	$T_{U(A,B)old}$
A	C	$P_{(A,C)old}$	$T_{(A,C)old}$	$T_{U(A,C)old}$
A	D	$P_{(A,D)old}$	$T_{(A,D)old}$	$T_{U(A,D)old}$

a copy of the message will be distributed to node B, and other nodes within the transmission range of node A will be ignored. When a message is distributed, an intermediate node will only receive a copy of the message and enter the waiting state after all the messages are distributed. Compared with the dichotomy SNW routing distribution, this method takes longer to distribute the message and increases the delay of the message distribution. In order to effectively solve this problem, an improved routing algorithm based on probability-PSN is proposed as follows.

In SNW routing, in the message dissemination stage, when the node carrying a copy of the message only passes the copy of the message to the node with a higher probability of delivery than itself, the node may not find a node that can distribute the copy of the message when the life cycle of the carried message expires. If this situation is encountered, the message will not be delivered to the destination node. With this method of dissemination, the node needs to find N nodes with a higher delivery probability than itself, so it takes longer to end the dissemination phase, which increases the delay of message delivery. In order to effectively make up for the shortcomings of the above algorithms, in the

dissemination stage, the dissemination node strategy will be improved. The improved algorithm no longer only distributes the nodes whose expected value is higher than itself. Instead, it calculates the number of copies of the message distributed to each node based on the probability of each node's message delivery.

Each node in the DTN maintains a two-dimensional table to record the probability value of the node meeting other nodes in the network, that is, the expected value of message delivery. As the nodes move, the topology of the network will change, and the probability of any two nodes meeting will also change. The calculation of probability is based on (2)–(4). In the message dissemination stage, the situation of each node distributing a copy of the message should be determined according to the expected value of each node's message delivery. Nodes with a higher expected value of message delivery will distribute more copies of the message. Nodes with lower message delivery expectations distribute fewer copies of messages or do not distribute copies of messages. The calculation method of the number of message copies distributed by the node is shown in the following formula:

$$N(i) = \begin{cases} \lfloor \frac{P(i,d)}{\sum_{j=1}^n P(j,d) + P(R,d)} \times M \rfloor & \frac{P(i,d)}{\sum_{j=1}^n P(j,d) + P(R,d)} \times M > 1 \\ 1 & \text{other} \end{cases} \quad (5)$$

Node R carries a copy of the message, and its probability of meeting the destination node D is $P(R, d)$. Within the transmission range of the node R, there are n nodes that do not carry a copy of the message. At this time, the node R needs to distribute the copy of the message it carries. We assume that i is any node that meets node R, and $P(i,d)$ is the probability of node i meeting the destination node, that is, the message delivery probability of node i . After calculation, $N(i)$ is the number of message copies forwarded by node i . After the dissemination ends, the message copies carried by the node R are reduced.

$$N(R)_{new} = N(R)_{old} - \sum_{j=1}^n N(j). \quad (6)$$

Node A carries 20 copies of the message. Before distributing the copy of the message, each node in the network first updates the probability table of encounters with other nodes in the network that it maintains. At this time, we assume that the destination node is D. After calculating the probability values by (1)–(3), the delivery probability values $P_{(B,D)} = 0.85$ and $P_{(C,D)} = 0.35$ at which node B and node C will deliver the message to node D are obtained. Through the probability table maintained by node A, the probability value $P_{(A,D)} = 0.4$ of node A and node D meeting can also be obtained. At this time, the encounter probability of all nodes that do not carry a copy of the message within the transmission range of node A and the destination node is calculated. The number of message copies distributed to each

