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Article

Research on The Application of Chinese Traditional Culture Teaching in Higher Vocational Education

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Abstract

Chinese Traditional Culture (CTC) teaching, among the most significant abilities in higher vocational education, significantly impacts the knowledge of vocational college students. The current focus of vocational education was on better cultivating students' CTC understanding and integrity competency through these activities. There should be a strong emphasis in vocational education on developing students' cultural competency by helping them better understand the value of CTC and the alternative stages in which it can be used. This will help students become more comfortable interacting with people while also helping them better understand China's values. This paper presents a novel hybridized long-short term memory and recurrent neural network (Hybridized LSTM-RNN) to predict the capability of vocational education students. First, collected datasets are standardized through the normalization technique in pre-processing stage to eliminate unwanted errors. Then, Artificial Intelligence (AI) technology is used in the CTC teaching application. The proposed approach is applied in the prediction stage. This approach's performance metrics are examined and compared with certain standard techniques to obtain this research with the greatest effectiveness. The findings of this research are accomplished by employing the Origin tool.

Keywords

Chinese Traditional Culture Teaching (CTCT), Higher Vocational Education, Artificial Intelligence (AI), Multi-Gradient Long-Short Term Memory (MG-LSTM), Origin tool

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China's people have collected five millennia of life experience, which has been condensed into a distinctive traditional culture that has been handed down from one generation to the generation (Reaume, 2021). They eliminate the excess and preserve the vital elements of their culture, which they then pass on to future generations of Chinese people. Many great quotations are well-crafted compositions that are rich in moral etiquette culture. Traditional culture significantly motivates students to develop a positive worldview while promoting cultural literacy, high-quality thinking, and enhancing students' willpower and tenacity. Earlier in 2009, the Chinese state authorities said that "China's far-reaching cultural works are a remarkable collection of works from all periods of history." It condenses boundless knowledge and unending ideas into a little package (Guttman et al., 2018). It explains humanity's long-term viability and evolution and the essential spiritual nourishment for us. Principles and philosophy abound in the polished culture that has been handed down from antiquity. In 2006, the Ministry of Education clarified that all vocational institutions should "enhance students' cultural connotation and moral character while nurturing technical skills." To cultivate technical talent, colleges must focus on developing higher vocational students' cultural connotations while also teaching them morals. This is the principle and the most crucial link in the chain. The Ministry of Education recommended in 2011 that "students' involvement in diverse courses might activate their desire for studying." Culture from China is a vital component of current vocational training programs. Chinese traditional culture should be taught at higher vocational schools to increase the quality of vocational education and talent nurturing (Shan, 2021). Figure 1 depicts the architecture of the vocational education system.

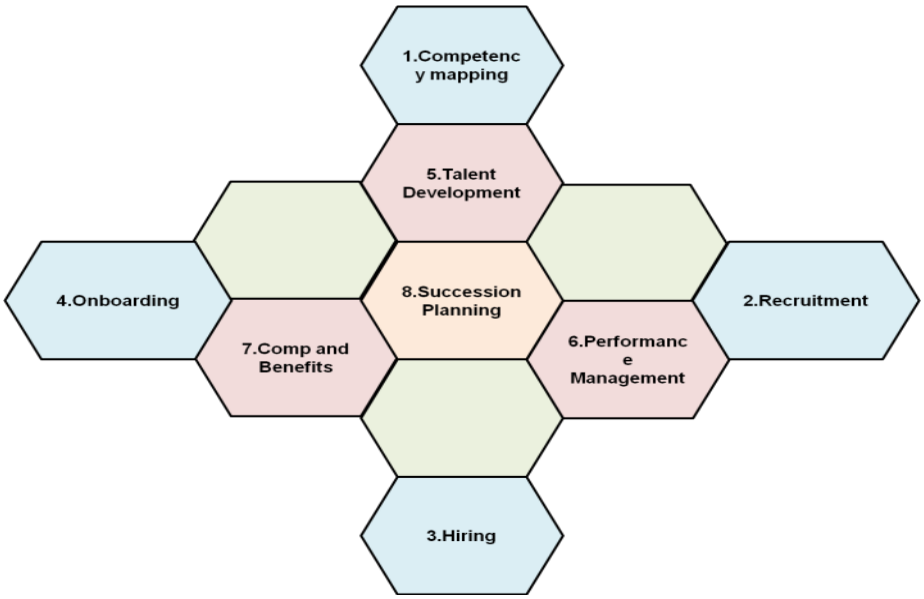

Figure 1. *Vocational education system architecture*

Teachers and students will face various issues throughout its implementation, including inconsistencies in time and space, a short development period for the subject, and a not-yet-fully-mature system. Artificial intelligence has permeated and penetrated numerous facets of social life, affecting people's routines and ways of living and penetrating multiple professional fields, including education. The July 2017 release of the "Next Generation Artificial Intelligence Development Plan" by the State Council stated that "smart technology should be used to expedite the reform of talent training modes and teaching techniques and to establish a new education system that integrates smart learning and interactive learning" (Girasa, 2020). In March 2019, the Ministry of Education announced "Key Points of Education Informatization and Cybersecurity Work in 2019," with the first fundamental objective being the compilation of the "China Smart Education Development Plan" and the organization of an international conference on artificial intelligence and education. Currently, there are several educational applications for artificial intelligence under development. However, there is no mature and systematic research on employing artificial intelligence to teach CTC. As a result, we developed a paradigm that includes AI in CTC education. The students' abilities are then evaluated using the Hybridized LSTM-RNN method to determine the efficacy of the method.

