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Adaptive Wireless Network Model with Reinforcement Learning for Language Proficiency Development

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Abstract

This study gives a new way to learn English, showing its importance in today's globalized world. The study recognizes how difficult it is to learn a language. It offers a new way to use wireless networks to create a flexible and adaptable learning environment by combining the latest developments in Reinforcement Learning (RL) algorithms with ideas from the field of education. This method produces a personalized learning path by thoroughly testing students' reading, listening, and observation skills. An application using the suggested method was carefully built by fifty people, who used RL techniques to check students' progress and identify their strengths. The model's fantastic success is shown by the fact that it passes 96% of tests and is accurate 95% of the time.

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Cross-linguistic skills include analytical thinking, good communication, and standard language skills that the system aims to improve. Students worldwide can benefit from this method, which combines cutting-edge technology with traditional teaching methods to create a personalized and adaptable learning environment that helps students succeed in today's changing educational environment.

Keywords: Wireless Network, Reinforcement Learning, Language, Proficiency.

1 Introduction

University students face many complex problems while studying, and learning problems are among the biggest (Wang et al., 2023). One major worry is that college and university brain demands are rising, requiring more complex thinking, reasoning, and problem-solving skills. University settings require a lot of independence and Self-Regulated Learning (SRL) (Dan et al., 2025; Zhai & Wibowo, 2023), which means that students have to keep track of their academic progress. This is different from secondary school, where learning is organized. Many students aren't good at self-regulating their learning, which impedes them from meeting their educational goals. If SRL strategies aren't used correctly, they can hurt essential things like time management, task priorities, and adaptability in learning methods, which are necessary to understand how higher education institutions use wifi networks (Majid et al., 2024).

This difference makes it hard for many students to handle their schoolwork, especially in subjects requiring them to study and evaluate themselves independently. People often face problems that include organizing knowledge, understanding complex academic material, and using theoretical ideas in real life. These problems are made worse by students not having cognitive awareness, which makes it harder for them to figure out the best ways to study and change how they learn to match.

Literacy, good conversation, and personal growth depend on speaking and writing English well in today's interconnected world (Shliakhovchuk, 2021). If student know how to speak and write English well, student can do many things, like join in global conversations and get information through digital networks. Educational language is a complicated task that often needs individualized methods for students with different learning styles and abilities. In response to this need, the study presents a new and thorough way to make an intelligent English learning system that goes against the usual language learning methods (Gupta et al., 2024).

The method combines cutting-edge Reinforcement Learning (RL) techniques with educational knowledge to create a fluid and adaptable learning environment. This is because reading is more than just language skills. People understand how important it is to know English, and it's a big part of the plan, which aims to improve literacy and cognitive independence in general. A complete first review is the first step in learning and is an integral part of the method (Lawrence et al., 2022). Testing students' reading, listening, and observation skills gives teachers much information about each student's strengths and areas where they can improve. This diagnostic step sorts users into different skill levels and sets the stage for the following personalized learning path. The last step is to help students become specialists without any problems. The main strength of the method is the use of RL computations, which change content and intensity all the time based on how well the user is doing. Students learn many different subjects and skill levels, and they have to be good at all of them before they can use wifi networks. This customized method speeds up the learning process and builds a sense of accomplishment, both essential for staying motivated.

The ongoing success assessment step is an essential part of the process. Statistical information about student growth is gathered by monitoring metrics like completion rates, precision, and success

percentage. Using wireless networks, this real-time assessment creates algorithms that change based on data to improve the learning path and the way material is distributed (Sahadevan & Manikandan, 2017). This creates a dynamic and valuable learning environment. This method has benefits. The website does more than teach languages; it also helps people develop cross-linguistic skills like problem-solving, analytical thought, and effective communication. In addition to recognizing how important it is to be able to speak and write English well, the suggested approach aims to make learning into an experience that changes you. By combining cutting-edge technology with traditional learning, the study aims to give students worldwide the language and thinking skills they need to achieve in today's globally connected world (Surendar, 2024). While the study looks into the changing world of schooling, its primary goal is to help students reach their full potential and raise a generation ready to do well in the 21st century.

2 Background

One essential use of Deep Learning (DL) (Sapoval et al., 2022) is that it can tailor learning, especially in schools and universities with wireless networks. DL systems look at data streams from many places, like how students connect, signs of success, and personal preferences, to create adaptive algorithms tailored to each student's learning needs. These visualizations offer resources, tests, or activities based on the learner's speed, strengths, and areas that need improvement. These DL-driven technologies improve education results by making the learning process more personalized.

