Mountain rainfall estimation and online English teaching evaluation based on RBF neural network

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Abstract
In order to solve the problem of the main parameters setting of traditional RBF neural network learning algorithm and the lack of local information based on space, this paper proposes a particle swarm hybrid optimization RBF neural network prediction algorithm based on genetic operation, which solves the early problems of PSO on the basis of the cross and mutation fusion of PSO and GA advantages. At the same time, we analyze the limitations of using the mountain rainfall simulation process and taking the mountain rainfall as the model input, and put forward the idea of using the radar estimation technology from the perspective of spatial rainfall, and carrying out the mountain rainfall evaluation and simulation according to the spatial rainfall. The application of flood forecasting focuses on the research of mountain rainfall estimation simulation method based on radar precipitation estimation technology, and it is also the combination of mountain rainfall simulation process. Finally, this paper evaluates and analyzes online English teaching, and the new network environment has become the carrier of College English learning. In the new network environment, students will form the awareness of reading, listening, and speaking English, and conduct conscious online English learning guidance and enhance their language ability to find their own understanding and perception of English. In this paper, we reveal the problems and shortcomings of the current college English education evaluation in China, put forward various new intelligence evaluation theories, and try to explore the practical functions of several education evaluation systems in education, so as to better use the means of education evaluation to improve the efficiency of College English teaching. According to the research of the RBF neural network, it is applied to rainfall estimation and teaching evaluation, which can effectively improve rainfall estimation and teaching evaluation.

Keywords RBF neural network · Mountain rainfall estimation · Online English · Teaching evaluation

Introduction
Aiming at the problem of optimizing the main parameters of radial basis function neural network, this paper proposes a hybrid optimization method of particle swarm RBF neural network algorithm based on genetic operation. This can avoid the potential local convergence of the particle group and genetic modification (Abbasi and McElroy 1991). The method is applied to the prediction of monthly average temperature and compared with the corresponding prediction results of the traditional RBF and BP neural network in the same period (Ahmad 2003). The results show that the hybrid optimized RBF neural network is superior to conventional algorithms in terms of prediction accuracy and stability, and can provide a basis for short-term climate prediction (Baker et al. 1988). Therefore, this paper optimizes the conventional mountain rainfall estimation model by inputting the design rainfall of a single rainfall station and improves the accuracy of rainfall input (Bobachev 2002). The purpose is to simulate the accuracy of mountain rainfall estimation and simulated rainfall input. At the same time, it makes up for the shortcomings of the traditional single-point rainfall input, using radar estimation rainfall technology to calculate the spatial distribution of rainfall, and estimate the spatial distribution of design rainfall in different turning cycles (Bosak et al. 1999). Using radar forecasting rainfall technology, the problem of real-time simulation and forecasting cycle for mountain precipitation, and forecasting future rainfall, combined with the future mountain rainfall estimation model, predicts the future flood disaster.
situation. Finally, this article evaluates and analyzes online English teaching (Braga et al. 2009). At the same time, the design of this article introduces the network platform into the English classes and after-school classes of universities (Bruthans et al. 2000). More and more school leaders and students show supportive attitudes towards online applied English education. But the attitude of the lecturer is relatively neutral. Therefore, when constructing various teaching evaluations, students should pay special attention to the following aspects: students change their test concepts, strengthen online English learning every day, and enhance English skills throughout the learning process, which can be used to deal with the English surprise test at the end of the semester (Costa and Vendeville 2002). You must concentrate on improving your own teaching methods and teaching methods, accumulate English knowledge on the Internet, handle the daily English learning process of students on the Internet, and use electronic databases to record the growth of students (Ćwiklik 2014). Compared with the appropriate evaluation form, the observation of general English language learning should focus on the modification of individual group design and evaluation (Doneva 2012). Appropriate detailed rules are also an important part of various evaluations. The correct implementation of this standard by the system directly determines the objectivity and fairness of multiple evaluation systems, and will have a profound impact on students’ motivation to learn English (Frohlich 2002).

Materials and methods

Basic data collection

In this document, the central city of Z is taken as the survey area. The central city of Z is located behind the Z Basin and has a relatively complete plateau with a total drainage area of 290 square kilometers. The seven central areas in the upper reaches are mainly used for agricultural irrigation, while considering urban flood control and drinking water for humans and livestock. Among the functional small reservoirs, the L River has 4 reservoirs, the T River has 3 reservoirs, and the Rich River and the T River are the main tributaries of the Z river system that passes through the Z city area. These two water supply systems are mainly due to the flood discharge and rapid water discharge of the reservoir caused by the heavy rainfall in the city. At present, the water system of the Ridge River is based on the 10-year rainfall discharge standard, while the mainstream and tributaries of the two-way river are based on the 5-year rainfall discharge standard. If the return period is exceeded, the water supply system will need to reconsider the Ridge River and the two-way river drainage system, and we will evaluate them and propose corresponding improvement measures. The range is shown in Fig. 1.