Related Works

In Tapani and Salonen (2019), the author mentions that since the beginning of 2018, vocational education in Finland has become competency-based and learner-centered. Teachers must now commit more time addressing their unique requirements to serve their students better. Individual learning plans are designed, and the company offers a larger variety of learning possibilities. They also investigated what types of teacher competencies exist in Finland. In Sergeeva et al. (2019), the author explains a growing emphasis on social integration and universality in education. Their research aims to demonstrate how the process increases the amount of intercultural contact between members of various cultural groups. Understanding between individuals from various cultures is becoming more important as intercultural encounters grow in the contemporary world (Zeng et al., 2019).

In Hidalgo-Peñate et al. (2020), the author mentions that "Hospitality and Tourism Vocational Education Schools (HTVES)" in Spain are the focus of this research. Additionally, HTVES must serve as a testing ground for new ideas and initiatives in the tourist industry to keep up with changes in operations and management at the organizations where the students will work. It would be advantageous for these institutions to understand the resources that play a role in the innovation process and how they combine to enhance or hinder the process (Jambulingam & Saxton, 2021).

In Lv et al. (2022), the author mentions that vulnerability to a lack of organizational culture and occupational dedication is becoming an increasing worry as vocational education becomes more important for national development. Chinese industry's ties to the country's educational institutions may be threatened if vocational schools cannot properly produce human capital. Organizational and job characteristics alter these relationships, and that is what this research investigates. A multi-layer linear model analyzed data from 406 instructors from 69 Chinese vocational institutions and universities.

In Morselli (2017), the author mentions that as a cross-curricular topic in compulsory education, this study aims to investigate how educators might teach the crucial competency of an entrepreneurial "Sense of Initiative (SIE)." The author drew from current research and the competency-based education movement to generate a list of five criteria for entrepreneurial education. A small sample of teachers was asked, via questionnaire, to identify these five attributes. In ALai et al. (2016), the author investigated cross-cultural teaching situations in this research to see how teachers' agency influenced their professional development. An examination of the perspectives of 14 Chinese language educators revealed a wide range of opinions on the role of the educator initiative in professional development. When teachers were placed in school environments, they were subjected to various social pressures and professional and social expectations, which shaped their agency.

Multiple odontogenic keratocysts are frequent in many of these disorders, according to Mody and Bhoosreddy (1995). An odontogenic keratocyst was found in a 12-year-old girl.

Using fine-grained data, Garg (2020) shows how tailored medication may identify specific deviations from normal. Engineers used 'Digital Twins' to analyze the philosophical and moral implications of these rapidly changing, data-driven health care solutions. As a whole, the artifacts were digitally connected and constantly shown. Moral differences may be recognized depending on the data format and its interpretation. Digital twins are examined in terms of their ethical and societal ramifications. Health care has grown more reliant on data. It has the potential to be a social equalizer because of the successful solutions it gives to improve societal equality."

According to the author Garg (2020), allergic rhinitis has been a worldwide epidemic for a long time. Many of Taiwan's health care institutions prescribe traditional Chinese or Chinese-Western drugs. In traditional Chinese medicine outpatient clinics, allergy rhinitis was the most often treated respiratory illness.

HDR brachytherapy is mentioned in Ahmed and Ali (2020) to reduce radiation and allow for outpatient treatment and quicker testing times. A single-stepping source might improve dosage dispersion by varying delay at each dwell location. HDR brachytherapy treatments must be performed accurately since the shorter processing intervals do not allow for any error checking, and errors might cause harm to people.

For rural locations, Foresti (2002); Shahabaz and Afzal (2021) the author presented a technique and technology for residential sewage treatment.

Samples gathered from *certain* vegetable farms in Zamfara State, Nigeria, were examined by the author of Salihu and Iyya (2022) and found to contain "physicochemical" and "organochlorine pesticides. To evaluate both testing methodology and test outcomes, QuEChERS with GC-MS was used.

In Velde (2009), the author mentions that an in-depth study of the current state of Chinese vocational education is presented in this research. As a result, this article seeks to move away from a narrow definition of "export ready" and instead focus on "compatibility." Their paper lays out the analysis of system and institution compatibility between Finland and China.

According to Liu et al. (2021), the author recommends generating suspense to guide individual inquiry, organizing learning so that students can uncover learning norms, and in-depth examination of students' independent learning abilities to improve classroom efficiency for vocational and technical students. There are two kinds of CNN target detection techniques based on the existing popular methodologies: Once the candidate regions have been formed, they should be classified. The R-CNN series algorithm is a good example of this algorithm based on area recommendations. It's also possible to use a 2-stage detection approach, which does not need the generation of candidate regions, or a 3-stage detection method, which requires so. With PyQt5 as an interface development framework, the CNN model predicts and analyzes class attention in higher vocational schools. This system's code is written in the Python programming language.