Adaptive learning systems, which DL inspires, use statistics to help students improve in colleges and universities (Zhai & Wibowo, 2023). By looking at past performance data, these programs can tell which areas will be challenging, and they can use wireless networks to offer extra resources or different ways to teach (Zakaria & Zaki, 2024). This proactive approach reduces unhappiness and lack of interest, ensuring a smoother and more effective learning experience (Ponduri & Mohan, 2021).

DL-driven apps often use Natural Language Processing (NLP) (Khurana et al., 2023) methods to improve communication and interaction. With the help of advanced Neural Networks (NN), Chatbots can help immediately by answering questions, walking students through complex material, and making ideas more transparent. People from all walks of life can learn with these new technologies because they make learning more accessible and help more people.

Reinforcement Learning (RL) (Uc-Cetina et al., 2023), a type of Machine Learning (ML) (Hippalgaonkar et al., 2023), improves how agents act by having repeated experiences in certain situations. RL agents come up with flexible ways to reach set goals by using feedback systems that include rewards and punishments. This makes adaptive learning easier and changes the difficulty of tasks based on how well users do on them.

This method, which is based on Markov Decision Procedures (MDPs), shows states, actions, and changes in a structured way. This makes it easier to make decisions when things are changing. RL, on the other hand, focuses on learning one thing at a time. This makes it perfect for fields that need to constantly change and improve based on feedback, like teaching using wireless networks.

Using RL in education has led to much success, especially in Intelligent Tutoring Services (ITS). These systems use RL algorithms to tailor educational materials to each student's unique profile, which makes them more interesting and valuable. Real-life practice is essential in game-based learning environments, where flexible engines constantly change the challenges and ideas. This makes learning to be more active and personalized when using wireless networks for proficiency. The fact that this fits with revisionist ways of teaching shows how important RL is in current classrooms.

RL improves methods like adaptive experimentation and instructive ordering in online classrooms. For instance, multi-armed bandit methods improve resource allocation by tailoring educational materials to each student's needs, while task sequencing enhances the efficiency of learning skills.

There are a lot of problems with modern studies on DL and RL in education, like the fact that there aren't many datasets available and that the results can't be used in other situations. Many methods have limited room for improvement and are often slowed down by the need for computer resources, which makes them less functional in many classroom settings. The lack of long-term studies creates ambiguities regarding the enduring effects on student achievement using wireless networks. The article seeks to tackle these difficulties by synthesizing empirical findings within academic settings. The review uncovers trends, deficiencies, and efficient methods by examining studies on DL and RL to evaluate and enhance the educational achievement of undergraduates. This methodology can yield tangible information for teachers and politicians, facilitating the advancement of refined DL-based solutions in academic institutions.

3 RL-based Language Proficiency Development Model

An application-oriented RL has been created for customers. A free online website application has been suggested and launched for use. Users can download it on their mobile devices or log in via their computer or tablet.

- **Individuals Involved**

Participants for the present research were recruited from English coaching centers and were pre-informed about the procedure using wireless networks. Fifty individuals were selected, and a distinct proficiency evaluation was generated for each individual.

- **Utilized Materials**

The research gathered audio, reading passages, and films for the instruction and assessment of the participants—a website designed to grant users access to monitoring and recording members' performance.

- **Procedure**

Participants are required to access their websites to complete the exam. At first, all instructional and evaluation resources had been uploaded to each part for all users. Training levels are divided into sections. A computerized model is presented to assess achievement and offer assistance and recommendations for learning in the future. The model receives instruction to evaluate performance outcomes for each activity using wireless networks. The scores obtained categorize people into several groups. It determines the most appropriate learning modality for every student. Three data points were utilized to organize people's proficiency learning styles according to their educational abilities. The initial skill assessed was listening; respondents were provided audio inputs and instructed to complete the test. The second component is studying skills; a passage to read is included in the Graphical User Interface (GUI), with quizzes at the conclusion to assess their competence. The third skill is observation; for this video, data were supplied, and similar to the initial, queries were posed at the last moment to assess understanding. A learner is categorized and comprehended using wireless networks based on these three facets of the learning approach. The suggested RL model would examine the advancement of all three actions and compare it to the outcomes derived from their skill selection.

