Virtual Reality-Enabled Deep Learning and Communication Technology for English Teaching through Webcast and Short Video

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Abstract. The emergence of the new coronavirus pneumonia in 2020 has prompted online live teaching to become a teaching method that primary and secondary schools and even universities across the country must adopt. This paper takes English live teaching for college students as an example, firstly analyzes the problems existing in the teaching live broadcast process and proposes corresponding solutions from two aspects of teachers and students, to improve the quality of "teaching" and "learning". The results are expected to provide reference opinions for the national online live teaching. Secondly, our excellent webcasts or short videos are closely related to the information technology behind them. This paper takes the video live broadcast system as the research scenario and conducts in-depth research on the spectrum sensing based on cognitive radio technology. Through the experimental results and analysis, it is verified that the long short-term memory network successfully predicts the trend of spectrum data, and at the same time reduces the system delay and load of the live video system. It can provide a stable live broadcast environment for English teaching.

Keywords: Video live broadcast system; Teaching live broadcast; English teaching; virtual reality
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1 INTRODUCTION

virtual reality (VR), communication technology, and live broadcasting platforms to develop an innovative teaching mode for English language education.Webcast teaching is an online teaching activity built on the network platform. Common teaching platforms include Ding Talk, Wisdom Tree, Tencent Classroom, etc. The teacher conducts the live broadcast through the control of the platform, and the students are the audience of the live broadcast, and they learn the classroom content by watching the teacher's live broadcast. Students are not only viewers, learners, but also participants. The online live teaching realizes the communicative interaction between teachers and students,

breaking the traditional classroom where students simply study in front of the computer screen. Teachers can name students to answer questions through the method of connecting Mai [20]. Students can also directly interact with teachers by asking questions, answering questions, and "sending gifts" online during the teacher's lecture. In this way, teachers can also monitor students' learning online in real time and test their learning effects [23]. During the online teaching process, teachers and students are not limited by time and space. Teachers broadcast live on QQ, WeChat, Doyin, Ding Talk and other software, and students can watch through mobile phones, computers, tablets, and other devices within the agreed time range, so that remote teaching can be realized, and teaching tasks can be completed. However, the most obvious shortcoming of online live teaching is that it is controlled by the strength of the network signal [11]. This natural factor directly affects whether the teaching live broadcast can be carried out smoothly [8]. There are many colleges and universities across the country, and each school will choose a college English live broadcast platform suitable for its own school according to its own conditions and the characteristics of the students and arrange and teach the corresponding college English live broadcast courses [12]. College English is a compulsory public course for college students across the country, so the course schedule is two hours a week twice a week. Nationwide, this is basically the case for college English online live classes [24]. It's just that the class time of each school is not fixed, and it is finally determined by students and teachers themselves [3]. To ensure the accuracy of the class, the specific time arrangement of the course will form a rule. Under normal circumstances, once it is negotiated and confirmed, it will not be changed. Unless the teacher has something to do, it will be notified separately [22]. The content of the college English webcast class does not deviate from the five aspects of listening, speaking, reading, writing and translation that are required in traditional classrooms [14]. In the live teaching, the English teacher will teach the whole process in English and will also give an appropriate explanation in Chinese according to the students' reactions. The explanation of the specific content of the class is arranged differently by different teachers. Some teachers will give a single, detailed explanation and specialized training on listening, speaking, reading, writing, and translation. Some teachers take all five aspects into consideration, rationally allocate online class time, and comprehensively train students' comprehensive abilities [15]. For the explanation of listening, speaking, reading, translation and writing, some teachers will follow the content of the textbook step by step, while some teachers will explain English classics, movies, etc. in a variety of forms. Different teachers have different live broadcast processes. Some teachers just follow the script to complete the teaching task, while others focus on tapping the potential of students, stimulating students' interest, improving classroom efficiency, and interacting with students online in real time [7]. In this way, for teachers and students, the online teaching of college students has different effects. In addition, live video requires high real-time performance. It is an online multimedia transmission that broadcasts at the same time (downloading and playing at the same time), rather than playing the complete video resource after downloading (offline) [21]. Therefore, live video broadcasting requires that the transmission network can provide a broadband transmission environment with high speed, low delay, and low bit error, that is, high-quality spectrum resources. As one of the main technologies of dynamic spectrum access, cognitive radio is of great research significance. At the same time, the development of deep learning provides technical support for the realization and use of spectrum prediction. Therefore, this paper chooses live video as the usage scenario, and focuses on the dynamic spectrum access technology based on cognitive radio and spectrum prediction. Therefore, a communication-live-broadcasting-teaching integration mode suitable for English teaching is explored.

