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A PERSONALIZED TEACHING SYSTEM FOR COLLEGE ENGLISH BASED ON BIG DATA AND ARTIFICIAL INTELLIGENCE

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Abstract. In the ultra-modern digital age, the schooling sector is experiencing a transformative shift driven by the convergence of massive records and artificial Intelligence (AI). This paper offers a singular initiative—a "personalised teaching machine for university English" that harnesses the electricity of these technologies to revolutionise how English language practice is delivered at the college level. The system is designed to address the various ways of gaining knowledge of the desires of students and adapting dynamically to their talent degrees, styles, and possibilities. The centre of this device lies in its capability to collect, technique, and analyse extensive amounts of records associated with students' language acquisition journey. By leveraging massive statistics techniques, the machine captures and interprets college students' interactions with direct materials, assignments, exams, and peer interactions. Concurrently, the latest AI algorithms, which include herbal Language Processing (NLP) and gadget learning (ML), are employed to create a responsive and smart learning environment. The system tailors mastering pathways for personal college students, ensuring they get hold of content material and sporting events aligned with their cutting-edge scalability stages. Ordinary formative checks are performed to gauge college students' progress, taking into consideration timely interventions and changes in teaching techniques. This progressive customised coaching device for university English now not only enhances language proficiency but additionally promotes self-directed getting-to-know and empowers educators with information-pushed insights. The amalgamation of large facts and AI promises to reshape English language education's panorama, paving the way for an extra personalised, green, and effective pedagogical method in university settings. In conclusion, this study illuminates the transformative ability of harnessing massive records and AI in schooling, with precise relevance to language instruction. The machine is a pioneering model for personalised, adaptive, and information-centric teaching methodologies in higher training.

Key words: Personalized Teaching System, College English, Big Data,Artificial Intelligence, Machine Learning

1. Introduction.

University English guides are simple guides for the public to better education in China. The best university English coaching and scholarly learning results influence the opposite teaching sports without delay [22]. The teaching reform of university English publications has been applied for decades. However, college English teaching based on traditional coaching models has encountered demanding situations in phrases of pupil participation and teaching outcomes. It presents new methods and tools for training and teaching and drives the essential transformation of education and teaching mode [9]. Through the in-intensity integration and innovation of artificial intelligence generation and university English lecture room education and coaching, clever and efficient lecture room coaching can be created, and good cost orientation and ideological pleasant of college students may be cultivated better. Primarily based on synthetic intelligence, smart classroom coaching with clever technology makes smart education viable [27]. The cultivation of English abilities within the university English clever school room based on artificial intelligence is related to the fast improvement of the economy and the progress of technological know-how in this era.

The conventional college English coaching version [3, 29] deprives newbies of English studying capability and communication capacity, and it's miles hard to faucet freshmen' studying capacity. Further, instructors spend too much time inside the lecture room, and freshmen lack opportunities for verbal language exchange and exercise. Inside the conventional trainer control model, the teacher is the protagonist of the university English teaching paintings version [17]. The beginners have not developed excellent self-study habits; within the study room, the newbies are nevertheless passive and robotically taking notes. As a result, many novices' hobbies in English aren't always high, and the impact of English coaching sports isn't ideal. That allows you to trade these issues in English teaching; it's far vital to find out extra powerful English coaching fashions [17].

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The new curriculum generally advocates the improvement of students' autonomous getting-to-know capacity and innovation capability.

Statistics-pushed learning, referred to as DDL, is a lively mastering method. It's miles a "scholar-centered" discovery learning approach, wherein students convey inquiries to the corpus saved with actual language use examples to find solutions [2]. In this manner, college students may have a deeper effect on understanding. From a more realistic language environment, lecturers can use examples to locate themselves, gaining knowledge of the use, cost, and importance of language, therefore enhancing the effect of overseas language getting to know, assisting college students to examine reflection, and enhancing their learning initiative. A huge variety of research effects show that facts-pushed studying is a perfect gaining knowledge of approach in overseas language vocabulary mastering [16, 23]. In addition, corpus linguistics additionally has a wonderful effect on the study of linguistics itself. The application of corpus linguistics in linguistics branches, together with phonetics, morphology, syntax, and pragmatics, can perform language studies activities at greater tiers. For instance, in terms of phonetics, we can carry out research sports on the manner of overseas language pronunciation, and pronunciation and intonation of spoken language corpus [20, 11].