City Z collects basic radar data from local weather stations through fieldwork. The basic radar information reflects some relevant information, which reflects the basic characteristics of the radar. The detailed information is shown in Table 1.

RBF neural network algorithm

The RBF neural network is a three-layer forward neural network. Considering the Gaussian path basis function, for a given input vector \( y \in \mathbb{R}^{m \times 1} \), the RBF network maps it to the output vector \( x \in \mathbb{R}^{n \times 1} \). In this case, the network output is defined as follows.

\[
y = f(x) = \sum_{i=1}^{h} \omega_i \exp\left(-\frac{(x-c_i)^2}{2\sigma^2}\right)
\]

Among them, \( c_i \) is the hidden layer, \( ||\cdot|| \) the center of the ith basis function of the Euclidean norm, \( \sigma \) is the basic width of the function, \( w_i \) is the output of the ith hidden node, and \( h \) is the hidden layer unit number.

Estimation and analysis of the spatial distribution of rainfall in mountainous regions

The working principle of radar is to send electromagnetic waves into the air and receive scattered electromagnetic waves in clouds and rainwater, and measure the intensity according to the received echo time, location, intensity, polarization, etc. During the echo period, the target echo can calculate the echo ability, regardless of the attenuation degree and charge degree of the echo, and if the Rayleigh scattering condition is met, the radar weather equation can be simplified to equation (2).

\[
\mathcal{P}_r = \frac{C|K|^2}{r^2} Z
\]

Rainfall intensity \( I \) is defined as the rainfall quality per unit time and unit area. If vertical airflow is neglected, the rainfall intensity \( I \) can be expressed by the following formula (3).

\[
I = \sum_{D_j} N(D_j)M(D_j)v(D_j) \Delta D
\]

Among them

\[
N(D_j) \Delta D = C_1D_j^p \exp(-\Lambda D) \Delta D
\]

\[
v(D_j) = C_2D_j^3
\]

It can be seen from equation (3) that the reflectivity \( Z \) is related to the physical properties of the target particles, and the sedimentation intensity \( I \) mainly depends on the quality and falling speed of the sediment particles. Here, the descending speed is related to the shape and relative shape of the precipitation particles, so theoretically there is a certain correlation.
(ZR relationship) between the radar reflectivity Z and the precipitation intensity I.

Construction of heavy rain intensity model

At present, the mathematical expression of the formula of rainstorm intensity is generally used in China:

\[ i = \frac{A(1 + C \log P)}{(t + b)^n} \]  

According to the rules, both the absolute mean square error and the relative mean square error are used as the standard for evaluating the accuracy of the typhoon intensity equation. The parameter \( n \) will be obtained by fitting the equation. Replace \( a \), \( b \), and \( C \) with the search frequency (P)-ratio intensity (i)-period (t) of the ratio intensity value of each period in the relationship table. By comparing the ratio intensity value, the absolute mean square error and relative average can be calculated as square error. Formulas (7) and (8) give the standard of absolute mean square error and relative mean square error.

\[ f_R = \min \left\{ \frac{1}{n} \sum_{i=1}^{n} \left( \frac{1}{m} \sum_{j=1}^{m} (x_{ij} - x_{ip})^2 \right) \right\} \]  

\[ f_Q = \min \left\{ \frac{1}{n} \sum_{i=1}^{n} \left( \frac{1}{x_{ip}} \sum_{j=1}^{m} (x_{ij} - x_{ip})^2 \right) \right\} \]  

Where \( m \) is the number of cycles, \( n \) is the number of reproduction cycles, \( x_{ij} \) is the specific intensity value \( x_{ip} \) calculated by substituting the parameters into the storm intensity equation, and \( x_{ip} \) is the ratio intensity value and average value.