In Mago et al. (2021), the author mentions that when it comes to education, the pandemic of COVID-19 has disrupted the sector significantly, which is seen as an important economic indicator. Even industrialized nations are fighting COVID-19 to minimize the economic effect of a long-term lockdown on their economies. Organizations are developing a work-from-home (WFH) culture to minimize losses to all stakeholders. The education industry is no exception, and the distribution of academic content has been severely impacted. Around the world, there has been an unexpected and rapid shift away from traditional classroom methods toward online and virtual ones. There is much debate regarding the long-term viability of online education during a pandemic. Hence, the effect of lockdown on the teaching-learning process was examined. Many educational institutions in Punjab participated in the survey, which gathered answers from their pupils. Fuzzy logic approaches have been used to gather, evaluate, and analyze responses connected to online teaching to determine the systemic influence of online learning on education under the current regime.

The author demonstrates in Chen (2021) that a new English education environment for college students is being developed due to the significant integration of AI and education. As part of this study, researchers investigate and evaluate how effectively students can adapt to AI-assisted English instruction, and they make suggestions for how these students might improve their adaptability in the future.

In de Oliveira Silva et al. (2020), the author depicts that students' satisfaction at "Higher Technical-Vocational Education (HTVE)" institutes may be predicted using a model of antecedents and consequences. HTVE students in Brazil were asked to participate in a survey to test the concept. Modeling the structures and their relationships using structural equations was employed in this study. This study found several factors influencing student satisfaction, including service quality, learning outcomes, and employment opportunities. While revising a curriculum to match the workforce's needs and improving the quality of the HTVE system, students' views and employment outcomes should be considered.

In Radianti et al. (2020), the author illustrates that VR's promise in teaching has been sparked in a recent study. A limited systematic study on how academics have used immersive VR in higher education with high-end and cheap head-mounted displays (HMDs). So, the author recommends employing systematic mapping to discover VR design features in higher education research. The examined papers were obtained by extracting important information from documents in four scientific digital libraries. These three key elements are examined to see whether VR-based learning may succeed: the current domain structure of learning materials, VR design components, and learning theories. The mapping between application domains, learning material, design components, and learning content was done.

In Taylor (2000), the author explores how many organizations educate employees to fit into the current labor-hostile economic structure. By exploring vocational education's roots and goals, the author demonstrates how it affects the political context of the moment.

In Sh et al. (2020), the author covers how to combine forms of education, their content, and creative ways of education. The study's purpose is explained. The educational cluster is a scientifically-pedagogically supported innovation with effective working mechanisms. The study's purpose, topic, and methodology are discussed. The phases of cluster creation, features, and quality operating mechanisms are scientifically supported. Analyses of issues affecting the development of the innovative cluster of teacher education and their solutions at the "School-Laboratory" experimental locations are provided.

In Khairullina et al. (2015), the author illustrates applying bachelor's degree programs to secondary and higher levels of vocational education. Justifies the organizational and pedagogy conditions of applied baccalaureate programs, presents the initial effectiveness of applied bachelor programs in higher and secondary vocational education, identifies the peculiarities of application programs and academic bachelor's degree programs, and highlights the pros and cons of associative learning.

In Khaled et al. (2014), the author mentions that using hands-on simulations in creative curricula is discussed in this work in a more clear conceptual manner. A comprehensive literature review compared hands-on training to other work environments and found that some constructivist qualities and outcomes were under-exposed in empirical studies concerning simulations. Based on further research on two basic aspects of constructive vocational learning (i.e., authenticity and boosting students' ownership), the findings suggest how hands-on simulations might add value to the innovative curriculum in this area. Design and implementation methodologies for hands-on simulations from the idea of constructive social learning are presented in this study to help students develop not just technical and procedural abilities but also their competencies and professional identities.

The author demonstrates in Hidayat et al. (2019) that the high unemployment rate among new college graduates in Indonesia is grounds for concern. This is due to various factors, including graduates' lack of self-sufficiency, character, and business skills. Entrepreneurship education is vital at the beginning of a student's schooling. This paper investigates and discusses this needs assessment. This study involved thirty university students from West Sumatra who exhibited an entrepreneurial mindset. The data were analyzed via Rasch analysis using descriptive statistics and differential item functioning (DIF). In Ling et al. (2021), the author depicts that with the fast expansion of Higher Vocational Education in China, the goal is to increase its quality overall. It has used knowledge-based education for a long time. Ability-based education was established progressively until the early 1990s. Higher vocational education research should go outside the classroom. Many laws and procedures have been developed to stimulate growth, and vocational education has expanded. China's higher education now includes vocational training. It's a kind of higher education and vocational training. Higher vocational institutions need a personality-based education strategy to develop students' personalities. Improve talent training method and quality. High-quality technical skills are needed in an innovation-driven society. It's a huge practical difficulty for contemporary vocational education.

