

Research on Resource Equilibrium Scheduling of Massive MOOC Teaching Resources Information Management System

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Abstract. The transmission channel of massive MOOC teaching resource information management system under routing conflict is easily affected by multipath effect, which leads to poor balance of teaching resource scheduling and high bit error rate. In order to improve the channel resource equalization scheduling ability of massive MOOC instructional resource information management system under routing conflict, a resource equalization scheduling model based on adaptive feedback equalization and symbol modulation technology for massive MOOC teaching resource information management system is proposed. The transmission channel model of massive MOOC teaching resource information management system under routing conflict is constructed, and the multipath characteristics of mass MOOC teaching resource information management system channel are analyzed. The random sequence code spread spectrum method is used to suppress the inter-symbol interference in the channel of massive MOOC teaching resource information management system, and the adaptive feedback equalization technique is used to design the channel equalization. The channel of massive MOOC teaching resource information management system is suppressed in order to realize channel resource equalization scheduling of massive MOOC teaching resource information management system. The simulation results show that the proposed method has the advantages of good fidelity, low bit error rate and good balanced allocation of teaching resources.

Keywords: MOOC teaching resources, information management system, resource scheduling, equilibrium.

1. Introduction

With the maturation of information management and information system design technology, the storage data of information management system is increasing, so it is necessary to schedule the massive teaching resources data in the information management system reasonably. In the case of routing conflict, the information transmission of massive MOOC information management system is affected by inter-class interference of tasks and channel multipath characteristics [1]. As a result of the poor balance of teaching resources scheduling, it is necessary to optimize the design of resource balance scheduling of massive MOOC teaching resources information management system, and to improve the load balancing scheduling ability of the massive MOOC teaching resources information management system channel. In order to improve the massive MOOC teaching resources information management system teaching resources scheduling and data transmission ability [2].

The channel resource equalization and scheduling technology of massive MOOC instructional resource information management system under routing conflict is based on the channel multi-mode control and symbol output modulation of information management system, combined with the design of routing detection protocol. The transmission channel equalization control of mass MOOC instructional resource information management system under routing conflict is carried out, and the spread spectrum technology is adopted to carry out channel spread spectrum scheduling to improve the anti-interference and robustness of the channel resource equalization scheduling of the information management system [3]. Some research results have been obtained, among which, in reference [4], an algorithm for information transmission and scheduling of massive MOOC teaching resources information management system based on Porter interval equalization is proposed [4]. Dynamic compensation technology is used to design routing conflict protocol to improve the conflict prevention ability of teaching resource scheduling, but this method cannot effectively suppress electromagnetic radiation and impulse response interference under routing conflict. The resource

equalization scheduling resulting in channel output is not strong in anti-interference. In view of the disadvantages of traditional methods, this paper presents a resource equalization scheduling model for massive MOOC teaching resource management system based on adaptive feedback equalization and symbol modulation technology. The transmission channel model of massive MOOC teaching resource information management system under routing conflict is constructed, and the multipath characteristics of mass MOOC teaching resource information management system channel are analyzed. The transmission channel adaptive adjustment model is used to suppress the channel of massive MOOC teaching resource information management system, and the adaptive forward control demodulation technique is used to realize the channel resource equalization scheduling of mass MOOC teaching resource information management system. Finally, the simulation experiments are carried out to demonstrate the superior performance of this method in improving the resource balance scheduling ability of massive MOOC teaching resource information management system.

2. Multipath Channel Model and Channel Characteristic Analysis of Massive MOOC Teaching Resource Information Management System.

2.1 Multipath Channel Model Description of Massive MOOC Teaching Resource Information Management System

In order to realize the channel resource balanced scheduling of massive MOOC teaching resource information management system under routing conflict, it is necessary to construct the transmission channel model of mass MOOC teaching resource information management system under routing conflict. The input and output characteristics of the communication bit sequence stream are analyzed [5]. The transmission channel of mass MOOC teaching resource information management system under routing conflict is an extended channel. In the mass MOOC teaching resource information management system, in order to adapt to the demand of mass MOOC teaching resource information task adaptive scheduling, the fitness function is used as the validity of data storage and the objective function, which is represented as follows:

$$f_{ij} = w_t \delta_t + w_c \delta_c + w_q \delta_q + w_s \delta_s \quad (1)$$

The convergence algorithm of teaching resource scheduling is constructed by channel allocation strategy. Combining with the characteristic decomposition method of task information flow, the iterative equation of teaching resource scheduling in massive MOOC teaching resource management system is obtained as follows:

$$x_{id}^{t+1} = x_{id}^t + aV_{id}^{t+1} \quad (2)$$

The channel model of information transmission of massive MOOC teaching resources information management system under routing conflict is constructed. The task conflict scheduling in information management system is described as a discrete system:

$$\begin{cases} \varphi_1 = r_1 c_1 \\ \varphi_2 = r_2 c_2 \\ \varphi = \varphi_1 + \varphi_2 \\ p = \frac{\varphi_1 p_0 + \varphi_2 g}{\varphi_1 + \varphi_2} \end{cases} \quad (3)$$

The task priority is optimized and the fuzzy K-means clustering method is designed to deal with the adjacent tasks of teaching resource scheduling [6]. The clustering model is described as follows:

$$v(t+1) = \omega v(t) + \varphi(p - x(t)) \quad (4)$$

$$x(t+1) = x(t) + v(t+1) \quad (5)$$

According to the above analysis, the transmission channel model of massive MOOC teaching resource information management system under routing conflict is constructed, and the multipath characteristics of massive MOOC teaching resources information management system channel are analyzed.

2.2 Analysis of Data Transmission Characteristics of Information Management System

The random sequence code spread spectrum method is used to filter the inter-symbol interference in the channel of massive MOOC teaching resource information management system, and the adaptive feedback equalization technique is used to design the channel equalization [7]. The forwarding control model of the teaching resource scheduling node is described as follows:

$$x(t+1) + (\varphi - w)x(t) = \varphi p \quad (6)$$

The dynamic compensation technique is used to sample the symbols in the transmission channel of mass MOOC teaching resource information management system under routing conflict. Through the above analysis and calculation, the optimal scheduling of mass tasks under routing conflict can be realized. Extracting the associated characteristic quantity of the task to be scheduled, and integrating multiple task flows in the finite distribution vector set S , the extended function of teaching resource scheduling is defined as:

$$\theta(t) = 2\pi \int_{-T/2}^{t/a} \left(\frac{K}{t_0 - t'} \right) dt' = -2\pi K \ln \left(1 - \frac{t}{at_0} \right) + \theta_0 \quad (7)$$

Where, $\theta_0 = -2\pi K \ln \left(1 + \frac{T}{2t_0} \right)$, the channel model of mass MOOC instructional resource information management system under routing conflict is constructed, and the channel equalization design is carried out. In the instantaneous state, the multiple task flow sets of the information management system are defined as:

$$\mu = \sum_{i=1}^L \lambda_i / \sum_{j=1}^H \lambda_j \quad (L \leq H) \quad (8)$$

Where, subscript i denotes the priority attribute of massive teaching resource scheduling in information management system, and the constraint relation of priority attribute of task flow is as follows:

$$p(y | \alpha, \theta) = \sum_{k=1}^K \alpha_k p_k(y | \mu_k, \sum_k) \quad (9)$$

The equalization collocation coefficient of channel allocation strategy is defined according to the number of frames of mass MOOC instructional resource information management system which is allocated layer by spread spectrum modulation:

$$b_m = t_0(1-a) \quad (10)$$

The energy transfer control function between cloud computing nodes in massive MOOC teaching resource information management system is obtained by using the energy balance control model:

$$f_{i_s}(t) = f_i(t + b_m) \quad (11)$$

The optimal solution vector of teaching resource scheduling model is constructed. Taking the optimal number of hops of virtual task transmission in the massive MOOC teaching resource information management system as the constraint condition, the load balance control of task

transmission is carried out, and the transmission channel of scheduling is dynamically allocated. The ability of balanced allocation of teaching resources is improved.