Table 1 Radar basic information data table

| Parameter                        | Z City Doppler Weather Radar |
|----------------------------------|-----------------------------|
| Radar model                      | CIVRAD CB                   |
| Radar antenna erection height   | 97.6m                       |
| Longitude                       | 103.722083                  |
| Latitude                        | 27.348994                   |
| Bandwidth/wavelength            | C/10.5cm                    |
| Body scan layers                | 9                           |
| Body scan time                  | 10min                       |
| Number of squares               | 360                         |
| Head of library                 | 0.5km                       |
| Detection range                 | 400km                       |
| Effective data radius           | 200km                       |
obtained after frequency analysis. Since the optimization algorithm proposed in this paper can optimize the larger value of the objective function, the objective function can be finally determined by formula (9).

\[ f = \min \frac{1}{f_R + f_Q} \]  \hspace{1cm} (9)

In addition, in the “Outdoor Drainage Code,” the absolute mean square error standard shall not exceed 0.05 mm/min, and the relative mean square error standard shall not exceed 5%.

**Results**

**Overview of regional research**

Based on the provided land use data, it can establish catchment area production and convergence parameters. The Horton penetration model is used for penetration, and the model parameters are selected based on the experience provided in the SWMM user manual. The specific parameter settings are shown in Table 2.

It collects data from seven regional reservoirs, mainly including design water levels and reservoir capacity curves. When dealing with the urban inland river system, the SWMM model is extended to analyze the number of river trapezoidal sections and related data. The depth of the Manning River coefficient and other parameters is determined based on actual local measurements. Figure 2 shows the cross-sectional shape of the river.

Based on the integrated river, pipe network, reservoir, and other data, the SWMM model is finally established, as shown in Fig. 3.

**Spatial estimation and analysis of rainfall in mountainous areas**

Based on the data of 6 rain gauge stations provided locally (the five-minute rainfall data from 2019 to 2020) and the radar reflection coefficient during this period, the ZR relationship optimization study will be carried out. The genetic algorithm is used to optimize the parameters A and b of the Z-R relationship. Taking into account the location of the rainfall observation station and data integrity, the rainfall data measured by the National Meteorological Administration in urban areas is selected as the standard for selecting general rainfall. From the rainfall data of the past 25 years, 10 rainstorm processes were selected and compared with the weather radar of the same period, and the basic reflectance record data was monitored. According to the principle of selecting the typical spatial rainfall process, the radar reflection coefficient field from August 24 to 26, 2019, was finally selected, and the typical spatial rainfall distribution process can be obtained by combining with the ZI calculation.

As shown in Table 2, the following objective function values and the empirical frequencies of x, Cv, and Cs are obtained by the above various methods (N is the measured rainfall sequence m is the characteristic value of the descending sequence of each sequence number).

The corresponding magnification ratio is shown in Table 4. According to the OLS, ABS, and WLS standards in Table 4, it can be seen that the hybrid optimization algorithm proposed in this paper searches for smaller objective function values, and the optimization results are better than other conventional methods. The “Code for Design Flood Calculation of Repair Water Conservancy Projects” stipulates: x and Cv are estimated by the moment method, the adjustment range of x is less than 10%, the adjustment range of Cv is 15% to 30%, and the value of Cv/Cs is 2.6:1, the parameter results obtained through the optimization of the hybrid algorithm meet all the above regulations, and more reasonable hydrological

| Parameter name                                      | Type of land             |
|----------------------------------------------------|--------------------------|
|                                                    | The way | Building | Land     | Green space |
| Impermeable percentage (%)                         | 100     | 100      | 0        | 0           |
| Impervious surface manning n                       | 0.02    | 0        | -        | -           |
| Permeable Surface Manning n                        | -       | -        | 0        | 0.2         |
| Water storage in impervious surface depressions (mm)| 2       | 1.5      | -        | -           |
| Water storage in permeable surface depressions (mm) | -       | -        | 4        | -           |
| Maximum infiltration rate (mm/h)                   | -       | -        | 34       | 77          |
| Minimum infiltration rate (mm/h)                   | -       | -        | 6        | 24          |
| Attenuation coefficient                            | -       | -        | 3.3      | 2.3         |

Table 2: Values of catchment parameters

Space estimation and analysis of rainfall in mountainous areas

Spatial estimation and analysis of rainfall in mountainous areas

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frequency statistical parameters that are consistent with the actual can be obtained.

Finally, we can obtain a 24-hour design space rainfall distribution process with 10-minute steps in different probability periods. Figure 4 shows the design space rainfall distribution map at key moments in different probability periods. Figure 4 shows the distribution of the maximum rainfall in the design space.

Figure 5 shows the maximum time distribution of rainfall in the design space.

The design spatial rainfall distribution diagram with the maximum time is shown in Fig. 6.

The rainfall distribution diagram of the design space at the maximum time is shown in Fig. 7.