The education sector is undergoing a significant shift in the current digital era, driven by the intelligent combination of big data and artificial intelligence (AI). The novel method described in this research, dubbed a "personalised teaching machine for university English," aims to revolutionise tertiary English language training by utilizing the cutting-edge capabilities of these state-of-the-art technologies. This system's comprehensive capacity to gather, process, and evaluate a multitude of data regarding students' language learning paths is its foundation.

The main contribution of the proposed method is given below:

1. AI algorithms can examine substantial amounts of information on a person's overall performance, mastering styles, and alternatives. This allows the machine to tailor the coaching content and methods to every student's desires, improving their knowledge of efficiency and engagement.
2. Big statistics analytics can provide precious insights into the simplest coaching methodologies, direction content material, and pupil engagement techniques.
3. This statistics-pushed approach permits for continuous refinement of the English curriculum, making sure it remains relevant and powerful. AI structures can examine historic and actual-time data to predict pupil performance. This may help in early identification of college students who might be suffering, making an allowance for well-timed intervention and aid.

The remainder of our research paper is composed as follows: Section 2 covers the related research on deep learning techniques and English-based teaching system categorization schemes. Section 3 illustrates the suggested work's general working technique and algorithmic procedure. Section 4 assesses the outcomes and application of the suggested approach. Section 5 concludes the job and covers the outcome evaluation.

2. Related Works. The writer [5] studied the impact of the English corpus on English coaching reform and the improvement of students' vocabulary competence. In [26] the researcher presented the usage of advanced multimedia era and community generation to construct an ecological teaching model for English. The authors [14] presented a progressive teaching mode primarily based on big facts era and takes expert English coaching as a complement to normal English teaching. In [25], the writer supplied an innovative direction version of the English teaching mode primarily based on an ant colony set of rules to enhance the efficiency of the first-rate way to choose a revolutionary English teaching mode. In [18], the writer presented an implementation plan for an English-assisted practice system based on synthetic intelligence technology to improve the exceptional impact of English coaching. The author [8] provided a synthetic intelligence writing evaluation device to reduce instructors' workload and improve the students' English writing stage[21, 15].

Nowadays, personalised mastering has been effectively found with the improvement of synthetic intelligence, and it is apparent that synthetic intelligence plays an important function in the fields of mastering tutoring, gaining knowledge of assessment, and teaching. Optimization, which promotes the all-around improvement of coaching performance and better learning, revel in for college kids. Synthetic intelligence [24, 13, 12, 28] has, step by step, grown to be a vital element inside the development of training records era, supporting the innovative development of education and coaching. The development of the statistics era has now not only brought a massive impact on the sector of science and era but additionally has a critical function within the

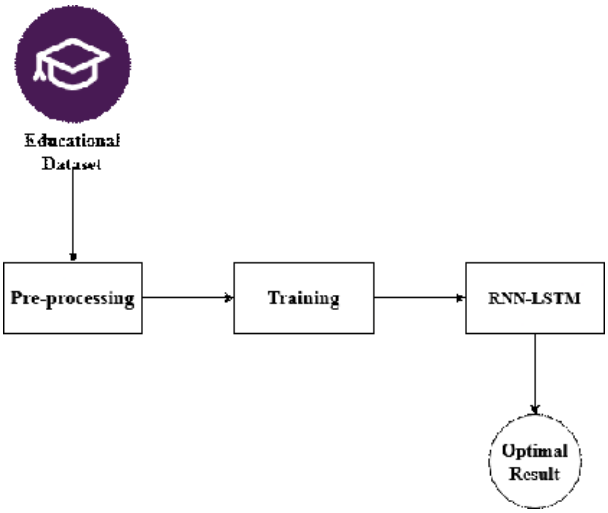

Fig. 3.1: Architecture of Proposed Method

improvement of times that cannot be neglected [19]. At present, the training field is actively introducing the synthetic intelligence era, and the factors of coaching sports are constantly converting, promoting students' getting-to-know activities towards personalization and lifelong gaining knowledge of and pushing the complete training stage from low-degree crude training to high-level specific training.

Polina offers an overview of the next generation of synthetic intelligence and blockchain era [1] and proposes innovative answers that can be used to boost up the research of teaching models and enable rookies and instructors to apprehend their non-public statistics and skip personalized teaching plan with new equipment for continuous gaining knowledge of monitoring. But there can be errors in tracking [6, 10]. Myeongae is aware of college students' improvement scores on the platform through modules that meet local understanding [7]. He used 10 institution test college students and 30 limited area experiment students. His studies effect display that, after the usage of the local intelligence module for mastering, the instructional score has multiplied [4]. His studies suggest that the instructional scores in experimental training and management instructions are getting better and better through nearby intelligence modules.