Problem statement

CTC ensures humanity's long-term sustainability and progress and provides individuals with the spiritual nourishment they need. The education department made it clear that all vocational institutions should work to improve students' cultural connotation and moral character while also developing their technical abilities. Because of the implementation of CTC in education, both students and instructors are faced with several educational challenges. Because of this study, a new model for CTC instruction that includes artificial intelligence has been developed.

II. Proposed Methodology

This section discusses the application of CTC teaching in higher vocational education in detail. Figure 2 depicts the schematic representation of the suggested methodology. Initially, datasets were collected and pre-processed using the normalization technique. And then, Artificial Intelligence (AI) is integrated into CTC teaching. Then the students' abilities are tested using the Hybridized LSTM-RNN approach to evaluate the method's effectiveness.

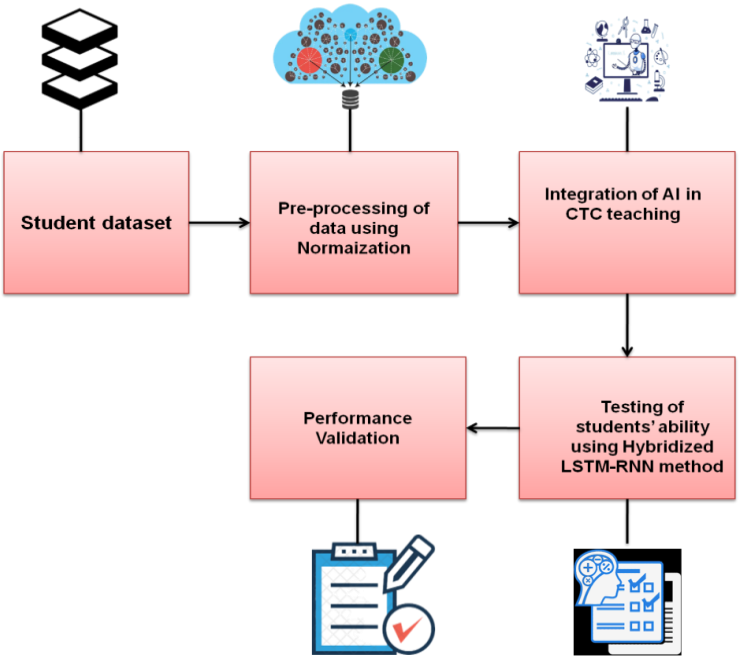

Figure 2. *The flow of the suggested methodology*

A. Data collection

Education and training for jobs can be obtained in China at one of four different levels, namely: lower secondary schools (a very small and declining sector); upper secondary vocational schools (in various educational institutions); tertiary education (primarily in 3-year vocational colleges); and adult education and on-the-job training. Lower secondary schools are a very small and declining sector. Table 1 illustrates how Chinese vocational schools may be divided into public and private institutions based on their funding sources. In 2009, there were 1181 vocational institutions; about 272 of the schools, or 23 percent, were private colleges. The remaining 77 percent were state colleges. There were 635 public institutions owned by either central or local governments, 84 public institutions affiliated with state-owned enterprises, 173 public institutions affiliated with industry associations, and 17 public institutions that belonged to other public agencies (Velde, 2009).

Table 1. *Vocational Colleges types (2009)*

Sector		2009	
		No of Institutions	**Percentage**
Private	Individual or Social Organization	272	24.03%
Public	State-owned Enterprises	84	8.11%
	Industries	173	12.65%
	Government	635	52.77%
	Others	157	2.44%
	Total	1181	100%

Source: MOE 2009 Vocational Higher Education Institution Talent Cultivation Data Collection Platform.

B. Preprocessing using normalization

As a pre-processing step, most Data Mining systems apply data transformations like normalization. Normalizing attribute data involves ensuring that attribute values lie within a predetermined range, such as 0.0–1.0. Normalization is significant to classification techniques that employ neural networks or distance measures, such as classification by nearest neighbor and clustering. Normalization smooths and normalizes data before modeling. To execute the method, standard mathematical transformations, including normalization, z-score normalization, logarithmic normalization, and decimal scaling normalization, are used to normalize numerical columns. It may be more difficult to identify patterns in data sets with extreme values. This may be particularly useful if the data is

highly irregular, has extreme highs and lows, contains distributed values, or does not adhere to a Gaussian distribution. Examples of data normalization approaches include min-max normalization, z-score normalization, and decimal scaling. Here, the data on our pupils is pre-processed using Z-score normalization. Z-score normalization refers to normalizing every value in a dataset in such a way that normalizing every value in a dataset is carried out so that the mean of all of the values is equal to zero standard deviation equals one. The Z-transform data normalization technique was used for this research to ensure that the data normalization phase was completed correctly. Additionally, it is advocated that sampling methods be used to ease the modeling process since the analysis of vast amounts of data might be time-consuming and expensive. To remove unnecessary mistakes from a dataset, we conduct a z-score normalization on every value in the dataset using the following equation:

$$New\ value = \frac{(y-\mu)}{\sigma} \quad (1)$$

The original value is represented as y, mean as μ, and standard deviation as σ. The key to reducing the size of the data collection is data cleansing. It takes more time and computing resources as the dimension rises.

