Occupation and Professional Education Vol. 1 No. 1, 2024

Academic Education Publishing House

The Application and Realization of Internet+ Technology in College English Listening Teaching

Zhongmei Pan
Jiangsu Yancheng Yunke Teachnical School, Yancheng, Jiangsu, China

Abstract: In the context of the "Internet +" era, the in-depth integration of information technology and educational practice constantly changes the teaching mode of traditional listening classes in foreign languages. The application of blended learning mode based on multimedia network teaching platform and intelligent mobile terminal is applied in the colleges and universities foreign language listening teaching. An English listening teaching method facing "Internet +" is proposed in colleges and universities. Firstly, the word is applied to realize the effective recognition of English listening teaching words. Then, as for the teaching knowledge and the listening content, the "Internet +" English listening network teaching is used. Finally, experimental results show that the method can improve students' English listening level so as to complete the purpose of college English listening teaching under the "Internet +".

Keywords: Multimedia Network; College English Listening Teaching; Internet+ Technology

1. Introduction

Due to various reasons, at present, foreign language listening teaching in many colleges and universities is still using the traditional teaching mode of "playing the listening material - doing exercise - checking answers". In face of the modern students who are active in thought and pursuit of personalized development, the mechanical and unidirectional teaching malpractices are gradually exposed. the mode that "teachers are the main bodies, and students' study passively" inhibits students' learning enthusiasm and the ability of autonomous learning [1-3]. With the rapid development of mobile Internet, the continuous optimization of information environment has changed people's life and learning style, and the integration of information technology and educational practice is imperative. Under this background, the mode of blended learning that is integrated traditional classroom and online learning advantages provides new ideas for foreign language listening teaching [4-7].

To solve the problem effectively, this paper proposes an English listening teaching method that is facing "Internet +" in colleges and universities. This paper also effectively reduces the difficulty of English listening teaching. For DBNs(Dynamic Markov Networks,DBNs) , that is when the relationship between variables is in an unknown state, MOL is used to teach unknown structures and words, as well as English listening teaching [8-10]. Finally, the "Internet +" oriented method of English listening teaching in colleges gives students more autonomy in time and space, and allows students to relatively freely control the progress and the difficulty of learning through Internet technology according to their own individual conditions.

2. Modeling English Listening Teaching in Colleges

The "Internet +" English teaching process (IPCELT) can be described by the quadruples <S,A,T,R> . the formula $S = \{s_1, s_2, \cdots, s_n\}$ represents a set of states that cover the English listening vocabulary; while the formula $A = \{a_1, a_2, \cdots, a_n\}$ shows that all English conversation contents are likely to appear in English listening comprehension. the formula $T(s, a, s') = P(s'|s, a)$ is the state transfer function, which indicates that when English listening is in state s , the English dialogue content a is used, so that the state can be transferred to the possibility of state s' . the formula $R(s, a, s')$ represents reward function, which refers to the payment that can be obtained by the successful transfer of state

a to state s' under state s. In the state of college English listening teaching mode, the state transfer function $T\left(s,a,s'\right)$ is unknown word $\theta^{s,a,s'}$. the method of PBMOL is defined as follows: Partial observable "Internet +" English teaching process, which is described by sextuple < S_P, A_P, Z_P, T_P, O_P, R_P >. S_P represents the cross product between discrete state S and $\theta^{s,a,s'}$. MDPs that has a collection of English dialogue content A and A_P is consonant. $Z_P = S$. The state transfer function $T_P\left(s,\theta,a,s',\theta'\right) = P\left(s',\theta' \middle| s,\theta,a\right)$ can be broken down into the product of conditional distributions:

$$\begin{aligned} T_P\left(s,\theta,a,s',\theta'\right) &= P\left(s',\theta' \middle| s,\theta,a\right) \\ &= P\left(s' \middle| s,\theta,a,\theta'\right)P\left(\theta' \middle| s,\theta,a\right) \\ &= \theta^{sas'}\delta^{\theta\theta'} \end{aligned} \quad (1)$$