Take a specific grid as an example. As shown in Fig. 8, the 24-hour design rainfall process of the grid is calculated on the iteration period \( p = 2a, 5a, 10a, \) and \( 20a \).

**Discussion**

**Principles of optimizing college English classroom teaching under the network environment**

Chen Jianlin extended the theory of education ecology to college English teaching and established a complete theoretical system of college English ecology research. According to this theoretical framework, it is possible to explore ways to maintain the dynamic balance of the classroom education ecosystem by analyzing the ecological status of each element of the foreign language education ecosystem and the development and changes of each element, in order to optimize the college English classroom teaching in the network environment, to meet the flexibility, compatibility, and harmony. Under the guidance of educational ecology theory, through empirical research on the reasons for the imbalance of the college English classroom ecosystem, the author believes that the optimization of classroom teaching should adhere to the principles of “optimization” and “stability.” “Educational structure, compatibility of educational elements,” “limited” training operations can promote personal development, as well as the basic principles of “independent learning” and “multiple interactive education.”

Yukang Babanski (Yukang Babanski) put forward the theory of optimized education, which believes that optimized education requires a systematic approach to the curriculum. All the elements contained in this education system are interrelated with the education elements inside and outside the classroom. The education system shows the principle of optimizing the curriculum from a global perspective, so as to select the best teaching method to form the best teaching
content and the best teaching structure for the selection of teaching types.

In fact, teaching English in universities can be called “practical” skill courses. In the era of modern information technology, research on the optimization of college classroom teaching is a relatively large problem. According to Bavanski’s “Optimization of Teaching Method” theory, to realize the optimization of teaching method, not only the labor of teachers must be organized scientifically, but also the learning activities of students must be organized scientifically. In the Internet, in order to optimize the selection and combination of network media and other teaching methods, the environment should use different classroom teaching methods to teach different teaching methods, and choose the best teaching methods to teach different teaching methods. Generally speaking, it is impossible to rely solely on online education media to achieve the goal of college English education. We will have to choose several appropriate education methods or methods at the same time, including the combination of traditional methods and modern methods. Choose college English classroom teaching methods, change the role of teachers and let students choose learning methods, choose

| Duration (min) | WLS |
|----------------|-----|
|                | Method of Moments | Probability weight | Single right | Dual rights | Project assessment | Optimization |
| 5              | 0.0998 | 0.1 | 0.113 | 0.132 | 0.095 | 0.0776 |
| 10             | 0.0711 | 0.075 | 0.092 | 0.087 | 0.082 | 0.0661 |
| 15             | 0.1026 | 0.109 | 0.186 | 0.169 | 0.18 | 0.1003 |
| 20             | 0.1048 | 0.108 | 0.149 | 0.183 | 0.244 | 0.0997 |
| 30             | 0.2331 | 0.183 | 0.318 | 0.323 | 0.233 | 0.165 |
| 45             | 0.4658 | 0.178 | 0.47 | 0.358 | 0.245 | 0.17 |
| 60             | 0.6317 | 0.156 | 0.52 | 0.422 | 0.204 | 0.133 |
| 90             | 0.3884 | 0.189 | 0.361 | 0.34 | 0.184 | 0.1241 |
| 120            | 0.437 | 0.151 | 0.351 | 0.271 | 0.174 | 0.1399 |
| 150            | 0.267 | 0.145 | 0.243 | 0.183 | 0.185 | 0.1223 |
| 180            | 0.2156 | 0.183 | 0.232 | 0.234 | 0.184 | 0.1543 |
| 240            | 0.1221 | 0.121 | 0.165 | 0.164 | 0.156 | 0.1068 |
| 360            | 0.24 | 0.283 | 0.485 | 0.34 | 0.24 | 0.2336 |
| 720            | 0.1905 | 0.179 | 0.433 | 0.36 | 0.183 | 0.1536 |
| 1440           | 0.2115 | 0.1944 | 0.569 | 0.449 | 0.219 | 0.1664 |