2 RELATED WORK

2.1 Problems Existing in English Teaching Live Broadcast and Short Video

The lack of professional classroom environment is mainly reflected in two aspects, one is the teaching environment of English teachers, and the other is the learning environment of college students. In the process of English webcast teaching, there is no clear specification and requirement for the teaching environment, but it will be controlled artificially to ensure that the teaching is carried out in a quiet and undisturbed environment [1]. Therefore, there are some uncontrollable factors. The teaching environment will be destroyed unexpectedly, and a series of teaching failures will appear [19]. There are many examples of this kind of "car accident" in reality. English teachers with children at home, during the live class, the teaching will be interrupted by the crying of the child, or the child will suddenly break into the live broadcast camera, and the shouting voice will be recorded in the live broadcast room, to appease the child and remove obstacles, the English teacher Teaching had to be interrupted [18]. When teaching live, it will inevitably be blocked by these "symphonies". Especially for English teaching, once there is a lack of a quiet environment, the pronunciation of English will be unclear, which will hinder the imparting of professional knowledge [6]. In addition to the teacher's teaching is difficult to guarantee, so is the student's learning. When students take live classes, it is difficult to learn without a professional learning environment. Even college students with self-control ability will lose their interest in learning instantly once they are disturbed. In real life, what happens to teachers also happens to students [9]. During the learning process, students will be disturbed by the noise, laughter and shouting at home, and cannot immerse themselves in English listening practice [5]. Some college students will eat, walk around, lie down, do whatever they want, and do whatever they want during the teacher's live broadcast. In their cognitive concept, if the task of listening to the lecture is completed, the form is secondary. In this way, they lose the learning attitude they should have in the professional classroom, disrespect the classroom, and do not clearly recognize their identity as a college student. To ensure the effect of live teaching, the environment of live classroom must be strictly controlled. In contrast, offline teaching does not need to be done deliberately, but is something that comes naturally in the classroom. The lack of professional teaching environment has seriously affected the quality of online courses [10]. Because of its own characteristics, college English online live classes are controlled by the strength of network signals.

2.2 Cognitive Radio Communication Technology

Spectrum sensing is one of the main applications of cognitive radio technology. Figure 1 shows the spectrum sensing system model. In the system model, the authorized users (PU1, PU2, ..., PUN) communicate through the base station, and the unlicensed users (SU1, SU2, ..., SUN) perform spectrum sensing on the licensed channels used by the authorized users and transmit the sensed data. Perform data processing and analysis on the cognitive base station to determine whether the authorized user is using the channel. If an authorized user is sending a signal, an unauthorized user can detect the authorized user's user signal within its signal range with a certain probability of detection. Unlicensed users dynamically detect spectrum resources and look for spectrum holes by using dynamic spectrum access technology and use these spectrum holes for temporary communication. Of course, the premise of using spectrum holes is not to affect the use of authorized users. Therefore, unlicensed users need to always monitor the frequency band in use. Once the authorized users start to use the current spectrum resources, the unlicensed users need to avoid authorized users to avoid affecting the use of the current spectrum resources. Normal use by authorized users. The existing dynamic spectrum access models are mainly divided into three types: interleaving model, lower layer model and upper layer model. First, the interleaving model is a conventional model, and the biggest difference from the other two models is that as long as the authorized user is active in the authorized spectrum, the unlicensed user cannot access the frequency band.

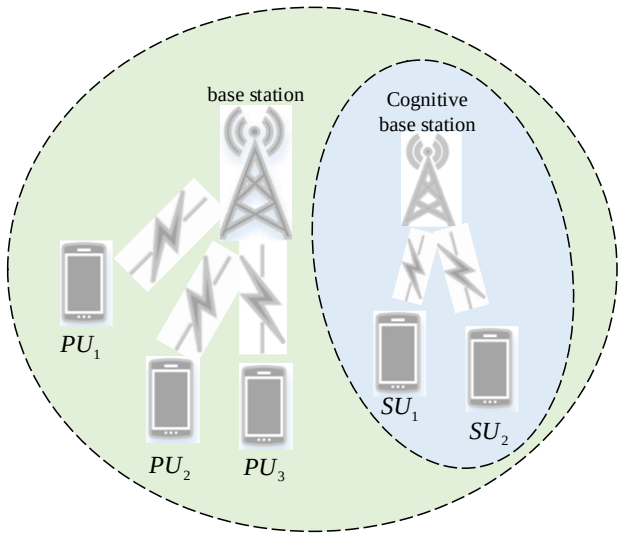

Figure 1: Spectrum sensing system model.

In the interleaving model, the authorized user has an absolute position, and the unauthorized user must avoid the authorized user no matter when and under any circumstances, so the unauthorized user is limited to speculatively use these spectrum holes in the interleaving model. The lower model, in which licensed users can tolerate unlicensed users to access and use their licensed frequency bands under certain conditions.

2.3 Deep Learning

In 2016, the emergence of AlphaGo set off a wave of artificial intelligence development and application, and its core deep learning algorithm has also attracted the attention of many researchers. The deep learning algorithm simulates the thinking process of human brain neurons through the computer, so that the computer can automatically learn data features, and rely on these data features to complete complex data analysis tasks or data prediction tasks. With the continuous development of deep learning algorithms, related researchers have proposed many mature neural network models, and these neural network models are also widely used in various fields. Among them, convolutional neural network and recurrent neural network are the two most common neural networks. Convolutional neural network is a feedforward neural network that includes convolutional computation, which has outstanding performance in image processing. The convolutional neural network is basically the same in structure as the traditional neural network, but the function and form of the layers are improved. Convolutional neural network can process high-dimensional data, does not need to manually select features and has the advantages of good feature classification, but it needs to be trained on a large number of sample data and needs to continuously adjust the model parameters in the training process to complete Model training, and the physical meaning of the parameters in the model is not very clear. Now the mainstream convolutional neural network models include Le Net model, Alex Net model, Google Net model, etc. Recurrent neural network is a recurrent neural network that takes sequence data as input and performs recursive operations in the evolution direction of sequence data. The information in sequence data is not only related to the data itself, but also contains certain information about the location and context of the data itself. For example, the word "dog" in the proverb "he is a lucky dog" means dog, but the full sentence means "he is a lucky guy". The order of the sequence data also has a certain degree of influence on the final result.