Among them, $\delta^{\theta\theta'}$ is the Kronecker delta function, Meeting the condition:

$$\delta^{\theta\theta'} = \begin{Bmatrix} 1, & \theta' = \theta \\ 0, & otherwise \end{Bmatrix} \quad (2)$$

$O_P\left(s',\theta',a,z\right) = P\left(z \middle| s',\theta',a\right)$ represents that when the content of English conversation a is in English listening, the state and the word are shifted, and the state becomes s'. While the word becomes θ', at the moment it is the probability of z. Based on θ, θ' will not affect the payment words, $R_P\left(s,\theta,a,s',\theta'\right) = R\left(s,a,s'\right)$ and MDPs are the same.

According to the basic definition of MOL, the effective conversion of the problem can be realized and we can transfer it to understand POMDPs. In this problem, because the state is unknown, putting $b(s)$, namely regarding the probability distribution of the introduction of the state S as a belief. By introducing the concept, θ is able to achieve the behavior of English listening teaching through the method of belief monitoring. Based on the "Internet +" updating rule, the following update belief $b(\theta)$ can be obtained:

$$b^{s,a,s'}(\theta) = \eta b(\theta)P\left(s' \middle| \theta,s,a\right) = \eta b(\theta)\theta^{s,a,s'}$$

(3)

In the upper formula, η represents the normalization factor. In the method of MOL, the prior and update distribution of the belief is realized by the distribution function, and if its prior is $b(\theta) = \prod_{s,a} D\left(\theta^{sa};n^{sa}\right)$, and nsa represents the vector of the hyperword $n^{s,a,s'}$. Then the update distribution is as follows:

$$\begin{aligned} b^{s,a,s'}(\theta) &= \eta\theta^{sas'}\prod_{s,a} D\left(\theta^{sa};n^{sas'}\right) \\ &= \prod_{s,a} D\left(\theta^{sa};n^{sa} + \delta_{\tilde{s},\tilde{a},\tilde{s}'}\left(s,a,s'\right)\right) \end{aligned} \quad (4)$$

δ represents the Kronecker delta function. If satisfying $s = \tilde{s}$、$a = \tilde{a}$, $s = \tilde{s}$, the value is 1, and it is 0 in other cases.

3. Application "Internet +" Oriented in College English Listening Teaching

3.1 The Application of English Listening Teaching

In fact, for most state variables, the internal structure can be described by a collection of random variables. This feature is also called applied characteristics. For the application state variables, $X = \left\{X_1, X_2, \cdots, X_n\right\}$ can be represented by finite random variables, and each X_i represents a certain characteristic of the state variables. X_i represents the set of values for each of the variables in X. At this point, one of these states can be represented by $s = \left\{X_1 = x_1, \cdots, X_n = x_n\right\}$. Meeting $x_i \in X_i$, $s = \left\{x_i\right\}_{i=1}^n$ can express its simplified expression. $|S| = \prod_{i=1}^n |X_i|$ represents the space of the state variables. After the application of state variables is applied, the effective representation of state transfer function, observation function and so on can be achieved by compression of the structure DBNs.

If $G(a)$ represents a directed acyclic graph that is a two-story structure and satisfies $a \in A$, $X = \{X_1, \cdots, X_n, X_1', \cdots, X_n'\}$. $\theta_{G(a)}$ represents the conditional probability table, and then the state function can be represented by $G(a)$ and $\theta_{G(a)}$; X_i represents the first characteristic variables in the current state. While X_i' represents the first characteristic variables of the state at the next moment. $X_{\prec i}^{G(a)}$ indicates the value of feature variable $X_i' = x_i$, and it can effectively calculate the state transfer function by the following formula:

$$T(s,a,s') = T(X,a,X') = \prod_{i=1}^{n} P\left(X_i' \middle| X_{\prec i}^{G(a)}\right) \quad (5)$$

In the formula (5), $T(s,a,s')$ stands for the state transfer function in the absence of decomposition. While $T(X,a,X')$ stands for the state transfer function in the application processing.