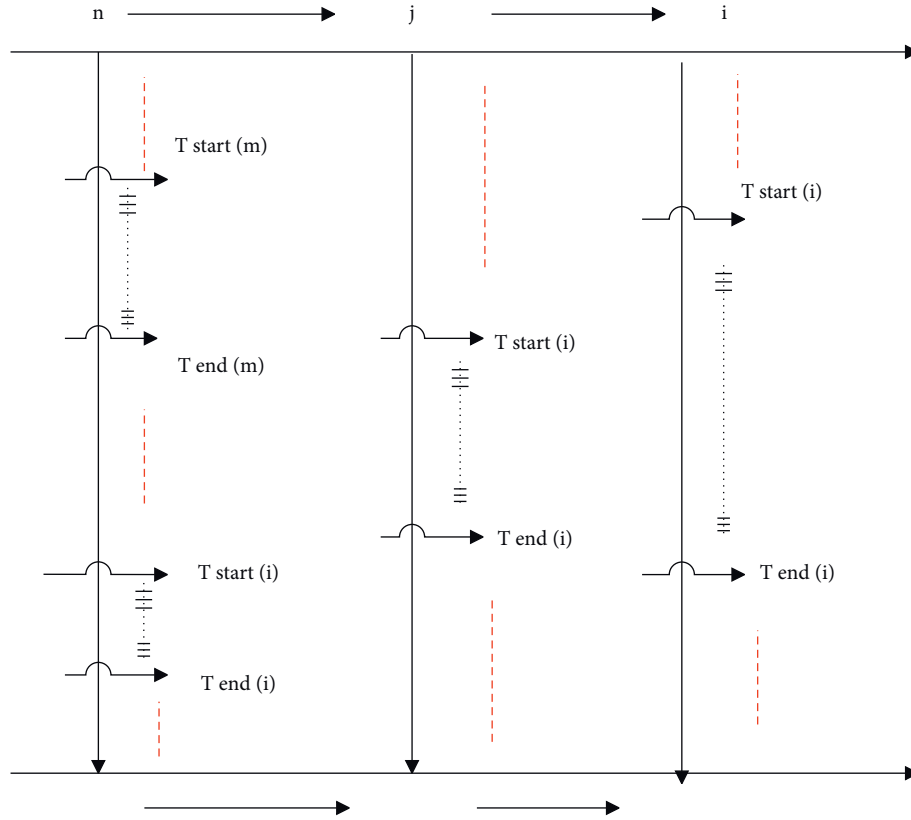


FIGURE 7: Schematic diagram of node connection time.

node is determined according to the probability of each node meeting the destination node. The result calculated by (4) is as follows:

$$N(B) = \left\lfloor \frac{P_{(B,D)}}{P_{(B,D)} + P_{(A,D)} + P_{(C,D)}} \times M \right\rfloor = 10,$$

$$N(C) = \left\lfloor \frac{P_{(C,D)}}{P_{(A,D)} + P_{(B,D)} + P_{(C,D)}} \times M \right\rfloor = 4, \quad (7)$$

$$N(A) = M - N(B) - N(C) = 10 - 10 - 4 = 6.$$

Among them, $N(B)$ and $N(C)$ are the number of message copies distributed by node B and node C, respectively. $N(4)$ is the number of message copies carried by node A after it distributes a message to nodes within its transmission range. Both $N(B)$ and $N(C)$ are the values rounded down after calculation. When this method is used for calculation, it always distributes more copies of the message to the node with the highest probability of encountering the destination node. Compared with simple probability-based SNW routing, it not only reduces the time required for message dissemination, but also avoids the node's discarding of message copies in the dissemination phase due to the end of the life cycle. The node that encounters the destination node more carries more copies of the message, which can increase the success rate of message delivery and reduce the delay of message delivery.

When a message is distributed, a node in the network can receive copies of the same message distributed by

multiple nodes at the same time, but at this time it is stipulated that a node can only receive a copy of a message from one node, so it needs to select the node that sends the copy of the message. In addition, if a node already carries a copy of the message, it will no longer receive a copy of the message from the node.

Figure 7 is a schematic diagram of the connection time between a node and n nodes, which shows the connection time for each node to be connected m times.

4. Design System of Mathematics Teaching Plan Based on Big Data Technology

According to the needs of mathematics teaching and management, the functional structure of this system is divided into mathematics teaching subsystem and management subsystem. The structure is shown in Figure 8.

The student user operation process is shown in Figure 9.