While the initial findings are promising, there is a need for more longitudinal studies to understand the long-term impact of personalized teaching machines on language proficiency, student engagement, and overall educational outcomes. To find the best personalization tactics that can change to meet students' changing educational demands, research is required. Investigating the ideal ratio between AI-driven automated instructions and in-person teacher interventions is part of this.

3. Proposed Methodology. To frame a proposed technique for a coaching machine for college English based totally on large facts and synthetic Intelligence (AI), we can define a comprehensive approach that leverages the abilities of each technology to enhance the studying enjoy. This suggestion could be dependent to align with global college standards, specializing in efficiency, personalization, and statistics-pushed insights.This proposal outlines a unique teaching gadget for college English that integrates large records analytics and AI technology. It pursuits to revolutionize language studying by using personalizing educational content material, enhancing student engagement, and presenting real-time feedback to both college students and educators. Initially, the dataset is collected from the educational institutions and then the data is pre-processed. Next the dataset is trained by using RNN-LSTM method. In figure 3.1 shows the architecture of proposed method.

3.1. Data Collection and Analysis. Statistics collection and analysis for a teaching device for college English based totally on large information and artificial Intelligence (AI) contain numerous steps, each aligning with worldwide university requirements for such initiatives. This process could be fundamental to enhancing the effectiveness and efficiency of English language teaching in a college putting. Pick out distinct kinds of

facts needed, inclusive of student performance facts, interplay information in virtual systems, and comments. Utilize numerous assets like studying management structures, on-line quizzes, and AI-primarily based language gear. Make certain information collection complies with privateness laws and moral standards, obtaining vital consents.

3.2. Recurrent Neural Network based LSTM. We build attention-based deep neural networks on top of recurrent neural networks (RNNs). A recurrent neural network is an extension of the conventional feed-forward neural network. Long short-term memory (LSTM) models are also constructed with RNN design. They solve the RNNs' gradient-related flaws and improve learning ability for long-time sequencing data. The difference is that instead of just one neural network layer, there are four levels that each communicate in a different way. An LSTM unit consists of an input gate, an output gate, a forget gate, and a cell. The three gates regulate the information that enters and exits the newly inserted memory cell, which can keep its state for lengthy periods of time:

$$X = [h_{t-1}, x_t] \tag{3.1}$$

$$f_t = \sigma(W_f.X + b_f) \tag{3.2}$$

$$i_t = \sigma(W_i.X + b_i) \tag{3.3}$$

$$o_t = \sigma(W_o.X + b_o) \tag{3.4}$$

$$c_t = f_t \Theta c_{t-1} + i_t \Theta \text{tanh?}(W_c.X + b_c) \tag{3.5}$$

$$h_t = o_t \Theta anh(c_t) \tag{3.6}$$

Gated recurrent units (GRUs) are an LSTM version that was made available. By incorporating a gating system, fusing the "forget" and "input" gates into a signal update gate, along with a few other small adjustments, they create a more straightforward model than LSTMs.

$$z_t = \sigma(W_z.X + b_z) \tag{3.7}$$

$$r_t = \sigma(W_r.X + b_r) \tag{3.8}$$

$$h_t = \tanh(W_h.(r_t \Theta X)) \tag{3.9}$$

$$h_t = (1 - z_t)\, \Theta h_{t-1} + z_t \Theta h_t \tag{3.10}$$

The main way that a deep recurrent neural network varies from a regular recurrent neural network is that it is made up of multiple layers of individual recurrent networks layered on top of each other. The idea for the current implementation came from the problem that, despite the depth that RNNs may achieve, this notion won't require a hierarchical examination of the data. By employing the same procedure performed repeatedly to ascertain the assistance children make to their ancestors and the identical calculation to produce an output reaction, every component and phrase may be viewed in a single location.

Furthermore, we modified our strategy parameters during training by utilizing the Adam optimizer, which is well-known for its reliable performance on a range of assignments, as a component of our optimization method. Adam uses feature sets to properly calculate and adjust learning rates. Despite other methods, it computes current gradients using velocity in alongside storing a decreasing mean of past gradients. The Adam algorithm features little variation, fast integration, and a good learning rate that does not vanish. The variables used in the training process are presented in depth by the experimental inquiry. The Recurrent Neural Network's construction is depicted in figure 3.2.