Therefore, recurrent neural networks are designed and applied to process and predict sequence data. Different from the traditional deep neural network, the current neuron in the hidden layer of the recurrent neural network can receive the result calculated by the previous neuron. Figure 2 shows a recurrent neural network structure with one hidden layer and unrolled in the time domain with a time step of 2. For a fixed-length vector, one element can be input at a time step in the recurrent neural network, while only a complete vector can be input in the forward network, which also reflects the importance of the recurrent neural network to highlight the time sequence. From the structure of the recurrent neural network, part of the historical data is stored in the neural network in a specific form, and the current neuron can use this part of the historical data.

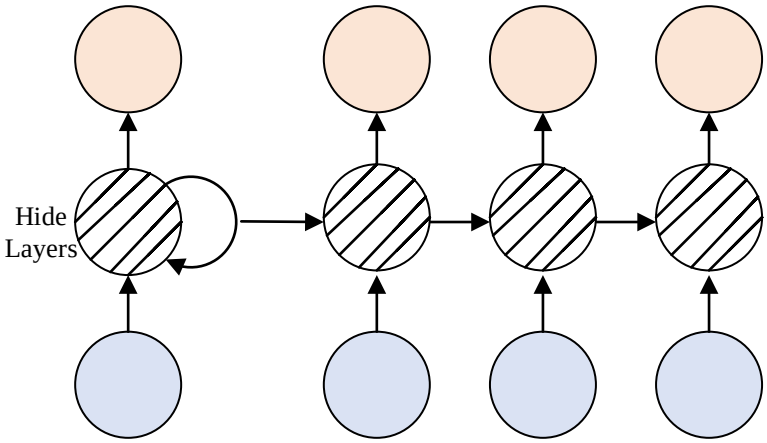

Figure 2: Structure of recurrent neural network.

Recurrent Neural Networks are used in speech recognition, language modeling, video tagging, text generation and many other fields. At the same time, in the process of applying recurrent neural networks, researchers have also derived various special recurrent neural networks, such as bidirectional recurrent neural networks and long short-term memory networks. Long short-term memory network is a temporal recurrent neural network specially designed to solve long-term dependency problems. Long short-term memory network is suitable for processing and predicting events with very long interval and delay in time series, and its effect is better than temporal recurrent neural network and hidden Markov model.

3 METHODOLOGY

3.1 Video Live System Framework

The most basic and most important of the live video system is the live video function. Therefore, this section designs a system framework with live video function. The system usage scenario designed in this section is indoor communication, so after referring to the complex situation of the indoor communication environment, a centralized network structure combined with home base stations is adopted. The live video system mainly includes several users, home base stations and information fusion centers. The specific model diagram is shown in Figure 3.

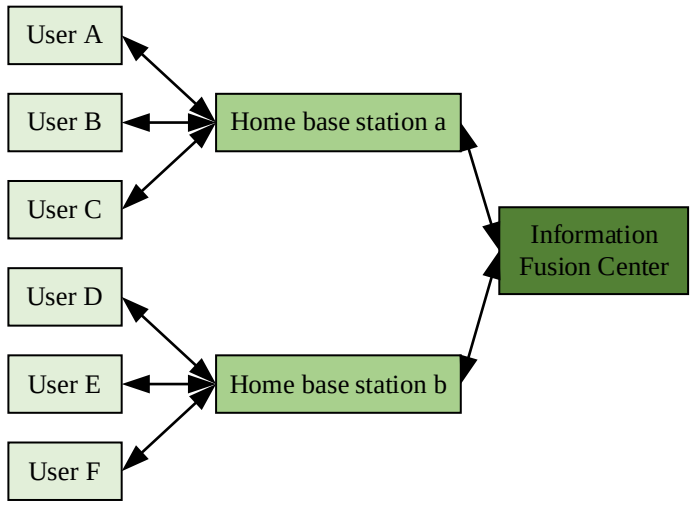

Figure 3: Block Diagram of Video Live Broadcasting System

As can be seen from the figure 3, the live video system consists of three parts: the user, the home base station, and the information fusion center. The information fusion center is the central control node of the system, which is responsible for the unified management and scheduling of home base stations and other peripheral devices in the service area. As can be seen from the system block diagram, multiple home base stations are connected to an information fusion center, and the information fusion center uniformly manages and schedules the spectrum resources in the service area. The centralized network structure is used in the system. For the distributed network and other structures, this paper will not discuss it here due to space problems. For the information fusion center, the benefit of the centralized network structure is that more data can be collected, and the integrity of the data is guaranteed. Because the centralized network structure is selected, to ensure the reliability of network operation, the communication mode between the information fusion center and the home base station is wired transmission. A home base station is an access node that provides network access functions in a small area. Users access the home base station in the form of 4G signals, thereby using low-latency, high-speed wireless communication services. The femtocell, as a miniature microcell base station, provides wireless access services within an indoor range. Although the signal coverage of femtocells is not large, in dense building groups (residential areas, commercial office buildings), mutual interference will also occur between femtocells. At this point, the information fusion center plays a scheduling role. Taking advantage of the centralized structure, the information fusion center aggregates and schedules the information of the home base stations within its management range to avoid mutual interference between home base stations. Here, the aggregated information includes, but is not limited to, frequency band information in use, user identity information, transmission rate, home base station equipment information, and the like. The user form in the model is not limited to smartphones but can also be other smart mobile terminals such as iPads. Such terminals are mostly accessed by means of wireless communication. Therefore, the communication mode between the user and the home base station discussed in this paper is mainly wireless communication.

