



Research on Culture Construction and Management Under Computer-Based Model

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Abstract. The new round of information technology revolution and industrial revolution has been promoted in recent years, and a new generation of information technology such as big data, artificial intelligence and cloud computing has achieved vigorous development, comprehensive integration, rapid transformation and wide application. Especially under the “unprecedented changes” of the global epidemic, the Internet culture formed and developed on the basis of Internet technology has a profound impact on human work, life and learning, so much so that the Internet culture seems to be everywhere, all the time, no one can use it, and it is all-pervasive.

Keywords: Computer models · Culture building · A management study · Internet Culture

1 Introduction

With the deepening of the technological revolution and industrial change, new industries, new business models and new modes that are constantly being updated under the mutual promotion of social informatization and economic globalization are driving the deep integration of modern social life into all aspects of the Internet, and people’s learning styles, work patterns, production habits and lifestyles have undergone profound changes [1]. Network culture, as an important carrier of social customs, people’s ideology and the public’s aesthetic interests, has a great influence on the formation and development of the values of the general public [2].

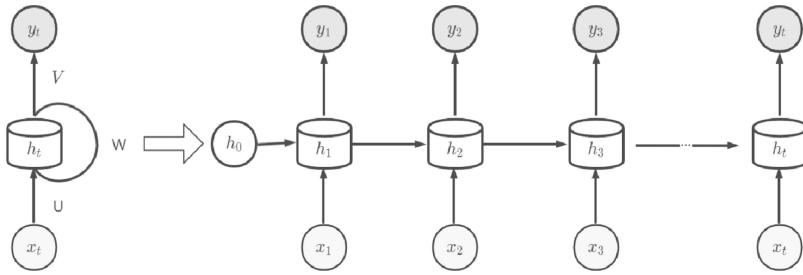


Fig. 1. Recurrent neural network

2 Design of Ranking Algorithms Incorporating Long and Short Term User Behavior

2.1 Sequence Modeling Knowledge

2.1.1 Basic Recurrent Neural Network

Recurrent Neural Network (RNN) is a common way to model sequences. The RNN introduces a memory to retain historical information (Fig. 1), and the memory h_t at moment t is jointly determined by the memory h_{t-1} at the previous moment and the input x at moment t [3].

During forward propagation the memory state h_t is refreshed at each moment t and the parameter matrices U, W, V remain unchanged; during backward propagation the parameter matrices U, W, V are updated sequentially [4].

$$h_t = \sigma(Ux_t + Wh_{t-1} + b)$$

where U, W is the parameter matrix, b is the bias, and σ is the activation function, which is generally tanh.

$$y_t = \sigma(Vh_t + c)$$

where V is the parameter matrix, c is the bias, and σ is the activation function, which is generally soft max [5].

2.1.2 Long and Short-Term Memory Unit and Gated Loop Unit

Long Short Term Memory (LSTM) solves to some extent the problem that RNNs cannot train longer sequences of data. LSTM introduces three gate structures and cellular states for recording long-term memory and candidate states for generalizing new knowledge based on RNN, as shown in Fig. 2 (left).

Gated Recurrent Unit (GRU) has a prediction effect close to that of LSTM with fewer training parameters and only two gate structures, reset gate and update gate [6], which is a simplification of LSTM structure [7].

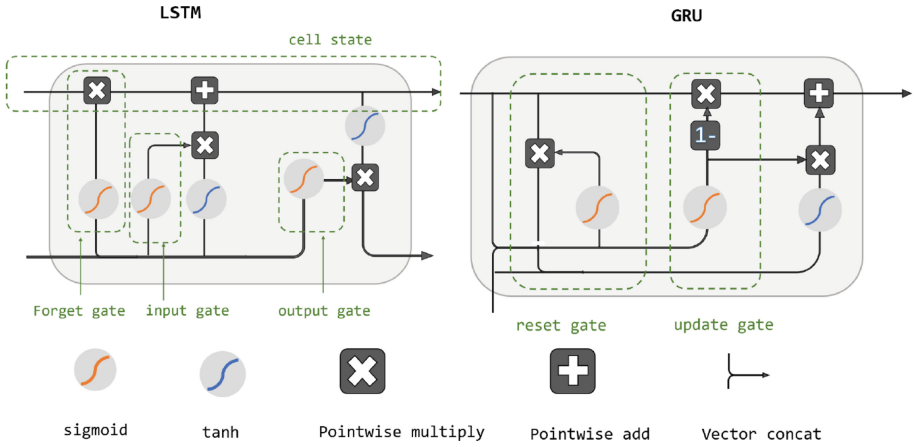


Fig. 2. LSTM (left) and GRU (right)

3 Model Definition and Detailed Structure

In this paper, we propose a ranking model LSIN (User Long-term and Short-term Interest Network), which combines users' long-term behavior and short-term behavior, to predict users' click rate on candidate item v_t . The model network structure is shown in Fig. 3.

For user u , the behavioral sequence characteristics can be expressed as:

$$S(u) = \{v_1, v_2, v_3, \dots, v_n\}$$

$L(u) = \{v_1 \cup v_2 \cup v_3 \cup \dots \cup v_{n-k}$ is chosen as the long-term behavior of user u , and the recent k behaviors $v_{n-k+1}, v_{n-k+2}, \dots, v_n$ are taken as the short-term behavior of user u .