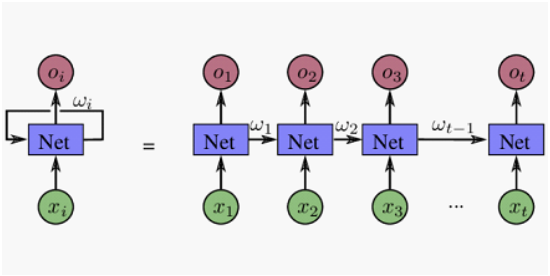

Fig. 3.2: Structure of RNN

3.3. Long Short-Term Memory (LSTM). Text, music, and time series are examples of sequential data that can be processed by an LSTM, a kind of artificial neural network. When data is processed with persistent dependencies—that is, when the outcome at one time step depends on information from earlier time stages—it is very advantageous. LSTM networks employ memory cells, forget gates, input gates, and output gates in order to store this information for extended periods of time. By regulating the data that enters and leaves the storage cells, the gates enable a network to store and retrieve data in response to requests. Speech recognition, language translation, and stock price prediction are among the many applications for LSTMs. An LSTM network's components consist of.

Data entry into the memory cell is managed by the input gate.

$$input = \sigma(Wi^* [ht-1, xt] + bi) \tag{3.11}$$

The forget gate regulates the data flow that leaves the memory cell.

$$forget = \sigma(Wf^* [ht-1, xt] + bf) \tag{3.12}$$

The output gate regulates how the memory cell's output is sent to the remaining components of the network.

$$output = \sigma(Wo^* [ht-1, xt] + bo) \tag{3.13}$$

The memory cell is where the information is stored.

$$memory = ft^*ct - 1 + it^*\tanh(Wc^* [ht-1, xt] + bc) \tag{3.14}$$

The LSTM unit's output is utilized to generate predictions or transfer data to the following LSTM unit.

$$hidden = ot^*\tanh?(ct) \tag{3.15}$$

4. Result Analysis. Because the experiment in this text wishes to educate a RNN-LSTM, the scale is huge, the structure is more complex, and the calculation scale is large. The programming language used is Python, the version is 3.6.5, the deep studying framework used is Pytorch zero.Four, the IDE for program deployment is Pycharm, and all experiments are performed inside the equal surroundings. All ourExperiments have been carried out on a laptop computer with an Intel middle i7-8700 processor and an NVIDIA GeForce GTX 1080 GPU.

To verify that the personalized mastering sources advocated by way of the method on this paper meet the desires of beginners, a chain of experiments have been conducted. Experimental statistics includes now not simplest getting to know aid data, however additionally the ancient records ofBeginners' getting to know. In the existing public information units, along with EDX, international UC, and other information sets, it presents dozens of attributes, along with path records, learner records, and learner conduct facts. This paper additionally collects the flipped classroom huge records from lessons of an English important in a college [3]. The proposed method RNN-LSTM is evaluated by using metrics such as accuracy, precision and recall.

$$accuracy = \frac{TP + TN}{TP + TN + FP + FN} X100 \tag{4.1}$$

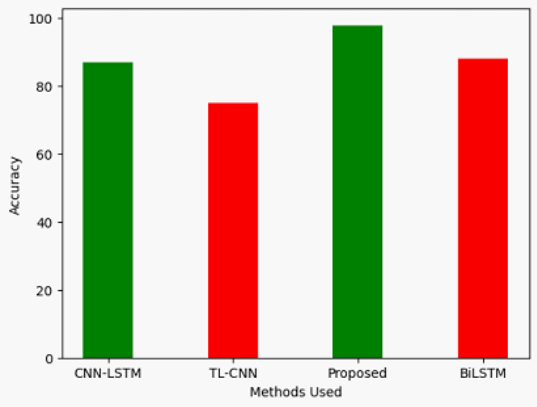

Fig. 4.1: Accuracy

$$precision = \frac{TP}{TP + FP} X100 \tag{4.2}$$

$$recall = \frac{TP}{TP + FN} \tag{4.3}$$

The accuracy of a teaching system for university English based on large statistics and artificial Intelligence (AI) is a multifaceted concept that encompasses several dimensions. Whilst comparing the accuracy of this sort of machine, it is crucial to don't forget different factors that make contributions to its normal effectiveness in a getting to know environment. The accuracy of the AI gadget largely relies upon on the first-rate and relevance of the big statistics it utilizes. This includes the corpus of English language records, educational materials, and student interplay records. Brilliant, numerous, and updated statistics resources contribute to greater correct and powerful mastering studies. The system's ability to correctly apprehend, system, and generate natural language is essential. This includes know-how context, grammar, syntax, and semantics in English. The extra superior the herbal language processing algorithms, the more correct the device will be in deciphering and responding to students' inputs. Figure 4.1 shows the evaluation of accuracy.