C. Integration of AI in CTC teaching application

"Computer Science," "Cybernetics," "Informatics," "Linguistics," and other majors have successfully intertwined with advancing the development of AI. It has already shown considerable benefits in education and teaching as one of the three most important technologies of the twenty-first century. The findings of AI research are vital to all elements of education and teaching, and they directly impact the quality of teaching. Teachers of teaching CTC must have abundant knowledge, and AI can become the knowledge outsourcing of human teachers, which means that knowledge is the research object through computer hardware and software, and AI expert technology is used as a technique to create a continuous and huge knowledge base reserve.

Teachers must deal with various "diversities" while teaching CTC, including cultural diversity, language differences, and knowledge diversity. Because students in the same class may come from all over the world, the presentation of the educational impact will be influenced by their diverse experiences and cultural backgrounds. How to educate students according to their ability is a challenge that cannot be overlooked, and AI may achieve tailored demand perception by collecting student-specific data and then presenting it to instructors as data or text. AI may work as a multi-functional assistant in the teaching process, assisting CTC instructors in completing several educational tasks. The true quality of teaching remains in the hands of CTC instructors; AI just gathers and combines hazy data and delivers it to them in a particular and unambiguous manner; genuine decision-making power is ultimately in the hands of teachers. Artificial intelligence is subordinate to Chinese human teachers in this situation, known as the "AI assistant + teacher" method.

D. Testing of students' ability using Hybridized LSTM-RNN method

1. Deep Learning Architecture

One machine learning strategy that uses artificial neural networks (ANN) is called deep learning. A multi-layer neural network is the foundation of a deep learning network. The term "deep learning networks" refers to a collection of many types of neural networks, such as "deep neural networks" (DNN), "convolutional neural networks" (CNN), "recurrent neural networks" (RNN), and "deep belief networks" (DBN), amongst others. We test the students' ability using Hybridized LSTM-RNN method.

- **RNN**

Nodes in an RNN are connected in the same way neurons are connected in a human brain. Like synapses in the actual brain, neural network connections may convey impulses to other neurons/nodes. Afterward, the artificial neuron analyses the incoming signal and sends it on to the other neurons/nodes linked to it. Weights are often used in neurons and connections to fine-tune the learning process. It is possible to change the weight to alter the intensity of the signal as it moves from the input layers to the output layers. In an ANN, layers between the input and output are not visible to the user. At least three hidden layers are required for an RNN to function properly. Hidden units execute all the computations by adjusting the weights to create the outputs in RNNs' fundamental architecture, consisting of input, output, and hidden units. Only one direction of information flow occurs between the incoming and the outgoing unit, the input unit. The RNN model features an error comparison and weight adjustment directional loop compared to the preceding hidden layer. Figure 3 depicts a basic RNN structure with two hidden layers.