3.2 Video Live Broadcast System Model Based on Long Short-Term Memory Network Prediction

Figure 4 shows the live video system model based on long short-term memory network prediction. As can be seen from the figure, the video live broadcast system based on long short-term memory network prediction adds sensing nodes and deep learning servers to the basic system designed in Chapter 3. The role of the sensing node is to collect data of specific frequency points in the wireless environment, which will become the input data set of deep learning. According to the data set format required by the deep learning framework, the information fusion center preprocesses the frequency point data collected by the sensing nodes and uploads the preprocessed data set to the deep learning server. At the same time, the information fusion center receives the prediction data set returned from the deep learning server.

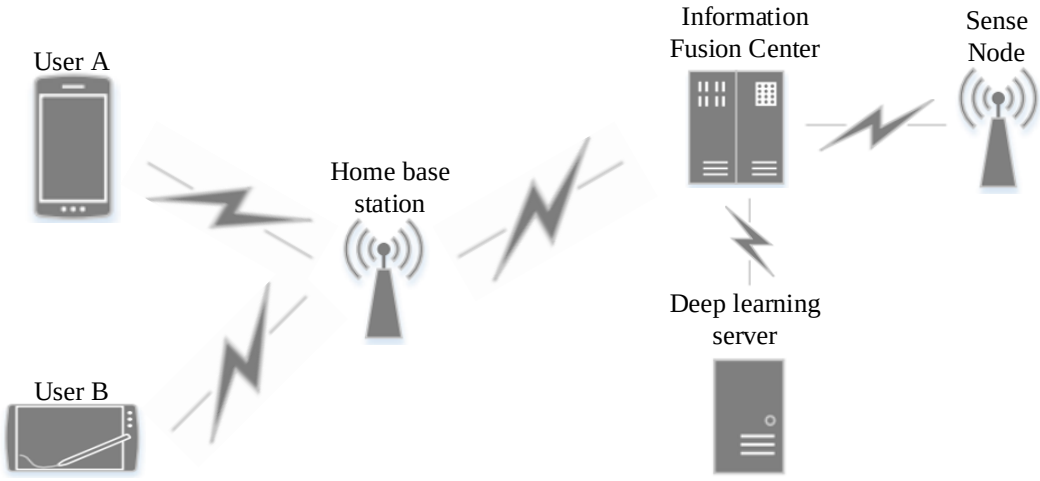

Figure 4: Video live broadcast system model based on short-term memory network prediction.

The information fusion center analyzes the obtained prediction data set and selects the appropriate time to enable the unauthorized users to dynamically access the channel and use the service. A deep learning server is a high-performance server that runs deep learning frameworks and programs. We can train the deep learning model and make predictions through the deep learning server to get the spectrum data of the next time slot. To ensure the efficient and reliable data transmission between the information fusion center, the sensing nodes and the deep learning server, wired communication is selected.

3.3 The Process of Live Video System Based on Long Short-Term Memory Network Prediction

Spectrum resource prediction in a slot-by-slot scenario can be performed by using the trained model. The live video process is the same as the previous two articles, aiming to complete the live video function and maintain the live video effect to a certain level without being affected by external factors such as interference. Figure 5 is a flowchart of the model training part of the video live broadcast system based on long short-term memory network prediction. The specific steps are as follows:

1) The sensing node collects the spectrum energy data in the surrounding wireless environment and transmits the sensed data to the information fusion center.

2) After the information fusion center receives the spectrum energy data, the information fusion center organizes and organizes the spectrum data.

3) The deep learning server obtains the sample data set from the information fusion center and starts training the designed deep learning model. Through the training of a large number of sample data and continuous adjustment of hyperparameters, the final model training is completed, and the expected parameter indicators are achieved.

4) After the model training is completed, the test data set can be input for data prediction. According to the input test set, the predicted data can be divided into two categories: verifying the correctness of the model and predicting the next time slot. If the prediction results of the input test data set are known, it is used to verify the correctness of the model prediction; if the prediction results of the input test data set are unknown, the prediction result is the prediction data of the next time slot.

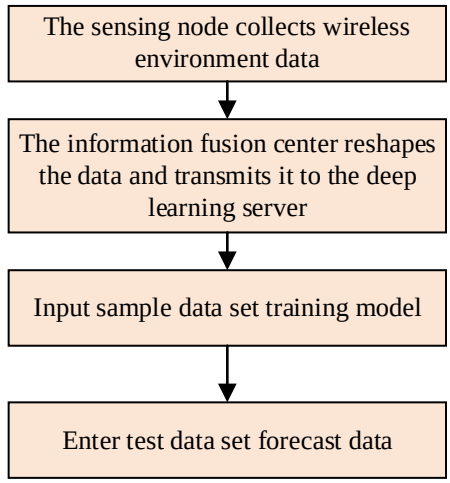

Figure 5: Flow Chart of Model Training of LSTM Live Video System.

Figure 6 is the partial flow chart of the video live broadcast system based on LSTM prediction. The specific steps are as follows:

1) After the model training is completed, a prediction data set is obtained. Once the user accesses the system and applies for the use of communication services, the home base station applies to the information fusion center for allocation of spectrum resources.

2) After receiving the request, the information fusion center analyzes and predicts the data set and obtains the specific available time slot of the spectrum hole. According to the distribution law of available time slots, it guides the resource scheduling work.

3) After obtaining the available resources, the user and the home base station start data communication.

4) While transmitting data, monitor whether the quality-of-service QOE of the user reaches the unqualified threshold. If it exceeds the threshold, it indicates that the predicted data has errors and seriously affects the communication service. Therefore, it is necessary to switch the mode of resource scheduling. The set-guided resource scheduling model is changed to a real-time detection data-guided resource scheduling model.