As a network mathematics teaching system, the content of curriculum mathematics teaching is mainly the electronic courseware of each chapter in the class, including knowledge key points, introductions to difficult points, and analysis of typical examples, as well as mathematics teaching reference materials and curriculum mathematics syllabus content information. The course learning module will display knowledge points by navigating through chapters in sequence. This module will be implemented using hypertext technology for static pages. Hypertext is a method of

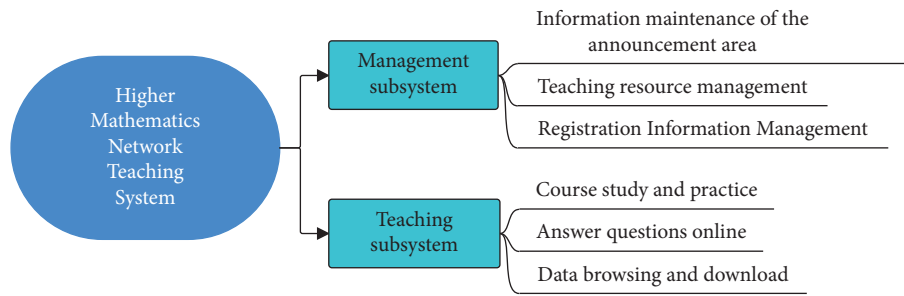


FIGURE 8: System function structure diagram.

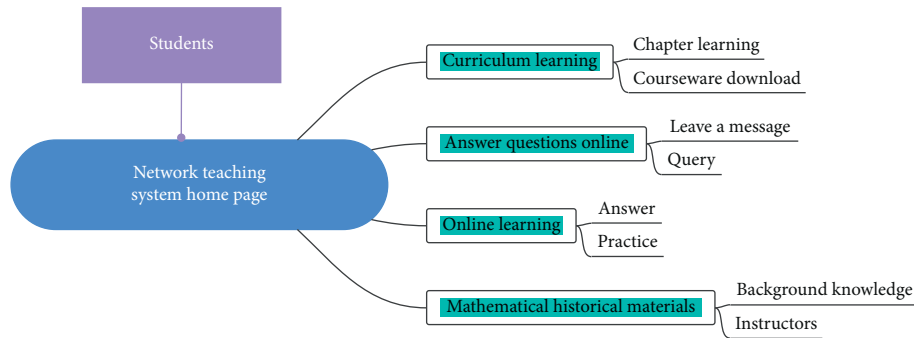


FIGURE 9: Flow chart of student user operation.

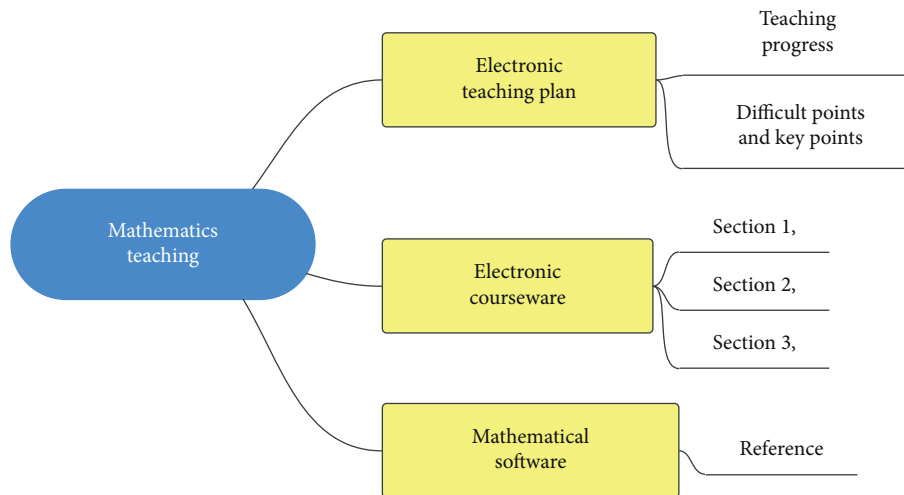


FIGURE 10: The structure diagram of the math teaching page.

information management, which stores data or information in nodes, and the nodes are connected by chains into a network structure. The node is the basic unit for storing data or information. It can be text, image, graphics, sound, video, source program, etc. The chain is the main way to connect each node. It is a pointer from each node to other nodes, or from other nodes to the node. Each node is connected by a chain into a network structure, and students can enter each node along the chain, as shown in Figure 10.