3. Information Management of Teaching Resources and Optimization of Scheduling Algorithm

3.1 Channel Equalization Configuration of Massive MOOC Teaching Resources Information Management System

On the basis of constructing the transmission channel model of massive MOOC teaching resource information management system under routing conflict, the optimization design of teaching resource scheduling is carried out. In this paper, an adaptive feedback equalization and symbol modulation based resource equalization scheduling model for massive MOOC teaching resource information management system is proposed. The fuzzy clustering strategy is used to simplify the transmission information of teaching resource scheduling. In the system model design of teaching resource scheduling, RTT (Round-Trip Time, round trip delay) can be defined to express the energy cost of massive MOOC teaching resource information management system, and the quantitative characteristic model of teaching resource scheduling can be obtained as follows:

$$x(t+2) = (\varphi - w - 1)x(t+1) + wx(t) \quad (12)$$

By using time-division multiple access (TDMA) protocol and taking virtual tasks in massive MOOC teaching resource information management system as scheduling set, the execution time of teaching resource scheduling is defined as follows:

$$x_{id}^{t+1} = wx_{id}^t + c_1 r_1 (p_{id} - x_{id}^t) + c_2 r_2 (p_{gd} - x_{id}^t) \quad (13)$$

In cloud computing platform, the task priority control of virtual task in massive MOOC teaching resource information management system is carried out, and the control model of teaching resource scheduling is expressed as follows:

$$\begin{cases} x = (x_1, x_2, \dots, x_n) \\ y = F(x) = (f_1(x), f_1(x), \dots, f_m(x))^T \\ g_i(x) \leq 0, i = 1, 2, \dots, q \\ h_i(x) = 0, i = 1, 2, \dots, p \end{cases} \quad (14)$$

The adaptive feedback equalization technique is used to design channel equalization when the task characteristic distribution set is satisfied:

$$u_a(t - b_m) = \frac{1}{\sqrt{a}} u(t) - \frac{aT}{2} + b_m < t < \frac{aT}{2} + b_m \quad (15)$$

Where, $\bar{R}_s(t) = (R_{s_1}, \dots, R_{s_m})$ is the priority control of teaching resource scheduling. $R_{s_i} (i = 1, \dots, m)$ is the channel distribution index of teaching resource scheduling. The random sequence code spread spectrum method is used to suppress the inter-symbol interference in the channel of massive MOOC teaching resource information management system. The multipath clustering function is obtained as follows:

$$V = \{v_{ij} | i = 1, 2, \dots, c, j = 1, 2, \dots, s\} \quad (16)$$

When the sender of the massive MOOC teaching resource information management system needs to send data, the distribution node automatically sorts through the priority list to realize the channel

equilibrium configuration of the massive MOOC teaching resources information management system [8].

3.2 Teaching Resource Scheduling Output

Combined with the Convergence Metric index of energy distribution, we can get the n input control parameter and m output parameter in the virtual teaching resource scheduling model of massive MOOC teaching resource information management system. Each cluster of massive MOOC teaching resource information management system is composed of one cluster head [9]. Several cooperative cluster heads and cluster members are formed to establish the priority attributes of task set $P(n_i) = \{p_k \mid pr_{kj} = 1, k = 1, 2, \dots, m\}$, and the iterative equation of teaching resource scheduling is obtained as follows:

$$V_{id}^{t+1} = wV_{id}^t + c_1r_1(p_{id} - x_{id}) + c_2r_2(p_{gd} - x_{gd}) \quad (17)$$

There are n samples in the data set of arrival task information table of each node. The power consumption of RTT_s anti-collision task scheduling in MOOC teaching resource information management system is expressed as follows:

$$RTT_s = (1 - \alpha) \times RTT_s + \alpha \times RTT \quad (18)$$

The transmission channel adaptive regulation model is used to suppress the channel of massive MOOC teaching resource information management system, and the adaptive forwarding control demodulation technology is combined to design the conflict planning of teaching resources scheduling. Therefore, the conflict prevention ability of teaching resources scheduling is improved [10]. The time slot allocation list of massive MOOC teaching resource management system is shown in figure 1.



Fig. 1 Slotted allocation list of teaching resources scheduling in massive MOOC teaching resource information management system

4. Analysis of Simulation Experiment

Aiming test the performance of this algorithm in the anti-conflict scheduling of complex tasks in the massive MOOC teaching resource information management system, simulation experiments are carried out. The experiment is based on the Matlab 7 simulation software. In the experiment, the massive MOOC teaching resource information management system uses BPSK modulation bit sequence stream to simulate the massive MOOC teaching resource information management system information transmission bit sequence flow. The sampling frequency of information transmission bit sequence stream of massive MOOC teaching resource information management system is 10kHz, the bandwidth of teaching resource scheduling is 10kHz~20kHz, and the amount of data of teaching resource scheduling increases from 100 MB to 1 GB. The channel resource equalization scheduling of massive MOOC teaching resource information management system is carried out and the channel forwarding bit sequence stream model of massive MOOC teaching resource information management system is obtained as shown in figure 2.