3.2 English Listening Teaching Content Updating

The method MOL is to realize the observation of data by using the effective interaction between English listening and environment, and to realize the effective English listening teaching of unknown word $\theta_{G(a)}$ and structure $G(a)$. However, for English listening, if the listening content $b(s)$ is given, the update $b_{a,z'}(s')$ can be calculated by the following formula:

$$b_{a,z'}(s') = \eta\delta\left([s']_{Z'} = z'\right) \sum_{s} b(s) P(s'|s,a) \quad (6)$$

η stands for normalized constants, while $[s']_{Z'}$ stands the set of observed variables. Z' stands for a subset of the corresponding state variable value. δ stands for the Kronecker delta function. If $[s']_{Z'} = z'$ is satisfied, then the return value of 1 can be obtained at this time. On the contrary, the return value is 0. Moreover, because the model and structure are unknown at this time, according to the knowledge discussed above, the process of renewal teaching status can be:

$$b\left(X', \theta_{G(a)}\right) = \eta\delta \sum_{X} P\left(X' \middle| X, a, \theta_{G(a)}\right) b\left(X, \theta_{G(a)}\right) \quad (7)$$

Both X and X' stand for the variable characteristics of the application. a stands for English conversation content. Z stands for the listening content. z is a subset of them. $\theta_{G(a)}$ stands for unknown words. δ stands for the Kronecker delta function.

The mixed product Dirichlet describes the state of teaching. Its prior probability can be expressed as follows:

$$b\left(X, \theta_{G(a)}\right) = \sum_{i} c_{i,X} \prod D_{i,X}\left(\theta_{G(a)}^{X_{\prec i}^{G}}\right) \quad (8)$$

$c_{i,X}$ stands for Dirichlet coefficient. D stands for Dirichlet distribution function. $\theta_{G(a)}^{X_{\prec i}^{G}} = P\left(X' \middle| \text{parents}\left(X'\right)\right)$ stands for the updated belief:

$$b_{a,z'}\left(X, \theta_{G(a)}\right) = \sum_{j} c_{j,X'} \prod D_{j,X'}\left(\theta_{G(a)}^{X_{\prec i}^{G}}\right) \quad (9)$$

3.3 English Listening Words Function

Based on the content discussed above, MOL can be constructed by using DBNs in the field of FMDPs, which has the model variable $\theta_{G(a)}$ at this time. If regarding $\theta_{G(a)}$ as the implicit in FMDPs at this time, then FMDPs which is attached to $\theta_{G(a)}$ can be converted, thus FPOMDPs(Factored POMDPs, POMDPs) can be obtained. Through the above theory, it can be concluded that MOL is solved by FPOMDPs. For FPOMDPs, its optimal value function is piecewise linear convex, that is the optimal value function is described by the upper interface of linear piecewise set Γ at the moment. the specific formula is as follows:

$$V^*(b) = max\, \alpha(b) \quad (10)$$

α satisfies $\alpha(b)=\sum_X c_X b(s)$, which is a linear combination of the probability values of characteristic variable. When in the discrete space, the number of states is relatively limited. Therefore, α can stand for Dirichlet coefficient vector and meet the function $\alpha(X)=c_X$. If POMDPs is in continuous state, then Γ belongs to the linear function, which can be described b the following formula:

$$\alpha(b)=\int_X c_X b(X)dX \tag{11}$$

In the application of English listening teaching in colleges and universities, suppose that the optimal value function of K moment is $V^k(b)$, and $\alpha-$ function is Γ^k then:

$$V^k(b)=\max_{\alpha\in\Gamma^k}\alpha(b) \tag{12}$$

According to Bellman, $V^{k+1}(b)$ stands for the optimal value function of $k+1$ moment, and $\alpha-$ function collection stands for Γ^{k+1}. This is because $\alpha-$ is introduced to it, then it can be transformed by Bellman to obtain the following:

$$V^{k+1}(b)=\max_{\alpha\in A}\sum_X b(X)R\left(X,a,\theta_{G(a)}\right)+\gamma\sum_{z'}P\left(z'\middle|b,a,\theta_{G(a)}\right)\max_{\alpha\in\Gamma^k}\alpha\left(b_{a,z'}\right) \tag{13}$$