- **Acoustic Input**

The audio sources utilized for testing, learning, and educational uses are from the latest news webpage. The audio selection categories include corporate English, surroundings, lifestyle, technological advances, global headlines, etc. In addition to these subjects, additional subjects are accessible on the internet. Every subject is being employed across all domains. The audio was transmitted via the website created for this educational purpose. The audio duration is around 1 minute during the initial phase of the level using wireless networks. With each level advancement, the duration of the audio will progressively increase.

- **Input Acquisition**

The excerpt for reading is sourced from an urgent news webpage. It consists of approximately two to three paragraphs. As in infancy, questions will be supplied beneath each text, with corresponding answers given as choices. The ability will be assessed by selecting the correct response.

- **Monitoring Input**

Videos or posters pertinent to the educational objective were uploaded from the internet. Users are instructed to look at the banner or communications video and to select accurate responses from the given options. These skills were assessed, determining the appropriate method of skill acquisition for particular users. The inputs supplied will be altered for each test. Three assessments will be conducted to determine the proper learning modality. The bulk of outcomes will be selected for additional study. Upon choosing the learning procedure, inquiries about interaction, syntax, vocabulary, and related subjects will arise. This practice persists until the student attains an acceptable standard. The RL will evaluate the satisfaction level using wireless networks. Upon completing each level, the progression meter will assess the advancement of each stage and consider the satisfaction degree. Figure 1 illustrates the comprehensive evaluation procedure for consumers.

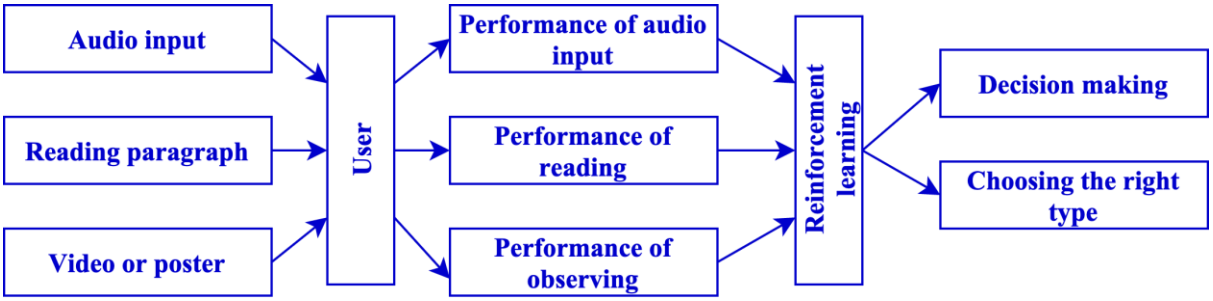

Figure 1: Judging Model of RL

After the decision-making process, the student will be integrated into the learning process. Every skill level will be established. Like the games, every player will progress to the subsequent level after the previous level. If the user cannot complete the present stage, they may attempt it many times until successful. The RL will track the frequency with which they finish the task to forecast satisfaction with the learning outcome. The satisfaction level is achieved when the user completes each challenge in a single try using wireless networks.

The level is completed by providing all the correct answers. All topics that users must address to finish their educational experience. This procedure will occur for each user at every selected skill level. Figure 2 elucidates the recursive component of the suggested model.