Table 4  Amplification ratio table of different design frequencies

| Frequency (%) | 1  | 5  | 10 | 20 | 50 |
|---------------|----|----|----|----|----|
| Return period (years) | 100 | 50 | 20 | 10 | 5  | 2  |
| 1 min         | 2.79 | 2.6 | 2.3 | 2.18 | 1.93 | 1.71 |
| 30 min        | 2.38 | 2.3 | 2.2 | 1.98 | 1.7 | 1.58 |
| 60 min        | 2.13 | 2 | 1.9 | 1.72 | 1.6 | 1.4 |
| 90 min        | 2.09 | 2 | 1.8 | 1.69 | 1.6 | 1.4 |
| 120 min       | 2.07 | 2 | 1.8 | 1.68 | 1.6 | 1.39 |
| 150 min       | 2.05 | 1.9 | 1.8 | 1.68 | 1.6 | 1.38 |
| 180 min       | 2.02 | 1.9 | 1.8 | 1.66 | 1.6 | 1.38 |
| 240 min       | 1.99 | 1.9 | 1.7 | 1.63 | 1.5 | 1.37 |
| 360 min       | 1.92 | 1.83 | 1.7 | 1.61 | 1.5 | 1.36 |
| 720 min       | 1.84 | 1.8 | 1.7 | 1.57 | 1.5 | 1.35 |
| 1440 min      | 1.74 | 1.7 | 1.6 | 1.51 | 1.4 | 1.33 |

Fig. 4  Design spatial rainfall distribution map at the maximum time (P=2a)
learning strategies, design and choose network education platform design, choose curriculum settings, evaluation systems, and educational resources in three-dimensional textbooks. Due to the principle of screen system optimization, it can effectively improve the quality of classroom teaching and achieve the best teaching effect. It can be said that the success of college English classroom practical education depends on the optimization of college English classroom courses.

Under the guidance of the theory of education ecology, the ecological environment of college English classroom education should be a comprehensive, dynamic, and balanced environment. In order to realize this ideal educational ecological environment, it must be compatible with the characteristics of each element of the classroom ecosystem. It also has the function of coordinating the relationship between the elements. At the same time, this is also a way to limit classroom teaching activities and enable classroom teaching, the interaction, interdependence, and mutual conversion of various elements. Originating from the nature of the classroom ecological environment, the theory of educational ecology emphasizes the stability of educational elements and the balance of the educational environment, and the relationship between the compatibility of classroom educational elements and the harmony of the ecological environment. The goal of “stability” needs to achieve “compatible” means and methods. The teaching content of college English classes includes general education goals, curriculum composition, teachers and students’ educational capabilities, and other elements to form the educational ecosystem of college English classes (Hewaidy et al. 2015). In the process of implementing classroom teaching, these elements are interactive and interdependent, but not necessary. If there is a problem with the educational elements of the classroom ecosystem, it will cause the entire educational environment to fall into disorder.
structure to lose balance, which leads to an imbalance in the education system and instability of the education system (Jaumé and Lillie 1988). Therefore, in order to achieve system stability, teaching components must be compatible with each other.

For example, when a part of information technology enters the traditional college English classroom, the balance of traditional college English classroom education is broken (Kazmi and Jan 1997). In order to re-establish the biological chain, it is necessary to integrate information technology with the university’s English courses (Khan et al. 1986). This highly integrated multimedia classroom uses computers instead of displaying 10 or more pages or dozens of pages of PPT, and this is only based on the classroom’s form and skill to be called (Lillie et al. 1987). Information technology is not really integrated into the actual content of classroom teaching, but this is the digital content of paper textbooks (Long et al. 2012). According to Professor He Kekang’s definition, “in-depth integration of information technology and foreign languages” refers to the establishment of a comprehensive and multi-level integration of information technology and education in college English classrooms, and the establishment of an ecological college English teaching environment (Lucha et al. 2008). In this environment, the leading role of teachers and the leading position of students are reflected in the “independent research cooperation” method, which maximizes the initiative, enthusiasm, and creativity of students, and reforms the traditional teacher-centered educational structure, cultivate real critical thinking and innovative foreign language talents with thinking and practical skills in college English classes (Maillet 1947).

The high compatibility of information technology and educational elements is reflected in the concept of technology and foreign language education and the compatibility of foreign language teaching methods, including the detailed interaction between students, teachers, and students and machines, and the relationship between network information technology and college English courses. Information emphasizes the interaction between teachers and students and plays a full role in their personal role (Martinez et al. 1998). As the curriculum changes, teachers’ traditional classrooms or computer self-study centers are compatible with the main roles of teachers and students (Mc Dougall and Khan 1990). Classroom teaching is sometimes implemented by “teacher center” and “student center” self-study, and is also based on “student center” and “teacher center.” Therefore, compatibility promotes the full application of the educational model, and seamlessly integrates the technology as a living organism into all elements of the classroom education environment, including the integration of technology and teacher teaching technology and the integration of student learning strategies (Meissner et al. 1974). In the integration of technology and software education in the classroom, the English classroom of network information technology is an organic part of teaching. This information-based educational environment is a comprehensive system that organically combines the three elements of hardware, software, and man-machine environment, and the system interacts with teachers, students, textbooks, and technology at the same time and interacts with them (Paracha 2004). Play a role in the ecological niche to create specific educational effects. Only by achieving a high degree of compatibility with information technology and the educational elements of the entire classroom and environment can the role and function of information technology be educated in order to achieve the balance and stability of the educational structure of college English classrooms (Pivnik and Scaliombe 1993).