3.4 English Listening Teaching Approach under "Internet +"

With the advance of time, $\alpha-$ will be growing with the index scale, MOL is put forward in this paper to solve this problem effectively and to plan the English listening teaching in colleges and universities.

PBMOL: inputting the current teaching status, the depth D, dynamic "Internet +" network structure $P(X_i|$ parents $(X_i))$. X represents the original set of features; A represents the collection of English conversation content. S refers to the whole set of X_i that will have an impact on the pay level, and satisfies X_i. D represents the maximum extended depth. a_{best} represents the best English conversation. $R_{max}(b)$ represents the maximum English listening test value. R_c represents the current level of English listening test. $U_T(b)$ represents the upper bound of English listening test; and b_c represents the current state of teaching. $R_{max}(b)$ is the output.

Step 1: the application of English Listening Teaching Model can be achieved by dynamic "Internet +". If $X_i\in S$ $X_j\in X$ and $a\in A$ satisfy $X_j\in$ parents $(X_i')\Lambda X_j\notin S$, then $S\leftarrow S\cup S'$.

Step2: if the depth of the tree T satisfies d = 0, the maximum English listening test value of the edge node can be calculated $\max_{\alpha\in A}\sum_s b(s)\in R(b,a)$. And it can assign value to $Rc, Rc\leftarrow RB(b,a)$.

Step3: for all $a\in A$, the following steps are performed for its loop.

Step4 assigning the $R(s,a)$ to R_{temp}, which is $R(s,a)\rightarrow R_{temp}$.

Step5 for all variables from 1 to N, all of them are Monte Carlo sampling operation:

It is required that the s' can be sampled from $P(s'|s,b,a)$ firstly, and then the belief update can be updated based on formula (9). Therefore, b' can be achieved through the "Internet +" English listening teaching process. Finally updating $R_{temp}=R_{temp}+\frac{\gamma}{N}V(s',b',d-1,N)$.

Step6 if $R_{temp}>R_{max}(b)$ is satisfied, then R_{temp} is assigned to $R_{max}(b)$, and current English conversation content a is assigned to a_{best}.

Step7 If $(d=D\cup)\left\|V^*(b)-R_{max}(b)\right\|<\varepsilon$ is established, that is, it satisfies the termination criteria. So it can get the best English conversation content $a_{best}\leftarrow a$.

4. The Experimental Results

4.1 The Problem of Simulation Experiment

This paper mainly launches the experiment on the three versions of this problem, and every version 500 experiment is carried out. the English listening test values are the mean and variance, etc. If the English listening test value is higher, the performance of the algorithm is the better. As shown in **Table 1**, the English listening test values obtained by different algorithms are compared and analyzed. N. V. stands for the unavailability of results. Optimal represents the optimal value that can be achieved when in an ideal state. BEETLE represents the iterative algorithm of the value of the "Internet +" problem. the decomposition of the algorithm to the state is realized by using DDNs(Dynamic DecisionNetworks, DDNs) . MC-MOL is based on the premise of Monte Carlo in the college English listening teaching algorithm. Q-Learning is a $\varepsilon-$ greedy strategy, and it satisfies ε values between 0 and 0.5; PB-MOL shows the algorithm proposed in this paper, and the sampling result is based on the sampling data of K= 1000.