5) The switching of the resource scheduling mode is a bidirectional process. When there is a large error in the prediction data set, the system switches to real-time detection data mode. At the same time, adjust the prediction model and prediction data set, and compare the prediction data with the real-time detection data of the same time slot. If the results are the same for multiple consecutive times, it indicates that the prediction data recovery is effective, and then switch to the resource scheduling mode guided by the prediction data set.

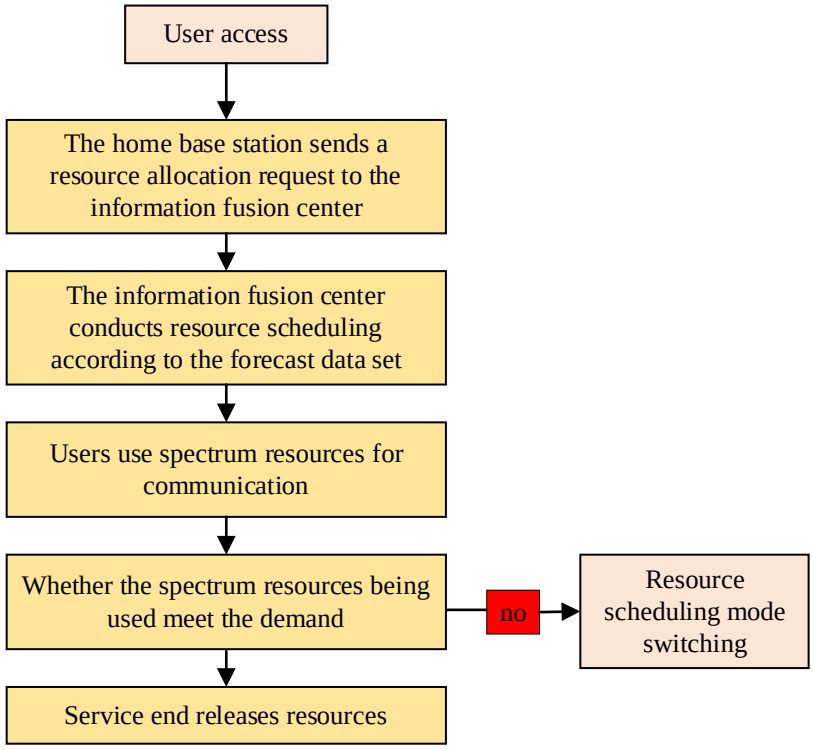

Figure 6: Flow Chart of Live Video of LSTM Predicted Live Video System.

3.4 Long Short-Term Memory Network Prediction

In a cognitive radio network, when an unlicensed user wants to use an idle spectrum resource, that is, a spectrum hole, the channel needs to be sensed in a time slot before use. If the sensing result finds that the power spectral density of the channel exceeds a certain threshold, the unauthorized user considers that the channel is being used by the authorized user. Unauthorized users cannot use this channel in this time slot and need to wait for the next sensing result. If the sensing result shows that the power spectral density of the channel does not exceed the threshold, it can be considered that the authorized user does not use the channel at this time, and the unauthorized user can start transmitting information. .Assume that the data for channel perception is stored in the form of a (Ej,ti) two-dimensional matrix, where one row of the matrix represents the measured data collected at a certain frequency point according to the time series, and one column of the matrix represents a certain time slot, each The measured frequency points are collected data. This section studies the feasibility of time-slot-by-slot spectrum prediction in the actual live video system.

Therefore, the model designed is to mine the relationship between historical data and predict the spectrum value of the next time slot. That is, for the historical spectrum data in the given T time slots, through the neural network training data xt-T+1, xt-T+2...XT of the first t time slots, the prediction result of the t+1 time slot is obtained. The spectral data xt+1. Before the neural network predicts the data, it needs to be trained through the sample data set and can be used to predict the data after the training of the model is completed. Figure 7 briefly illustrates the process of managing the model to train the model on a slot-by-slot basis. Di represents the data value of a specific frequency point collected in a certain time slot, Si represents the input sample of one training, and the length is L. With the change of the time slot, the data of the specific frequency point is continuously sensed and acquired, Different input samples Si are constructed using a sliding window of fixed length L (the length of the sliding window in Figure N = 3). Rj represents the label of the sample. The label corresponding to the input sample S1 is R1, that is, the label of each sample of length 3 is the data sensed in the next time slot. The training process of the neural network is to obtain the predicted value $\hat{R}j$ through different input samples Si, and then continuously adjust and optimize the model parameters to make the predicted value $\hat{R}j$ and the real label Rj as close as possible. To avoid the problem of uneven sample distribution, the entire undivided dataset is pre-shuffled before training the model.

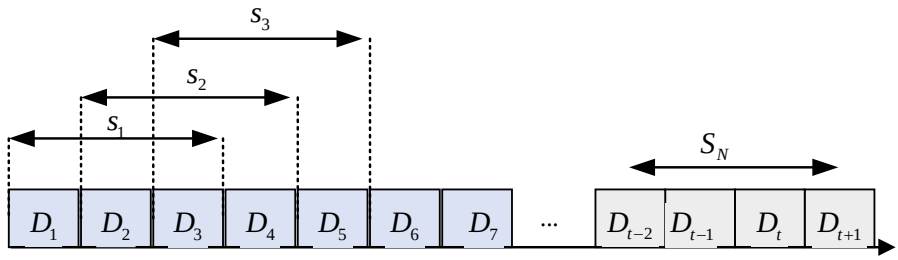

Figure 7: Time slot sample establishment process at a single frequency point.

Due to the introduction of memory units into the long short-term memory network, the historical data in the model also has a certain impact on the results. Therefore, this section chooses to study the role of long short-term memory network in predicting spectral resources and its practicality in practical systems.