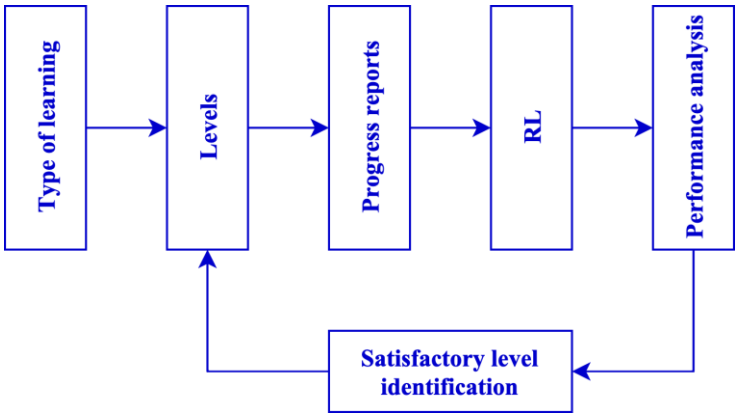

Figure 2: Continuous Monitoring of Satisfactory Level

4 Results

The RL was assessed for effectiveness at each stage. Initially, it categorizes users into three proficiency levels, resulting in a more precise categorization outcome. Figure 3 presents the initial performance metrics of the RL test. The suggested method results in an 86% total achievement rate, with successful completion rates for listening, reading, and observing skills at 86%, 66%, and 76%, respectively. The variance figures indicate the extent of fluctuation around these mean values. The method demonstrates an overall efficacy of 94%, including 91% in reading, 93% in observation, and 96% in hearing using wireless networks. The range of error indicates the anticipated variability surrounding this particular accuracy.

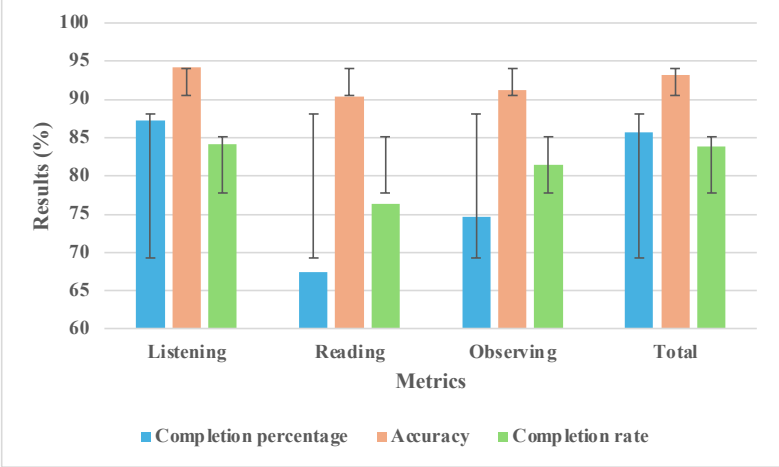

Figure 3: Preliminary Test Results

The technique indicates that 84% of tasks are accomplished in general skills, 76% in reading, 86% in listening, and 84% in observing. The margin of error figures can elucidate the variations in these proficiency fulfillment rates. Each step was assessed in a manner analogous to the preliminary testing. Figure 4 presents the outcome assessment of AI in development. The approach achieves higher completion rates throughout the progress evaluation stage, recording 93% in listening, 85% in reading, 90% in observation, and 87% in success rate. The error values indicate the anticipated variation surrounding these average figures. The suggested approach attains an overall accuracy of 93%, with 95% accuracy in auditory skills, 92% in reading proficiency, and 90% in observational capabilities. It

demonstrates enhanced precision in assessing progress. The error numbers signify the level of risk associated with these real numbers. The methodology indicates the following completion rates for talents: 85% for reading, 75% for hearing, 85% for watching, and 94% for hearing using wireless networks. The error metrics showed the fluctuations in these rates of fulfillment.

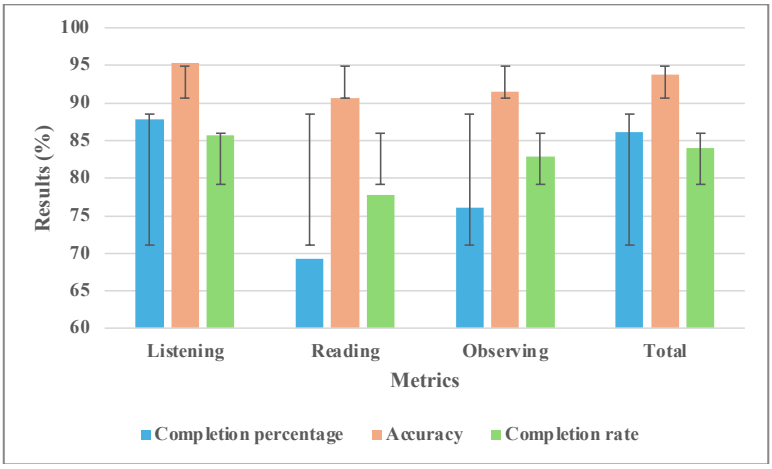

Figure 4: Progress Evaluation Results

Figure 5 indicates that the RL's progression and recursive training achievement demonstrate a precision of 95% in listening skills. This suggests that most individuals possess superior proficiency and hearing and task completion capabilities when using wireless networks. Figure 5 illustrates the achievement rate of RL in the educational process.