Evaluation and analysis of online English teaching

Student evaluation

According to the analysis of the statistical survey results of students, whether or not they support WeChat English teaching, 60.18% of students choose to “apply” instead of “not to apply,” and 39.86% of students choose to “mainly rely on” design guidance and content. At the same time, 47.17% of students cannot spend 30 minutes learning English every day. Since the 1990s, in the age of information digitization, students are very sensitive to information technology, and they are willing to accept and test new teaching methods. 82.13% of students think that using WeChat to support their English education will help them learn, while 15.47% of students think it will not help. In terms of supporting training on the WeChat platform, three things students like to do most are: push and interact with WeChat official accounts, share English materials in WeChat Moments, and WeChat group English answers.

For the WeChat public account, 46.36% of students read, study, and respond well when they are free. 26.85% of the students said that they read and study well and encourage students to choose English topics of interest and open their own WeChat public account.

As a display form of information conversion, the WeChat platform has excellent operability and significant advantages by integrating it into English teaching inside and outside the classroom. As the information environment penetrates into English teaching, teachers are becoming more and more familiar with WeChat and other information teaching methods. The support and promotion of English education on the WeChat platform will inevitably be recognized by many schools, and many teachers and students stand by.

Evaluation of teachers

(1) For English education, the basic WeChat plug-in function does not apply to English applications. With the active
development of information education, teachers can choose from a variety of education platforms. Example: Chaoxing’s Learning Link is a professional mobile learning platform for smartphones and tablets; another example is the UMU platform, which was created a multi-mode, innovative hybrid model. Self-preparation of the course content is carried out before class, and the interactive class strengthens the learning after class; the last example is the “class school,” which is characterized by the ability to quickly collect student work, and teachers can directly check and evaluate student work online, so that Able to quickly understand student work from multiple angles, we also provide an on-site inspection to prevent theft of student work.

Compared with the other education platforms mentioned above, the WeChat platform has its own advantages and disadvantages. The main problem is that WeChat training has no focus. When choosing a specific training platform, teachers can compare them in advance and decide which training platform to choose based on the characteristics of their subjects.

Back to the English classroom, the basic function of WeChat does not have any obvious advantages in teaching English. Educational promotion can also be universally applied to other subjects, and the targeted function is the English-Chinese translation application. If a foreign language is displayed, the dedicated chat function of WeChat can be directly translated into Chinese. However, this function can also be implemented in other software and APP, and provides more powerful functions in other software. For example, the “Youdao” translation application that everyone is familiar with. Students can directly use the camera function to take pictures of English texts, and the system will automatically recognize them and translate them directly into Chinese. The operation is relatively simple. The “Synchronized Translation Super Edition” developed by iFlytek Co., Ltd. supports voice translation in more than 30 countries/regions. It also has a spoken language assessment function. Learners can follow English sentences, and the system will automatically assign scores and list each subject’s scores and phonetic symbols of words, and speed up the speed of oral assessment.

There are many English education applications that can be used for oral assessment, such as “Speaking English fluently.” The category is relatively complete. Compared with the WeChat platform, these English applications are more suitable.

(2) Restrictions on classroom organization and management.

There are still concerns about the composition of the teacher’s classroom. Whether it is used for learning English or operating life and games, students can use their mobile phones to work with WeChat. According to the survey results of 200 students of the biography, only 26.85% of the students believe that using the WeChat platform to learn English will focus on learning without being affected by other WeChat plugins. Most students said that they might be attracted by WeChat “moments of friends” private messages or their official accounts. Therefore, it is necessary to be supervised and guided by the teacher from time to time in the classroom with guidance supported by WeChat.

In other words, we must consider the following factors to encourage teachers to use WeChat to teach and provide other information. The first is to fundamentally reduce the burden on teachers and allow them to teach more time and energy. Second, schools should proactively contact R&D companies as soon as possible and strive to provide teachers with various technical services, including the development of WeChat applets for English training, the creation of WeChat official accounts, and the collection of English training audio and video to provide teachers-related information. The third is the WeChat textbook developed in cooperation with the company, which is effective, simple, easy to operate, and effective for training. In this way, teachers can check the actual teaching effect as well as the efficiency and convenience of use. At the same time, most teachers will be willing to accept this teaching method.