Table 1. Comparison of Listening Test Values of Different Algorithms

Questions	BEETLE	MC-MOL	Q-Learning	PB-MOL
Chain_Tied	3751 ± 40	3719 ± 289	1716 ± 24	3758 ± 20
Chain_Semi	3749 ± 41	*n. v.*	1716 ± 24	3760 ± 22
Chain _Full	1855 ± 41	1747 ± 33	1716 ± 24	2665 ± 24

It can be concluded from **Table 1** that, in Chain_Tied and Chain_Semi two problems, because the uncertainty of the time factor is the less, then the result of the algorithm is as follows, three algorithms PB-MOL，BEETLE，MC-MOL have basic English listening test values on average. Among them, the result PB-MOL is closest to the true value. For large-scale Chain _Full problem, due to the state transition function, structures are unknown. And the uncertainty factors are more. Using the algorithm proposed in this paper can get an average return rate level of 2665. Compared with other three algorithms, it is higher. For this reason, it can be concluded that the algorithm performance in the paper is better.

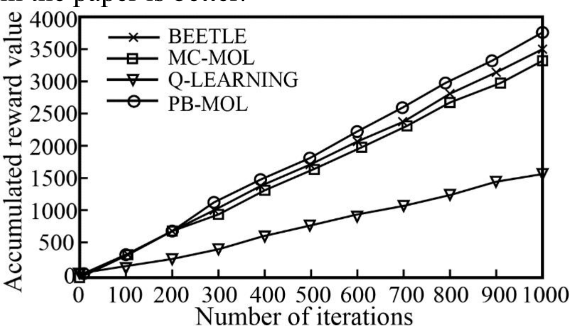

Figure 1. Comparison of Listening Test Values in English

It can be concluded from Table 1 that the maximum value of listening test is PB-MOL, and the minimum method is Q-Learning. The results of two algorithms Q-Learning and formula MC-MOL are adjacent. Through the above compared experiment, it can be concluded that PB-MOL is able to get better results so it can prove the performance advantage of the algorithm, as **Figure 1**.

As shown in **Table 2**, it shows that the time comparison results require three kinds of English listening teaching algorithms in colleges and universities, and the n. v stands for the data unavailable. It can be concluded from the upper table that the less time-consuming algorithms are PB-MOL and MC-MOL, so the two algorithms show the better real-time performance. However, the result of table 1 shows that for the large-scale problem, the algorithmMC-MOL shows a large error in solving the table. the algorithms PB-MOL and BEETLE have the same time consumption in terms of Internet problem processing. Therefore, training through the Internet is able to get more teaching knowledge, and will not have a great impact on the real-time performance of the university. At the same time, the possibility of increasing the rate of return can be increased, which can be used to explore and the problem effectively in college English listening teaching.

Table 2. Comparison of Computation Time of Algorithm(unit: ms)

Questions	BEETLE		MC - MOL		PB - MOL	
	Internet	In college	Internet	In college	Internet	In college
Chain_Tied	400	1500	1.8e+6	32	400	18
Chain_Semi	1300	1300	n.v.	n.v.	1300	22
Chain _Full	14800	18000	n.v.	n.v.	14800	37

4.2 Simulation Experiment of English Dialogue Test

The expressions of English dialogue are as follows:

$$\begin{cases} x_{t+1} = x_t + v_{t+1} \\ v_{t+1} = v_t + 0.001a_t - 0.0025\cos(3x_t) \end{cases} \quad (14)$$

In above formula, x stands for the position of the English dialogue, $x \in [-1.2, 0.5]$. v stands for the speed of English dialogue, $v \in [-0.07, 0.07]$. a_t stands for English dialogue and the content of the English dialogue $A(s) \in \{-1, 0, 1\}$. When meeting the conditions $x_t = -1.2$, the English dialogue speed is 0. When meeting the conditions $x = 0.5$, the goal is achieved. The $x = -0.5$ and $v = 0.0$ represent the starting point of the English dialogue.