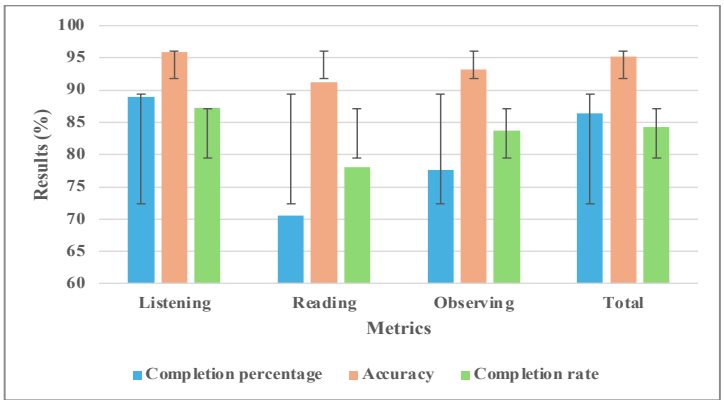

Figure 5: Teaching Process Results

The system demonstrates a high success rate in customer learning, attaining 95% in listening, 83% in reading, 93% in watching, and an overall completion rate of 91%. The error numbers measure the anticipated variability surrounding these average completion proportions. The student's learning success rate is characterized by a precision of 94% in listening, 92% in reading, 92% in observation, and a total precision of 93%. The error numbers signify the uncertainty associated with these average proficiency accuracy values. The method's elevated completion rates and methodical precision illustrate a strong and efficient learning methodology using wireless networks. The advancement of the assessment phase indicates an increase in complete and precision rates, implying the presence of adaptive learning processes. The elevated completion rates and precision of the student's instruction rate demonstrate the algorithm's efficacy in tailored learning.

The experiment revealed that listening abilities yield a better outcome in learning than other skills. It is observed that most users who participated in the exam possess a more excellent hearing proficiency than reading, as illustrated in Figure 6. Some individuals hear and watch, although no one excels at reading. The highest level of task accuracy is achieved in listening skills. The proposed approach demonstrates a 95% precision in the instructional process. At the same time, the suggested RL algorithm exhibits significant efficacy in keeping track of user performance, facilitating adaptive modifications of content according to user ability, and delivering feedback and suggestions to aid proficiency task completion. A reasonable threshold was determined for all 50 individuals, representing approximately 93% of the training component from this technique using wireless networks.

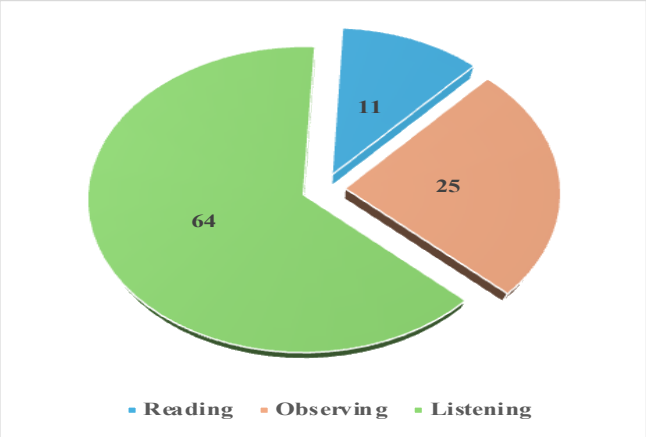

Figure 6: Test Result Analysis

5 Conclusion

This suggested approach for gaining proficiency in English has demonstrated extraordinary success, as evidenced by the results of the RL method. Early tests show that students have been carefully put into several groups based on their skills, which allows for a more focused and personalized teaching method. By improving finish rates and accuracy using wireless networks, progress checks show that the algorithm is flexible and helpful. The strong performance of the algorithm is demonstrated by the high achievement rate of the consumer, which constantly shows high completion rates and accuracy in all areas of competence. RL lets learning factors be changed on the fly, using data and pathways best based on each person's progress through the self-learning platform. The average deviation values of measures like accuracy and complete percentages show how well and consistently the system can adapt to different learning methods over wireless networks. The results show that the RL method is a good way to improve the process of learning English, and it lays the groundwork for future technological advances in personalized training. RL's role in learning English will continue to grow as a technology that offers significant benefits through digital platforms, like improving future accuracy, making chores more manageable, and learning important things.

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