School evaluation

Most schools mainly support education support on the WeChat platform, which is mainly due to the national policy’s supportive attitude towards information education as a whole. According to Article 20 of the Decision of the State Council on Accelerating the Discovery of Vocational Education, it is proposed to improve the informatization level of vocational education, strengthen the overall planning and distribution of informatization construction, and regard the ability to apply modern information technology as an important criterion for evaluating teachers. Recently, the Ministry of Education held a national information education competition for higher vocational schools every year to promote and reform through the competition. The construction of a model university requires all information education. Obviously, the focus is on national information education.

In terms of funding, we have invested a lot of money in information education, including the research and development of the school’s WeChat platform. In terms of hardware-assisted facilities, many schools’ educational facilities and dormitories already cover unlimited WiFi, and with WeChat, students do not have to use their own data to pay for additional network costs. Regarding school policies, many schools have issued specific educational policy requirements based on the information. For example, Quanzhou Medical University issued the “Implementation Opinions on Promoting the Application of Information Education (Testing)” in 2018. The document pointed out that information education is creating conditions, equipment, and technology for teachers. Support the development of a certification
system for teachers to use information technology, and integrate the teachers’ information technology application skills and educational abilities into the teacher’s job evaluation. The school also announced a method to identify teachers for information education. One is to use social software such as WeChat groups and QQ groups to build professional courses and platforms, and to disclose learning-related materials to students for self-study. It breaks through the space limitation, makes full use of students’ leisure time and scattered time, and provides students with undifferentiated educational goals. The school’s support for the WeChat platform, information platform, and even strict requirements will help promote the development of the platform in English education and other professional aspects.

Conclusion

In this article, we first propose an RBF network prediction algorithm based on genetic algorithm-based particle swarm hybrid optimization. First of all, we conducted simulation experiments on rainfall estimation in mountainous areas. In the rainfall technology dedicated to the research of urban freshwater simulation methods for radar estimation, we can draw the following conclusions: the accuracy of rainfall determination the simulation accuracy of mountain rainfall models and the performance of existing rainfall models. The design can make the rainfall input conditions of the model more accurate by optimizing the model, thereby improving the accuracy of rainfall simulation in mountainous areas. To this end, a hydrological frequency analysis and storm intensity equation parameter optimization method is proposed. The objective function brings the optimal hydrological frequency statistical parameters and storm intensity expression parameters, and is optimized through a combination of a hybrid optimization algorithm and a mathematical model. Reduce design rainfall error. Finally, we analyzed and evaluated online English education. In the new network environment, the establishment of a diversified evaluation system for college English teaching will surely become the mainstream direction of English teaching. The scientific and practical standard system is adapting to modernization. In the practice of college English teaching, this demand is supported. A variety of assessment methods optimize the classroom teaching model and are closely integrated with the practice of college English teaching. Through the coordination and communication of group cooperation, trust and consensus are established between teachers and students. Through online communication and Internet online learning methods, we have achieved a pleasant English learning, allowing us to easily access the Internet with a single click of the mouse, conduct a complete mutual assessment between teachers and students, and use multiple perspectives to help students improve practical motivational functions and various assessments.

Declarations

Conflict of interest The authors declare that they have no competing interests.