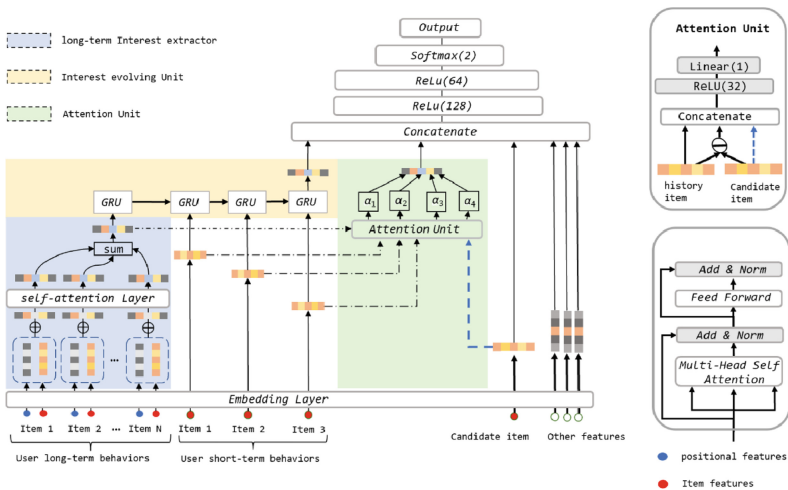


Fig. 3. LSIN model

Table 1. Performance comparison results of each model

dataset	ML-1m		M1-10m		NetFlix	
Model	AUC	LogLoss	AUC	LogLoss	AUC	LogLoss
Wide&Deep	0.7659	0.5834	0.7844	0.5393	0.7767	0.5178
DIN	0.7724	0.4993	0.818	0.4185	0.8075	0.4455
DIEN	0.7785	0.4225	0.8234	0.3927	0.8166	0.4378
BST	0.7834	0.4064	0.8267	0.3643	0.8257	0.4134
LSIN(b = 1)	0.7853	0.4016	0.8288	0.3525	0.8235	0.4175
LSIN(b = 2)	0.779	0.4356	0.8223	0.3744	0.8147	0.424
LSIN(b = 3)	0.7755	0.5022	0.816	0.4087	0.812	0.4345

3.1 Analysis of Experimental Results

(1) Performance indicators under offline conditions.

The results of comparing the offline performance parameters of several models on different datasets are shown in Table 1, and it can be seen LSIN achieves relatively good results under two different size datasets.

Wide & Deep utilizes a shallow network to memorize user preferences, while for the crossover of input features only the MLP fully connected layer is used, which is simple and effective, but does not exploit the relationship between the user’s behavioral sequences and therefore has the worst overall performance [8].

(2) Impact of different modeling approaches under offline conditions [9].

We masked the GRU unit as well as the basic attention mechanism separately to compare the effects of the two modeling approaches (Fig. 5), and the results are shown in Table 2.

Figure 4 illustrates the impact of different segmentation strategies for long- and short-term behavior on offline AUC.

Table 2. Effect of modeling method on offline AUC

dataset	method	AUC	Dataset	method	AUC
ML-10m	LSIN-A	0.785	NetFlix	LSIN-A	0.7734
	LSIN-E	0.7664		LSIN-E	0.7465
	LSIN	0.8288		LSIN	0.8235

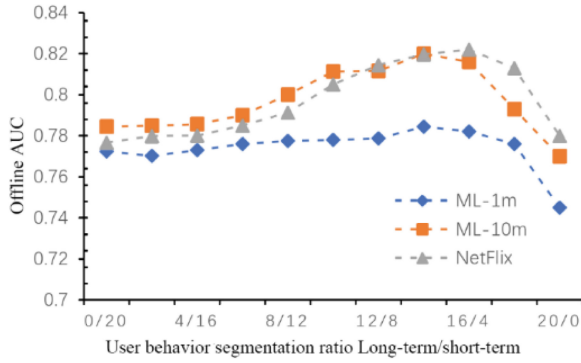


Fig. 4. Impact of the ratio of long- to short-term behavior.

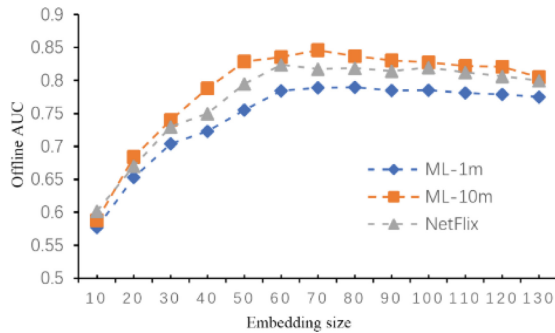


Fig. 5. Effect of embedding size on offline AUC

4 Conclusion

Xi Jinping on the construction of network culture made important discourse, is Xi Jinping according to the new round of information technology revolution and China's letter career development status, around the important task of building socialist culture with Chinese characteristics and the construction of a strong network country and the opportunity of the times, formed to follow the regularity, reflect the originality and highlight the system of network culture construction important discourse, with theoretical, political, people's, contemporary, practical and other significant features, for the construction of network culture with Chinese characteristics provides a fundamental theoretical guidance and important practical guidance.

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