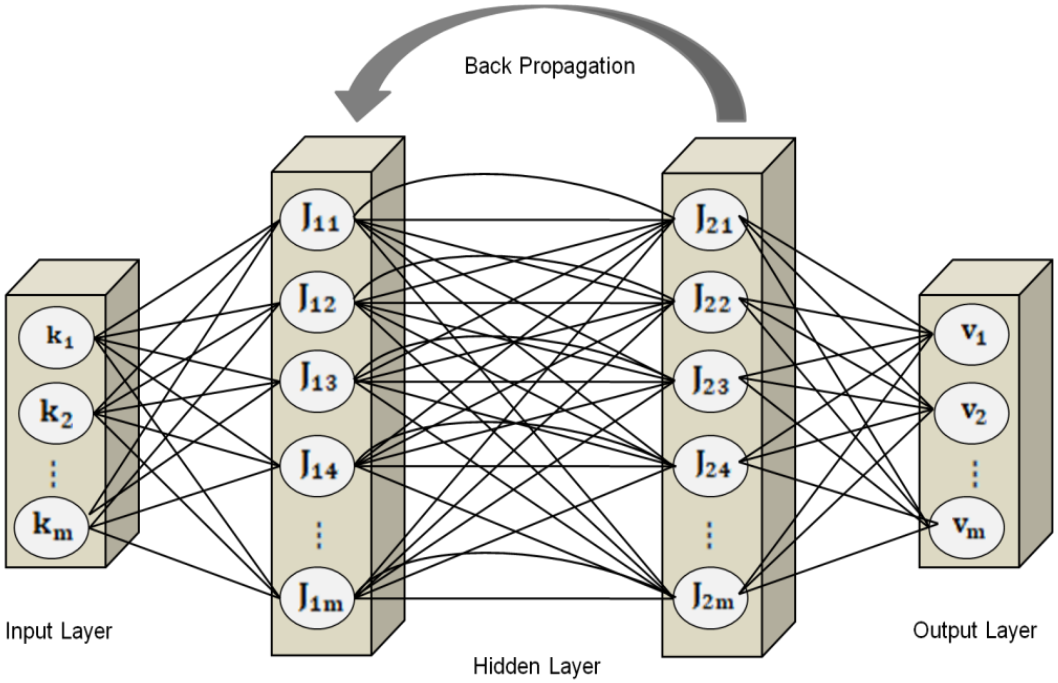

Figure 3. *A simple RNN.*

Traditional feed-forward neural networks (FFNN) have been extended to include RNNs as a variant. It is important to note that FFNNs do not have any loops or cycles in the network; instead, information flows solely in one way, from the input nodes to the output nodes. Traditional FFNNs do not need the use of hidden layers. Assume that we have an input vector sequence (K), a hidden one (J), and an output vector sequence (V). K = (k 1,k 2,..,k R) is an input vector sequence. This is how the output vector V=(v 1,v 2,..,v R) and the hidden sequence V=(v 1,v 2,..,v R) are computed using a standard RNN with r = 1 to R:

$$j_r=\sigma(E_{kj}k_r + E_{jj}j_{r-1} + n_j) \quad (2)$$

$$v_r = E_{jv}j_r+n_v \quad (3)$$

where nonlinearity activation function is denoted by σ, a weight matrices by E and bias term n in this equation. Calculate the hidden layer's output j_r at each successive t-time step using equation (2) and notice that the preceding hidden layer's output is denoted by j_{r-1}.

RNNs cannot construct more than 5–10 time steps. Using gradient-based learning techniques to update the weights of an RNN may result in a vanishing gradient issue. At the end of each training cycle, the weights are recalculated using a new fractional derivative of the error function. Although it's rare, the gradient may be as tiny as a hair. Error signals may appear or disappear, making it impossible for the weight to change. These disappearing erroneous signals might cause fluctuation in weights. Learning takes too long or doesn't function when there's a vanishing mistake. Supervised classification learning may be accomplished using RNNs. Due to disappearing and bursting gradients, it is difficult to teach them. Incorrectly given weights cause gradients to disappear and explode (assigned to either very high or very low value). An RNN is typically used to address the training difficulties of an LSTM with forget gates. A useful option for tackling time-series sequence prediction issues is RNN.

- **Long Short-Term Memory**

The vanishing error issue may be mitigated with LSTM. LSTM is capable of learning to bridge more than 1000 distinct time steps at a time. The hidden layer of LSTM networks is replaced with memory blocks. A minimum of one memory cell is required for each memory block. Figure 4 depicts a single node in a simple LSTM network. Regulating gates trigger memory cells. These gates regulate incoming and outgoing information. Between an input gate and an output gate is a forget-gate. If the stored information is no longer required, forget gates may reset the linear unit's state. Simple sigmoid threshold units, these gates are. From 0 to 1, these activation functions are obtainable.

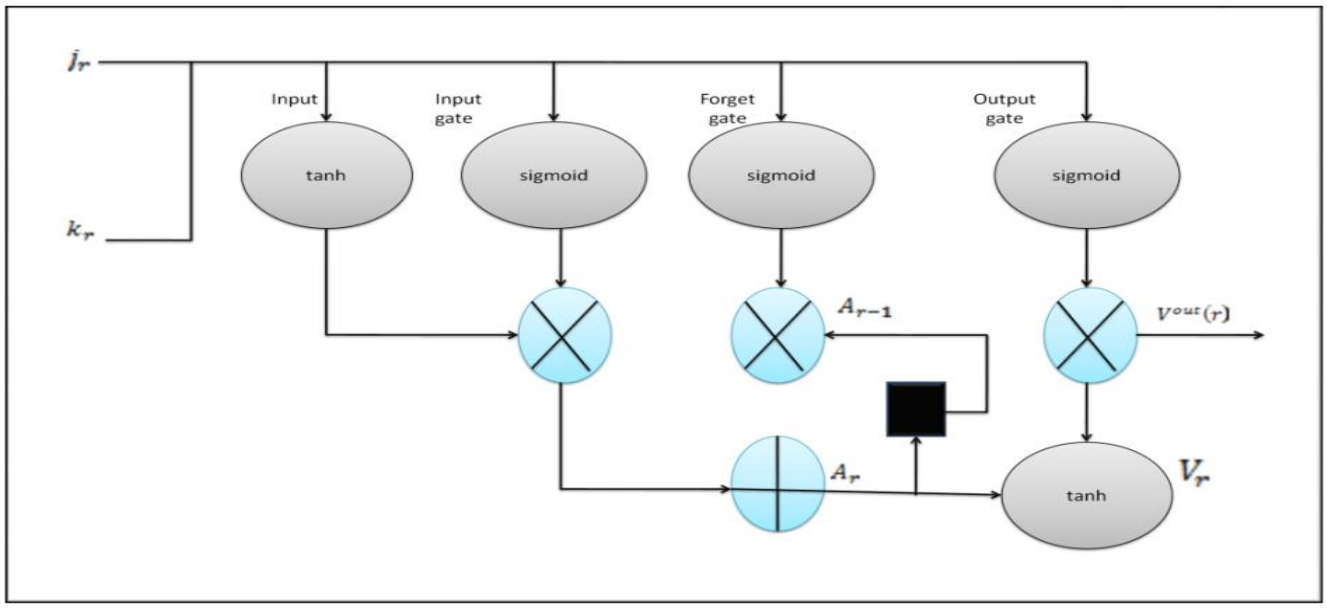

Figure 4. *One cell in a basic LSTM network*

Figure 4 depicts the output $v^{dh}(r)$ of an LSTM memory cell.