Online Q&A is mainly used to help students answer the questions they encounter in their studies. Students can ask questions to teachers through the message board. Teachers can use e-mail to give one-to-one or use online posting to give one-

to-many answers to students. The online Q&A data flow is shown in Figure 11.

The database is the cornerstone of the entire system. It organizes a large amount of data in the information system according to a certain model and provides the functions of storing, maintaining, and retrieving data, so that the information system can easily, timely, and accurately obtain the required information from the database. The key to whether the various parts of an information system can be closely integrated and how to integrate them lies in the database. Only a reasonable logical design and effective physical design of the database can develop a comprehensive and efficient information system. Database design is an

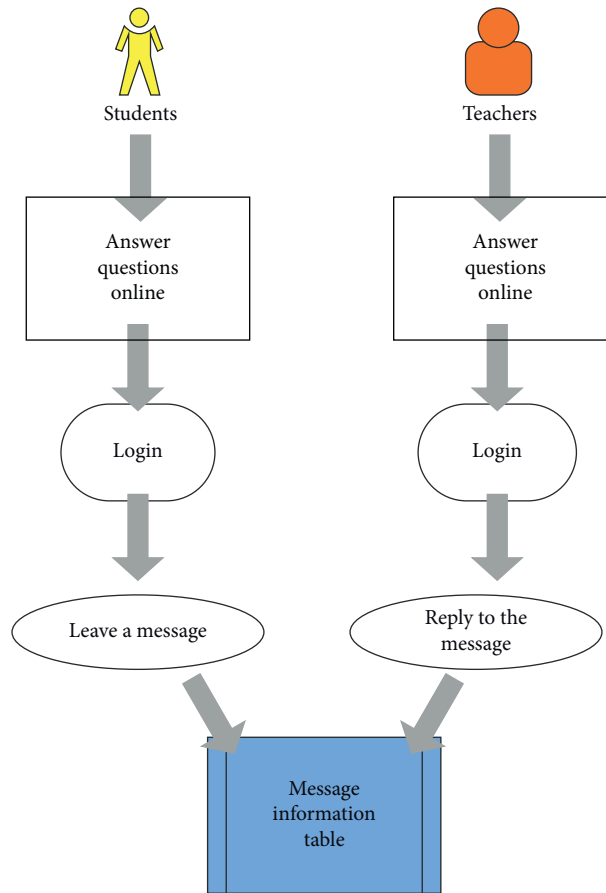


FIGURE 11: Data flow diagram of online Q&A.

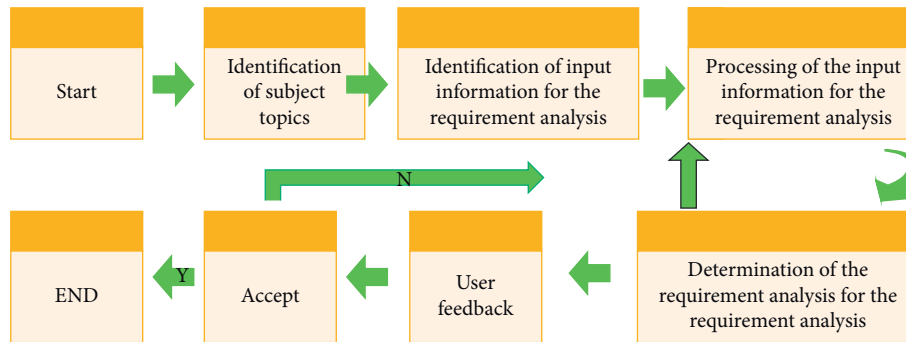


FIGURE 12: Work flow chart of demand analysis.

important part of information system development and construction, as shown in Figure 12.

After constructing the above model, the model is verified, and the actual situation is analyzed to verify the performance of the mathematics teaching system constructed in this paper. This article evaluates the system's mathematics knowledge recommendation, teaching plan,

and teaching effect, and the results are presented in Table 2 and Figure 13.