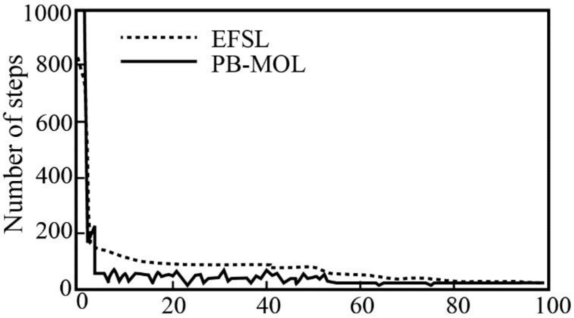

Figure 2. Listening Curve in English Dialogue Test

In this system, the evaluation indexes are English dialogue content and dialogue speed. In order to effectively analyze the PB-MOL of the algorithm proposed in this paper, it shows the comparison algorithm PB-MOL and EFSL (Enhanced Fuzzy Sarsa Learning) in **Figure 2**. In this experiment, the sampling period is setting at 0.02s, and the algorithm PB-MOL needs to pass 8 English listening teaching, and its time needs to be 15-20. In the method ESE, the times of English listening teaching are 10 times, and its time needs to be about 100. For the EFSL method, if you want to be like with PB-MOLthat achieve its goal in 20 times, 75 times of English listening teaching are needed. Combined with the experiments, PB-MOL shows better performance advantages in both convergence and real-time performance.

5. Summary

The paper puts forward the application of blended learning mode, which is based on multimedia network teaching platform and intelligent mobile terminal in college English listening teaching. An “Internet +” oriented English listening teaching method is proposed in colleges and universities. Firstly, systematic application of words is applied to realize the effective recognition of English listening teaching words and effectively solve the problem of generalization of English listening teaching in colleges and universities. Experiments show that the presented method is able to achieve maximum approximate English listening test in shorter time. Therefore, it provides the possibility for the application of “Internet +” in college English listening.

References

[1] Ratanapruks, & Alisa. (2015). the description and evaluation of listening on a thai university fundamental english course: a case study. Gut, 32(4), 395-398.
[2] Yan, Y., Arnold, A., & Keegan, D. A. (2016). the calgary guide: teaching disease pathophysiology more effectively. Medical Education, 50(5), 580-581.
[3] Kim, Y., & Ma, J. H. (2015). the effects of purposeful instruction on l2 listening comprehension, task motivation, and perceived difficulty. Japanese Journal of Applied Physics, 31(4), L394-L396.
[4] Christensson, J. (2017). Good acoustics for teaching and learning. Journal of the Acoustical Society of America, 141(5), 3457-3457.
[5] Chen, H., & Chen, H. (2015). the influence of world englishes on chinese english and

english teaching in college. Journal of Organometallic Chemistry, 192(1), 1-15.
[6] Bauer, R., Conell, J., Glenn, T., Alda, M., Ardau, R., & Baune, B. T., et al. (2016). Internet use by patients with bipolar disorder: results from an international multisite survey. Psychiatry Research, 242, 388-394.
[7] Naparstek, J., Wing, R. R., Xu, X., & Leahey, T. M. (2017). Internet-delivered obesity treatment improves symptoms of and risk for depression. Obesity, 25(4), 671-675.
[8] Swamy, N., Kuljaca, O., & Lewis, F. L. (2015). Internet-based educational control systems lab using netmeeting. IEEE Transactions on Education, 45(2), 145-151.
[9] Etter, J. F., & Perneger, T. V. (2017). A comparison of cigarette smokers recruited through the internet or by mail. International Journal of Epidemiology, 30(3), 521-5.
[10] Donker, T., Blankers, M., Hedman, E., Ljótsson, B., Petrie, K., & Christensen, H. (2015). Economic evaluations of internet interventions for mental health: a systematic review. Psychological Medicine, 45(16), 3357-3376.