$$v^{dh}(r) = v^{out_h}(\mathrm{r})\mathrm{j}(a_{d_h}(r)) \quad (4)$$

Output gate activation, gate internal state, and hidden layer output are all referred to as v^{out_h}, $a_{d_h}$and j.

- **Hybridized LSTM-RNN method**

Using the Hybridized LSTM-RNN technique, the ability of the students to learn AI-based CTC education may be tested to see how successful the system is. The capacity of RNN's internal state to represent dynamic temporal features makes it an ideal DL (deep learning) structure for processing time-series data. To counter this tendency toward gradient fading, increasing the weight matrix by a factor larger than the reciprocal of the tanh (from 0 to 1) function will cause it to become more likely that the interval of data will get longer. LSTM may effectively ameliorate the phenomenon of gradient fading in normal RNN as an enlarged version of RNN. LSTM may employ long-time sequence data with a gate control method to determine if an input should be recalled or deleted. Memory blocks with three different types of gates replace RNN neurons in LSTM (input, forget, and output gates). These equations (5 to 10) may describe LSTM memory blocks' computed data.

$$f_p^m = \sigma\left(T^m X_p + K^m s_{p-1} + \xi^m\right) \quad (5)$$

$$f_p^r = \sigma\left(T^r X_p + K^r s_{p-1} + \xi^r\right) \quad (6)$$

$$m_p^c = tanh\left(T^m X_p + K^m s_{p-1} + \xi^m\right) \quad (7)$$

$$c_p = e_p^m * c_{p-1} + f_p^r * m_p^c \quad (8)$$

$$f_p^o = \sigma\left(T^o X_p + K^o s_{p-1} + \xi^o\right) \quad (9)$$

$$c_p = f_p^o * tanh\ tanh\left(c_p\right) \quad (10)$$

Here, f_p^m=forget gate at time p, f_p^r=input gate at p, f_p^o=output gate at p, m_p^c= input candidates stored at p, c_p= memory cells, s_p=hidden state at p, X_p=input vectors at P, ξ^M=bias vector of forgetting gate, ξ^r=bias vector of input gate, ξ^o=bias vector of output gate. Then T^m, T^r, T^m, T^o, K^m, K^r, K^m, K^o are related weight matrices. The "Hadamard product" was indicated as $*$ among two matrices. Furthermore, σ and $tanh$ were termed as activation functions.

Students' ability data were classified using hybridized LSTM-RNN in this study. The Hybridized LSTM-RNN with LSTM hidden layer has been created for classification. The number of hidden and concealed units is determined by trial and error for all hidden levels. There are four main types of abnormalities and noisy areas that may be zed by the succeeding layers, including five neurons each. When training, holdout cross-validation was utilized instead of standard k folds because of the evident LSTM-DL overhead. LSTM-RNN training and verification datasets are split into two sets for this purpose.

Consequently, the accuracy rate is low, suggesting that it is not well-fitting the model. The challenge becomes more difficult as the number of hidden layers increases. Overfitting is used to describe a network with the best training accuracy but the worst verification performance. There are no issues with the LSTM working properly or keeping track of training time when it is set to 5. It is advised that 5 frames of input be given into the LSTM algorithm. Hybridized LSTM-RNN technique is exposed to a lengthy training process as a consequence. The amount of time spent on training has decreased, and it successfully evaluates the students' ability.

III. Results and Discussion

Research on the application of CTC teaching in higher vocational education was the study's primary objective. This section will discuss the results of the students' abilities, which are tested using the Hybridized LSTM-RNN approach. Origin pro simulation tool is used to run the proposed approach. To prove the effectiveness of our proposed method, we compare our method with traditional methods such as CNN (Liu et al., 2021), Fuzzy logic (Mago et al., 2021), and LSTM (Chen, 2021). Figures 5 and 6 depict the students' critical thinking skills and performance ratio. The proposed methodology outperforms the existing methodology.