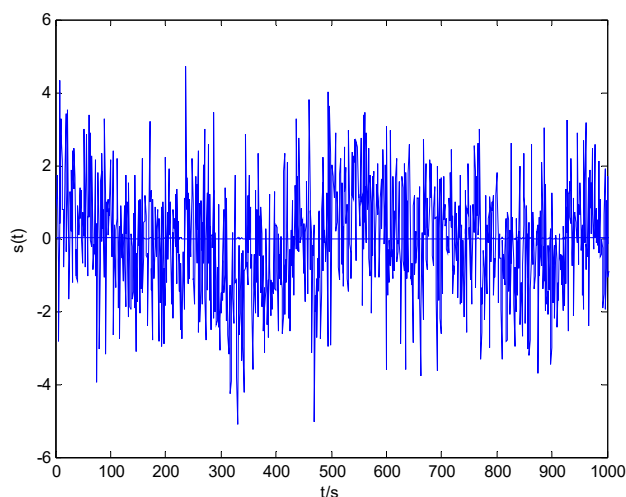


Fig. 2 Channel forwarding bit sequence stream
Model of massive MOOC teaching resource Information management system

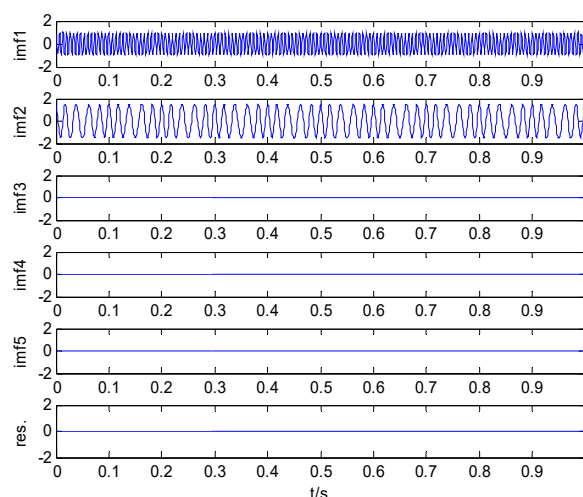


Fig. 3 Teaching resource scheduling output
Model of massive MOOC teaching resource Information management system

In this paper, the channel multi-path suppression of massive MOOC teaching resource information management system is carried out, and the adaptive forwarding control demodulation technology is used to realize the channel resource equalization scheduling of massive MOOC teaching resource information management system. The scheduling output is shown in figure 3.

Figure 3 shows that the balanced scheduling of massive MOOC teaching resources information management system using this method is good, and the delay of teaching resources scheduling is tested by different methods. The comparison results are shown in Table 1. The results of table 1 show that the delay of resource equilibrium scheduling in massive MOOC teaching resource information management system is small and the real-time performance of scheduling is better.

Table 1. Comparison of delays in the scheduling of teaching resources (unit: s)

Resource scheduling scale /MBit	Proposed method	Reference [5]	Reference [6]
100	0.12	0.42	0.65
200	0.24	0.55	0.79
300	0.35	0.69	1.54
400	0.68	1.90	1.69

5. Conclusion

In order to improve the channel resource equalization scheduling ability of massive MOOC instructional resource information management system under routing conflict, a resource equalization scheduling model based on adaptive feedback equalization and symbol modulation technology for massive MOOC teaching resource information management system is proposed. The transmission channel model of massive MOOC teaching resource information management system under routing conflict is constructed, and the multipath characteristics of mass MOOC teaching resource information management system channel are analyzed. The random sequence code spread spectrum method is used to suppress the inter-symbol interference in the channel of massive MOOC teaching resource information management system, and the adaptive feedback equalization technique is used to design the channel equalization. The channel of massive MOOC teaching resource information management system is suppressed in order to realize channel resource equalization scheduling of massive MOOC teaching resource information management system. The simulation results show that the proposed method has the advantages of good fidelity, low bit error rate and good balanced allocation of teaching resources. This method has good application value in information management system design and resource scheduling.

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