4 EXPERIMENTS

4.1 Experimental Environment Settings

The experimental deployment is shown in Figure 8. Due to limited equipment conditions, two users and their corresponding home base stations, an information fusion center and several sensing nodes are set up in the experiment. During the experiment, when the frequency bands used by the two users are adjusted to be at the same center frequency, mutual interference is formed between the two users, to achieve the purpose of testing the interference coordination function of the system, and there is no need to set additional artificial interference sources.

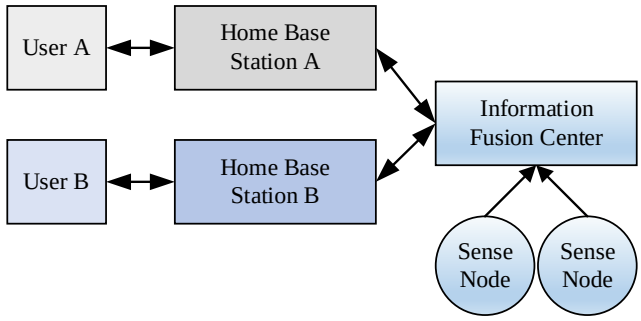

Figure 8: Experimental Deployment Diagram.

4.2 Experimental Framework

In this section, the live video system is used as the experimental framework, and the long-term and short-term memory neural network is used to predict the spectrum data, and then the prediction results are used as the basis for scheduling resources of the live video system. The pros and cons of system performance. First, we collected spectrum data between 2.4GHz and 2.7GHz frequency band and preprocessed the collected data as the dataset of LSTM neural network. The form of data collection is energy detection, that is, a certain data collected represents the energy data of this frequency point on a certain time slot. Since the forecast results are continuous values, the forecast accuracy cannot be used as a measure of the performance of the forecast model. Therefore, the evaluation criterion for evaluating the performance of the prediction model in this section is the root mean square error, as shown in Equation (1).

$$\mathrm{RMSE} = \sqrt{\frac{1}{\mathrm{N}_{\mathrm{test}}} \sum_{\mathrm{t}=1}^{\mathrm{N}_{\mathrm{test}}} \left(\hat{P}_{\mathrm{t}} - \mathrm{P}_{\mathrm{t}} \right)} \tag{1}$$

4.3 Analysis of Results

Figure 9 and Figure 10 are the results of the single-layer LSTM network and the double-layer LSTM network, respectively, predicting the 2.7GHz frequency point data, and Figure 11 is a partial enlarged view of the abscissa range of 58000~59200 in Figure 10. The abscissa in the figure is the order in which the frequency points are arranged in time series, and the ordinate is the normalized frequency point energy value. As can be seen from the figure, whether it is a single-layer LSTM network or a double-layer LSTM network, the predicted spectral data and the real spectral data are numerically very close and almost coincide. The RMSE=1.685 for the single-layer LSTM network, while the RMSE=1.2168 for the two-layer LSTM network. Because the collected energy data is about -110dBm at idle time, and about -65dBm during communication. Compared with the order of magnitude of the energy data, the result of RMSE is already very ideal, and the predicted spectral data is basically the same as the real value.

Figure 12 shows the RMSE line chart of the frequency point data in the 2.4GHz~2.7GHz frequency band predicted by the one-layer LSTM network, the two-layer LSTM network and the MLP network. The abscissa in the figure represents the corresponding center frequency point, and the ordinate represents the RMSE value after different neural networks predict the corresponding network.

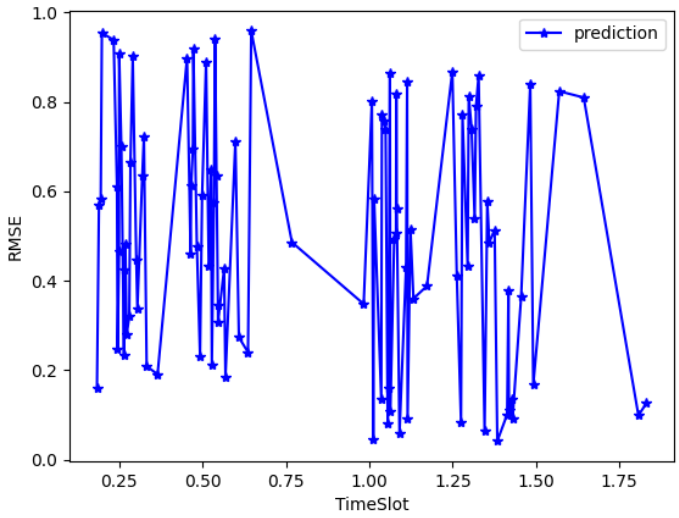

Figure 9: Comparison between the predicted results of single-layer LSTM network and the true values.

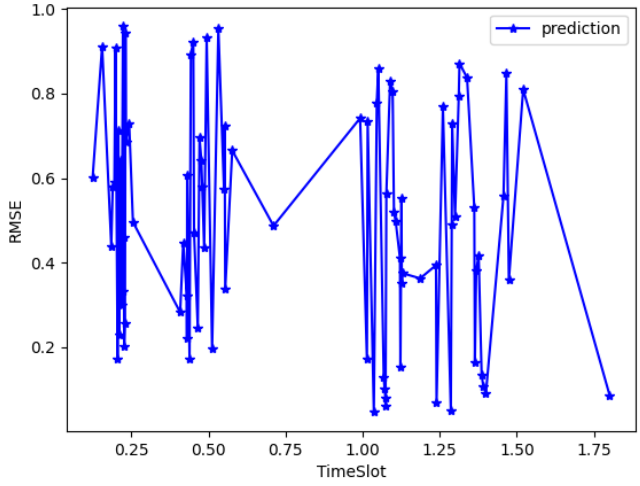

Figure 10: Comparison between the predicted results and the true values of the double-layer LSTM network.