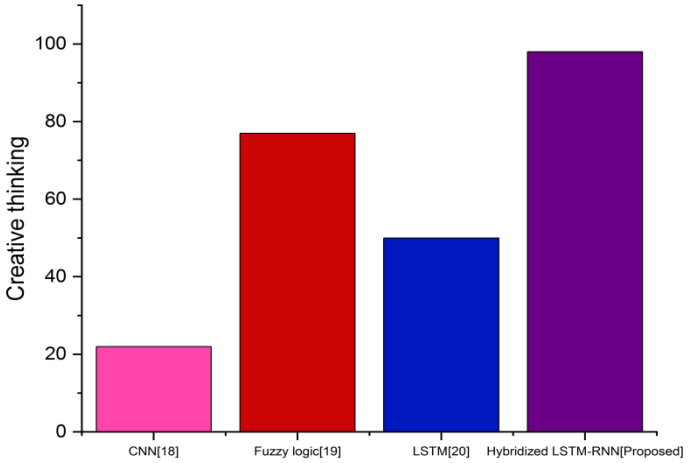

Figure 5. *Creative thinking skills*

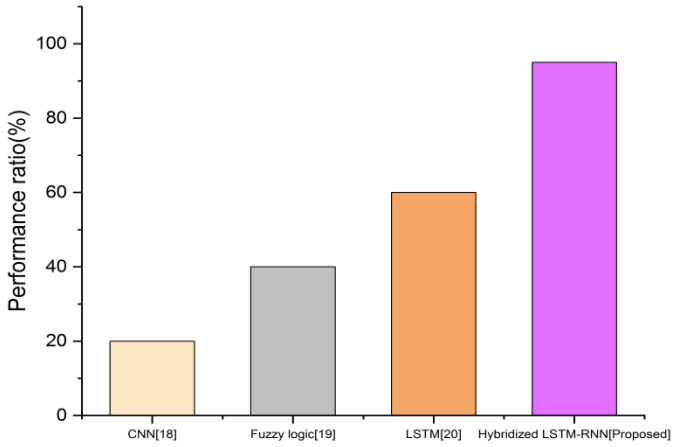

Figure 6. *Performance ratio*

Psychological skills or mental skills are tools for the mind. This includes skills like satisfaction, stress management, anxiety reduction, learning methods, and emotional stability. Improved psychological skills can enhance academic performance and the overall well-being of a student. Figure 7 depicts the psychological skills of a student learning AI-based CTC education.

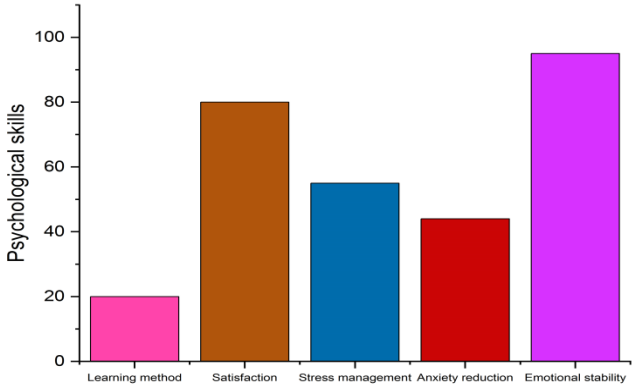

Figure 7. *Psychological skills*

Mental aptitude is characterized as the capacity for creativity, self-regulation, planning, abstract thought, comprehension of difficult concepts, and experiential learning. Figure 8 displays the mental aptitude and disposition of a student receiving AI-based CTC instruction.

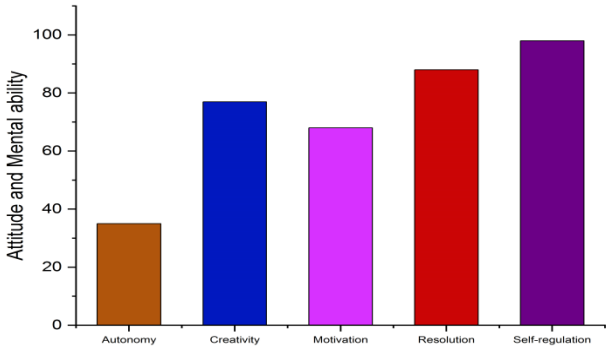

Figure 8. *Attitude and mental ability dimensions*

IV. Discussion

Figures 3 and 4 show that the proposed technique outperforms existing critical thinking methods and performance ratios because CNN is significantly slower due to operations such as a max pool. In contrast, the accuracy of the fuzzy logic system is compromised due to the system's reliance on inaccurate data and inputs. In LSTM, gradient exploding and vanishing problems are typical.

V. Conclusion

As a result of the rapid growth of the country's social economy, China's higher vocational education has made considerable achievements in terms of both size and quantity. Active expansion in higher vocational education is not only an educational and intellectual issue but also a strategic concern for societal development and global competitiveness as a whole. The study and investigation of higher vocational education should extend beyond the confines of academic institutions. It must be examined and analyzed from a range of disciplines and perspectives, including "history and culture," "society," "economics," "science," and "administration and policy," to be properly comprehended. This study focuses on CTC instruction in higher education that AI supports. AI+ teaching CTC mode is more efficient and effective for teaching CTC practice, but it also alters educational notions, creates new teaching objectives, and transforms educational modes. Students' individuality is usually neglected in conventional education and instruction, and the curriculum is increasingly standardized. Using the proposed technique, it is simpler to determine pupils' shared interests and characteristics. A paradigm change has occurred in schooling. In today's technologically advanced society, the acquisition of basic literacy skills is the main objective.

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