Teaching system for university English based totally on large information and artificial Intelligence" seems to be a idea or a system integrating huge records and artificial intelligence (AI) into the teaching of college-degree English. This technique leverages the considerable capabilities of massive statistics analytics and AI to beautify the mastering revel in. The use of AI algorithms, the device can examine students' studying styles, strengths, and weaknesses. It can then tailor the coaching materials and strategies to in shape individual needs, consequently optimizing the learning process. Huge information analytics can technique massive sets of statistics from numerous assets, like scholar performance information, engagement metrics, and remarks. This provides educators with insights into the effectiveness of teaching techniques, scholar engagement tiers, and areas wanting improvement. The system can use AI to create and grade tests, adapting the problem degree primarily based on the pupil's talent. This personalized technique guarantees a more accurate assessment of their abilities and information. Figure 4.2 shows the result of recall.

Precision in a educationtool for university English this is primarily based on large facts and synthetic Intelligence (AI) refers to the accuracy and effectiveness with which the sort of system can tailor and supply instructional content material to fulfill the precise desires and gaining knowledge of varieties of individual college students. This idea is important in the context of managerial accounting training, where personalised and records-driven methods can significantly enhance gaining knowledge of effects. Using huge records, AI-driven structures can analyze a scholar's performance, mastering tempo, and preferences to create personalised mastering paths. This aligns with global requirements for student-targeted getting to know, wherein training is customized to person wishes and skills. AI-driven systems can provide instant and unique comments on student

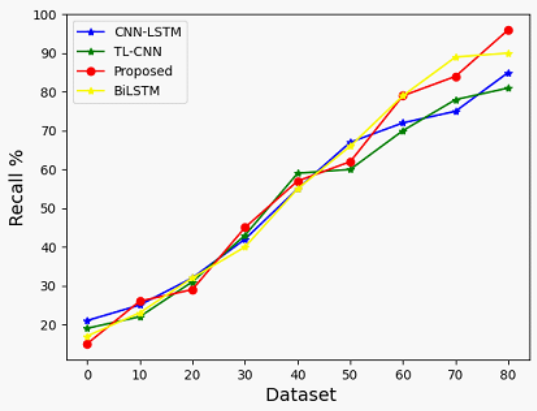

Fig. 4.2: Recall

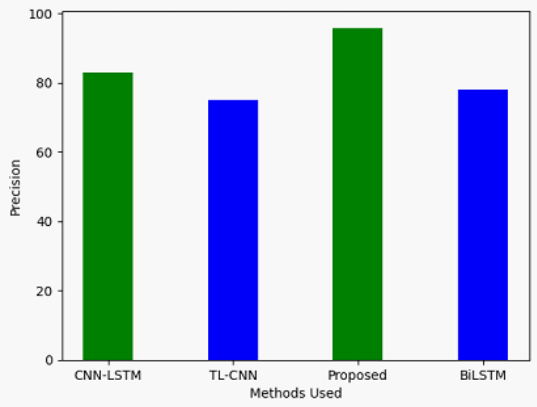

Fig. 4.3: Precision

submissions, aligning with worldwide standards for non-stop assessment and timely feedback in training. Figure 4.3 shows the result of Precision.

5. Conclusion. In the current digital era, the education sector is undergoing a radical transformation propelled by the combination of artificial intelligence (AI) and vast data. This study presents a novel idea: a "personalized teaching machine for university English" that uses the power of modern technologies to completely transform the way college-level English language instruction is provided. The system is made to accommodate students' diverse learning needs and dynamically adjust to their skill levels, learning preferences, and opportunities. This device's main strength is its ability to gather, process, and evaluate large volumes of data related to students' language learning experiences.Utilizing big statistical techniques, the system records and analyses how college students interact with course materials, assignments, tests, and other students. To build a dynamic and intelligent learning environment, the most recent AI algorithms are used in conjunction with natural language processing (NLP) and gadget learning (ML). Each college student's learning route is customized by the system to match their advanced scalability levels with the information and athletic activities they access. Formative assessments are conducted on a regular basis to evaluate the progress of college students, accounting for timely interventions and modifications to instructional methods. This advanced, specially designed coaching tool for college.The combination of big data and AI has the potential to completely change the face of English language instruction and open the door to more individualized, environmentally friendly, and productive teaching meth-

ods in higher education. This study's result highlights the revolutionary potential of using AI and large records in education, with application to language teaching. In higher education, the machine is a trailblazing example of an information-centric, personalized, and adaptable teaching methodology.

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