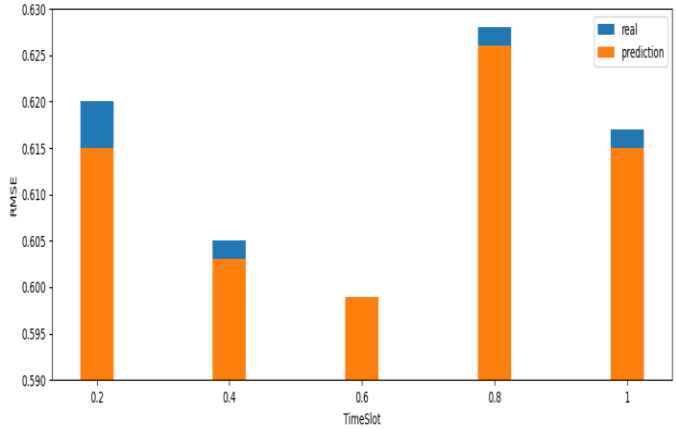

Figure 11: Partial Enlargement of Double layer LSTM Network Prediction

It is obvious that the RMSE value of the MLP neural network is larger than that of the LSTM network, and the prediction effect is not ideal. This verifies that the LSTM network has a good effect on the prediction of time series. The RMSE polyline distance between the one-layer LSTM network and the two-layer LSTM network is close, and there is almost no gap. However, in terms of network complexity and model training time, the complexity of the two-layer LSTM network is higher and requires more training time to complete the model training. Since in this section, the prediction results are used to guide resource scheduling, there are no strict requirements for the accuracy of the prediction values. Therefore, in terms of performance and resource consumption, a one-layer LSTM network is more suitable for frequency point energy prediction.

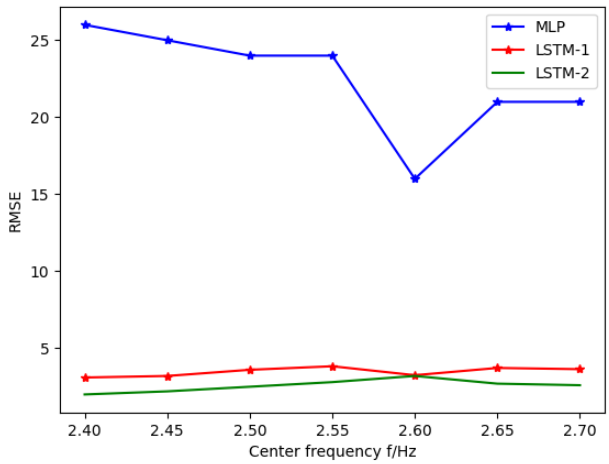

Figure 12: RMSE Line Diagram of Layer 1 LSTM, Layer 2 LSTM and MLP Networks.

Figure 13: Playback effect of prediction based live video system.

Figure 13 is the playback effect diagram of the prediction-based live video system. It can be clearly seen from the effect in the figure that the playback effect of the prediction-based live video system is almost the same as that of the basic system in Chapter 3. In the actual playback process, there is no obvious jamming and other interference phenomena except when switching resources.

	Prediction system	*real-time system*
System delay	*low*	*high*
Resource cost	*low*	*high*
Flexibility	*high*	*low*

Table 1: Performance comparison between prediction system and real-time system.

Table 1 is the system performance comparison table between the prediction system and the real-time system. The prediction system refers to the live video system based on LSTM spectrum prediction designed in this section, and the real-time system refers to the live video system with only sensing function. Both the prediction system and the real-time system are aimed at the situation of a single channel, looking for the time slot that can use the designated channel for data transmission, to achieve the efficient use of idle spectrum resources. The real-time system directly perceives the signal energy of the designated channel through cognitive radio, to determine whether the channel can be used. System delay refers to the delay of system scheduling resources. The real-time system performs resource scheduling according to the signal energy obtained by the perception, that is, when the channel energy changes at time t, the real-time system needs a certain time to adjust after the perception. Let the time from the perception information to the start of resource scheduling be T. At this time, the channel state has changed to the signal state at time T+T. However, because the prediction system uses the LSTM network to predict the data, the prediction data is already available at time t, and the resource scheduling can be performed directly, and it does not need to spend time T. Therefore, the prediction system is better than the real-time system in terms of system delay. Resource overhead refers to the resource overhead of the information fusion center during the operation of the system. The information fusion center is the core control component of the live video system. Therefore, the load of the information fusion center is reduced as much as possible, which is also conducive to the stable and efficient operation of the system. In a real-time system, the information fusion center not only needs to undertake the fusion and

judgment of perceptual data, but also performs resource scheduling; in the prediction system, the information fusion center only needs to send the perceptual data to the deep learning server and carry out processing according to the returned prediction data set. resource scheduling. In contrast, the information fusion center of the prediction system has a smaller load and requires less resource overhead. The flexibility indicates the flexibility of the decision of whether the system accesses the channel. When the system uses an idle channel to transmit data, the optimal state is that the channel is always available without frequent channel switching. The real-time system's perception of the channel status is real-time and can only perceive the channel status at the current moment. When the channel is poor or the channel authorizes the user to use the channel, the channel needs to be switched. However, the prediction system can know the change trend of the channel in a certain time interval in advance through the prediction data set, to decide the access timing in advance or give up access to the channel. In contrast, the prediction system is more flexible in the timing of selecting access channels.