From the above research, it can be seen that the mathematics teaching plan design system based on big data technology constructed in this paper has good practical effects. On this basis, the system of this paper can be verified through further practice.

TABLE 2: Design effect of mathematics teaching plan based on big data technology.

Number	Knowledge recommendation	Teaching plan	Teaching effect
1	94.70	89.26	92.21
2	96.78	94.35	90.71
3	96.50	93.79	87.02
4	94.98	91.71	91.56
5	91.02	94.64	92.13
6	94.34	92.41	86.84
7	95.61	94.23	88.72
8	91.29	91.81	93.31
9	92.42	89.35	88.46
10	96.12	88.75	88.18
11	92.08	91.85	92.11
12	96.45	94.37	92.03
13	93.79	90.07	92.60
14	96.79	90.40	87.61
15	92.48	94.82	89.02
16	95.12	91.59	87.54
17	93.07	91.26	93.12
18	92.97	93.38	91.03
19	95.03	89.67	88.04
20	93.83	92.32	88.40
21	94.91	92.76	92.07
22	93.31	91.27	88.86
23	95.67	91.80	87.08
24	94.23	93.48	93.75
25	96.72	92.77	90.22
26	95.25	89.05	89.76
27	91.15	89.57	93.57
28	93.27	94.25	92.71
29	91.39	92.92	89.93
30	95.08	91.80	87.82
31	93.70	90.22	89.69
32	96.26	88.57	87.21
33	96.54	91.89	93.94
34	94.13	94.89	92.17
35	95.79	94.44	91.64
36	94.59	92.66	87.89
37	94.49	94.64	87.11
38	91.24	93.34	90.36
39	92.85	91.42	91.43
40	96.39	91.85	90.27

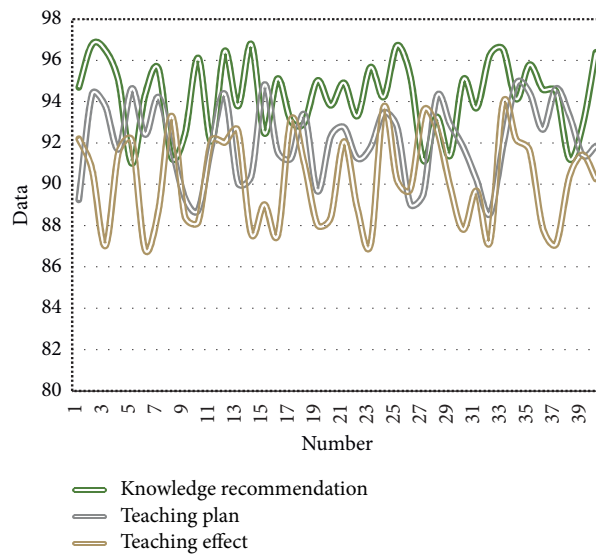


FIGURE 13: Statistical results of system performance.

5. Conclusion

Accurate teaching in the era of big data is of great significance for advancing the realization of modern education, individualized learning, intelligent environment, and intelligent management. Accurate teaching in the era of big data requires meticulous characterization of student characteristics and behaviors, accurate summarization of the teaching process and teaching rules, and a clear description of the specific implementation of the teaching plan. Moreover, the realization of precision teaching in the era of big data is inseparable from the in-depth analysis and mining of big data in education. Data-driven support for education and teaching decision-making is the main feature of precision teaching in the era of big data. In addition, by constructing a mathematical model, the relationship between the variables in the education process can be portrayed, and the formulation methods of precise teaching plans can be derived from it, which provides support for the realization of precise teaching. Therefore, to achieve accurate teaching in the era of big data, it is essential to construct a suitable mathematical model. This article applies big data technology to the design of mathematics teaching plan, designs a mathematics teaching plan design system based on big data, and verifies the system of this paper with experiments. The test results verify the reliability of this system.

Data Availability

The labeled dataset used to support the findings of this study is available from the author upon request.

Conflicts of Interest

The author declares no conflicts of interest.

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