References

Abbasi IA, McElroy R (1991) Thrust kinematics of the Kohat Plateau, Trans-Indus Salt Range, Pakistan. J Struct Geol 13:319–327. https://doi.org/10.1016/0191-8141(91)90131-2
Ahmad S (2003) A comparative study of structural styles in the Kohat Plateau, North West Himalayas, NWFP, Pakistan. Unpublished Ph. D Thesis, NCE in Geology, University of Peshawar
Baker DM, Lillie RJ, Johnson JD, Yousaf M, Zamin ASH (1988) Development of the Himalayan frontal thrust zone: Salt Range, Pakistan. Geology 16:3–7
Bobachev C (2001) Wechat: a windows software for an automatic interpretation of resistivity sounding data. 2002(11):89–94
Bosak P, Pobhans J, Filippi M, Svoboda T, Smid J (1999) Karst and caves in sand dykes, SE Zagros Mts. (Iran). Acta Carsol 28(2):42–74. https://doi.org/10.3986/ac.v28i2.484
Braga ACO, Malaguti FW, Dourado JC, Chang HK (2009) Correlation of electrical resistivity and induced polarization data with geotechnical survey standard penetration test measurements. J Environ Eng Geophys 4:123–130. https://doi.org/10.4133/jeeg4.2.123
Brähmans J, Filippi M, Palatinus L (2000) New findings about salt karst in Zagros Mountains, Iran. Paper presented at the fourth European Caving Expedition Symposium, 2000(20):42–46
Costa E, Vendeville BC (2002) Experimental insights on the geometry and kinematics of fold-and-thrust belts above weak, viscous evaporitic décollement. J Struct Geol 24(11):1729–1739. https://doi.org/10.1016/S0191-8141(01)00169-9
Ćwiklik M (2014) Characterization of near-surface sediments based on electrical resistivity tomography measurements in the vicinity of the Wawel Hill (Krakow, Poland). Geol Geophys Environ 39:351. https://doi.org/10.7494/geol.2013.39.4.351
Doneva B (2012) Geoelectrical measurements with Terrameter Sas 1000. In: SGEM2012 12th Int Multidiscip Sci GeoConference, vol 2. https://doi.org/10.5593/sgem2012/s06.v2004
Frohlich RK (2002) Combined geoelectrical and drill hole investigation for detecting fresh-water aquifers in Northwestern Missouri. Geophysics 39:3–352. https://doi.org/10.1190/1.1440432
Hewaidy A, El-Motaal SSA, Ramdan TM, El Khatif AA, Soliman SA (2015) Groundwater exploration using resistivity and magnetic data at the northeastern part of the Gulf of Suez, Egypt. Egypt J of Pet 24:255–263. https://doi.org/10.1016/j.ejpe.2015.07.010
Jaumé SC, Lillie RJ (1988) Mechanics of the Salt Range Potwar Plateau, Pakistan: a fold-and-thrust belt underlain by evaporites. Tectonics 7:57–71. https://doi.org/10.1029/TC007i001p00057
Kazmi AH, Jan Q (1997) Geology and tectonics of Pakistan. Pakistan Graphics Publishers, Karachi
Khan MA, Ahmed R, Raza HA, Kemal A (1986) Geology of petroleum in Kohat-Potwar depression, Pakistan. AAPG Bull 70:396–414. https://doi.org/10.1306/9488571E-1704-11D7-86450000102C1865D
Lillie RJ, Johnson GD, Yousaf M, Zamin ASH, Yeats RS (1987) Structural development within the Himalayan foreland fold and
thrust belt of Pakistan. In: Beaumont C, Tankard AJ (eds) Sedimentary basins and basin-forming mechanisms: Can Soc Pet Geol Memo, vol 12, pp 379–392.

Long M, Donohue S, L’Heureux JS, Solberg IL, Ronning JS, Limacher R, O Connor P, Sauvin G, Romean M, Lecomte I (2012) Relationship between electrical resistivity and basic geotechnical parameters for marine clays. Can Geotech J 49:1158–1168. doi.org/10.1139/t2012-080

Lucha P, Cardona F, Gutiérrez F, Guerrero J (2008) Natural and human-induced dissolution and subsidence processes in the salt outcrop of the Cardona Diapir (NE Spain). Environ Geol 53(5):1023–1035. doi.org/10.1007/s00254-007-0729-3

Maillet R (1947) The fundamental equation of electrical prospecting. Geophysics 12:529–556. doi.org/10.1007/s00254-007-0729-3

Martinez JD, Johnson KS, Neal JT (1998) Sinkholes in evaporite rocks: surface subsidence can develop within a matter of days when highly soluble rocks dissolve because of either natural or human causes. Am Sci 86(1):38–51

Mc Dougall JM, Khan SH (1990) Strike slip faults in the foreland fold thrust belt; the Kalabagh fault and western Salt range, Pakistan. Tectonics 9:1061–1075. doi.org/10.1029/TC009i005p01061

Meissner CR, Master JM, Rashid MA, Hussain M (1974) Stratigraphy of the Kohat quadrangle, Pakistan. 1974(14):151–162. doi.org/10.3133/pp716D

Paracha W (2004) Kohat plateau with reference to Himalayan tectonic general study. CSEG recorder 29(4):126–134

Pivnik DA, Sercombe WJ (1993) Compression and trans-pression related deformation in the Kohat Plateau, NW Pakistan. Himalayan M, Treloar P (eds) Himalayan tecton-ics: Geo Soc of London Special Publication, vol 44, pp 559–580. doi.org/10.1144/GSL.SP.1993.074.01.37