5 STRATEGIES FOR IMPROVING THE TEACHING OF ENGLISH LIVE CLASSES

5.1 Improve the Level of Network Management

For the phenomenon of car rollover and the lack of quality of online live broadcast, teachers are required to have a strong level of network management. English teachers should train themselves in many aspects to control the level of live classes and ask professionals for advice. Not every teacher is as adept at manipulating the software as the internet celebrity anchor. This is the result of practice makes perfect and humility to ask for advice. Therefore, English teachers should do more training after class, make full preparations for each live class, check whether the facilities such as microphones and videos are complete, and whether the network signal is disturbed. When doing a live class, say hello to the people around you in advance, make a do not disturb sign in class, and lock the door of the live broadcast room. During the live broadcast, it is necessary to communicate with the students well, and the live broadcast will not start until the response from the students is received, to avoid useless efforts and accidents such as dumb classrooms. After the live broadcast, be sure to check whether the corresponding facilities are closed and make sure that the preparation is correct. After teachers form a certain live broadcast mode for a long time, become familiar with the operation process, and develop their habits, the frequency of live broadcast accidents will be reduced, even to zero. If the accident cannot be avoided, teachers must have the ability to adapt, maintain the order of the live broadcast, and manage their students well.

5.2 Improve Interactive Communication Skills

The results of the online questionnaire showed that at the beginning of the English online live class, the students had a sense of freshness, became interested in the teaching method of the live broadcast teacher, participated in the interaction during the live broadcast, and were highly motivated. However, with nearly two months of live English classes going on, students develop a sense of boredom, as well as hostile measures. This requires teachers to make timely summaries, adjust, show strong communication and interaction skills, maintain the vitality of English live broadcasts, and mobilize students' emotions, so as to ensure the quality of live broadcast teaching. During the live broadcast, teachers should not only focus on their own teaching, especially for English subjects, language teaching itself is boring, excessive teaching, coupled with the limited ability of students, can't understand the whole English teaching at all, then just It will go in to the left ear and out of the right ear, with no effect at all. Therefore, in the process of live English classes, teachers can fully focus on the interaction of students, teaching with students, sharing interesting stories in English, expression in spoken English, and typing in Chinese, which not only exercises listening, but also improves translation. Students will not feel that the English live class is too difficult and boring.

Teachers should not only interact with students during the live broadcast, but also communicate with college students through students' classroom responses and homework completion, to provide targeted physical, mental and academic guidance. At the same time, according to the opinions of most students, the content or difficulty level of the live class was adjusted, which was recognized by the students.

5.3 Strengthen the Improvement of the Comprehensive Quality of College Students

College students can improve their participation and attention in online courses by correcting their learning attitude and strict requirements on themselves, then they will be able to avoid the negative impact of live online courses, give full play to the advantages of online courses, and improve themselves. Do your due responsibilities and obligations and listen carefully to every English webcast class. During the live webcast, listen carefully, actively participate in the interaction, take notes, practice oral English, communicate well in English, and improve English listening. Not only that, but before each live class, it is also necessary to do the pre-class preparations and collect the corresponding learning materials. After the live class, private message to discuss with the teacher, solve doubts, and watch the live replay at any time to consolidate and practice in time. For college students with poor English foundation, they must seize the advantages of online live classes, have no offline face-to-face ridicule, overcome psychological barriers, and actively participate in the oral and translation exercises of live English classes. College students should deeply realize that they are people with independent thinking and acting independently, and they must be responsible for themselves in dealing with others, rather than relying entirely on outsiders to supervise them, otherwise they will be no different from primary and secondary school students. If you even have the most basic webcast, a very important way is to optimize the external environment first. College teachers, as the guides of students in the new era, their outlook on life, values, theoretical ability and behavioral quality, work character and life philosophy will all have an impact on students. Therefore, in order to improve the effectiveness of funding and educating people, we must give full play to the power of the funding team. On the one hand, the professionalization of the subsidy work team should be reflected in the policy of financial aid, the implementation of accurate publicity, and the compliance with the disciplinary requirements of subsidy work. As the specific implementer of student financial aid work in colleges and universities, the business content and work requirements of the student financial aid policy are the premise of student financial aid work. The number of information resource channels is sufficient, the policy publicity must be accurate and accurate, and each financial aid activity must be ensured. It is carried out within the framework of legal regulations and policy requirements. On the other hand, the funding team should take the initiative to acquire a certain degree of professional knowledge of psychology through theoretical study and practical training, and integrate integrity education, gratitude education and mental health education into the funding work. Educating people in colleges and universities is not only to meet the needs of students at the material level, but more importantly, to make students grow into a comprehensive, capitalized "person" who has family and country feelings and social responsibility.

6 CONCLUSION

In this paper, a long short-term memory neural network is used for spectrum prediction, which improves the utilization efficiency of idle spectrum resources. At the same time, to verify the results of spectrum prediction, a live video system based on long short-term memory network prediction is designed for testing. Experiments show that the LSTM neural network can effectively predict spectral data and the one-layer LSTM neural network has almost the same effect, lower complexity, and training time than the two-layer LSTM neural network. By comparing the system performance between the prediction system and the real-time system, the prediction system has lower system delay, less load on the information fusion center and higher scheduling flexibility than the real-time

system. Through the efficient communication methods, we can ensure the normal operation of college English online live classes under the epidemic. In addition, this paper puts forward useful suggestions and strategies for the development of English classroom live broadcast and short video format.

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