A Differentiated Approach to Teaching the Russian Language Using Artificial Intelligence

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Abstract

The article deals with the issue of a differentiated approach to teaching the Russian language, based on artificial intelligence. It analyzes the work of prominent scientists on artificial intelligence. The problems hindering the development of Russian speech of students of military academic lyceums "Temurbeklar Maktabi" (School of Temurbeks) are studied. A model and algorithm for organizing teaching the Russian language with a differentiated approach is proposed.

Keywords: secondary specialized military education; level of knowledge of the Russian language; artificial intelligence; adaptation: machine learning algorithm; differentiation and individualization; classification and regression; Personalized recommendations; generation of recommendations; differentiation; sequence analysis.

The need for new methods and forms of teaching is pushing specialists towards a more creative approach to education. These efforts contribute to the effective use of computer capabilities. A differentiated approach to teaching the Russian language, based on artificial intelligence, creates favorable opportunities for students to demonstrate their individual abilities.

The concept of "artificial intelligence" is not new in the science of education. This term usually refers to the support of the educational process with the help of computer technology. This question has been considered by many scholars including O.N. Evseeva, E.V. Shirinkin, I. S. Sinogeev, A. D. Daragan, G. L. Ezhova, G. A. Ezhov, E. A. Slepko, etc.

E.A. Slepko, considering the methods of using artificial intelligence in the field of education, confirms the opinion that artificial intelligence can improve the process of teaching foreign languages. Its application in practice "makes it possible to adapt and personalize the educational process for each student by forming individual flexible learning paths".

In addition, such a system for assessing the development of the student's language level creates an opportunity for the teacher to deeply analyze and evaluate the level of preparedness of the student.

A.D. Daragan, G. L. Ezhova and G. A. Yezhov propose patterns of learning artificial intelligence. According to scientists, it consists in improving the educational model; in providing training examples to the artificial intelligence system and identifying the error of the reaction of the trained system to the input example; correction of network parameters according to the system response and the magnitude of the error; repetition of the learning process on a whole set of training examples, as well as control of learning outcomes and completion of training.

Based on the proposals of the above scientists, we will consider the issue of a differentiated approach to teaching the Russian language to students of military lyceums using artificial intelligence. This approach is based on a combination of modern teaching methods and advanced technologies in the field of artificial intelligence.

One of the key components of a differentiated approach to learning is the analysis of the data of the learning process using machine learning algorithms. These algorithms allow the system to automatically process data about the student and identify their individual characteristics, strengths and weaknesses in learning the Russian language. Then, based on this analysis, the system can offer personalized recommendations and exercises specifically tailored to each student in order to effectively develop their language skills.
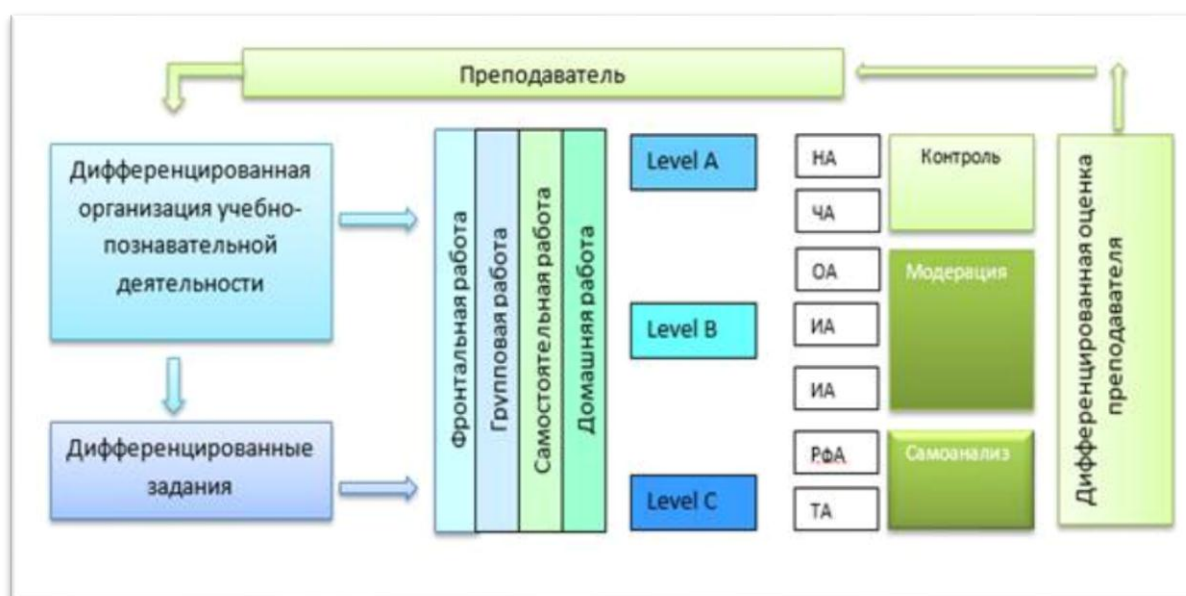

Рис. 1.2. Model of the organization of teaching the Russian language with a differentiated approach

Machine learning algorithms can be used for the following purposes:

1. Analysis of student progress

Machine learning algorithms can analyze learning data such as test scores, assignment completion, and time spent learning the material. This allows the system to assess the student's progress and identify their strengths and weaknesses in various aspects of learning the Russian language, such as grammar, vocabulary, pronunciation, etc.

1. Personalized recommendations

Based on the analysis of the data of the learning process, the system can offer the student individual recommendations and exercises that will help develop his weaknesses and improve his language skills. For example, if a student has problems with grammar, the system may suggest a series of exercises aimed at improving grammar skills.

2. Adaptation of educational content

Machine learning algorithms can help the system tailor educational content to the level and needs of each student. For example, the system can automatically adjust the difficulty of assignments, provide additional explanations or detailed materials when a student is having difficulty, or suggest more challenging tasks for advanced learners.

1. Track and evaluate progress

Machine learning algorithms can help the system track a student's progress over time and automatically evaluate student achievement. This allows the student and teacher to see their progress and determine which areas need more attention.

The use of machine learning algorithms to analyze the data of the learning process allows you to create a more individualized and effective approach to teaching the Russian language. This contributes to more accurate and focused work with students, helping them to achieve better results in learning the Russian language.

Artificial intelligence plays an important role in creating interactive and adaptive educational platforms. Using natural language processing and computer vision technologies, systems can automatically assess students' pronunciation, grammar, and written work, providing instant feedback and assistance.

The use of artificial intelligence in Russian language teaching offers a number of advantages: students receive personalized learning, which contributes to more effective assimilation of the material; the use of interactive and adaptive platforms stimulates the interest and motivation of students; AI-based systems allow educators to more effectively track the progress and individual needs of each student.

However, some limitations of this approach must also be taken into account, namely: the use of artificial intelligence requires high technical equipment and access to computer systems; guarantee the protection of student data and ensure their confidentiality; take into account differences in preferences and educational culture of students in order to provide an optimal learning experience.

In general, a differentiated approach to teaching the Russian language using artificial intelligence is a promising direction that can improve the quality of education and provide a more individualized and effective approach to learning. However, further research and practical implementation are needed to confirm these results and optimize the language learning process. When analyzing a student's progress in the context of learning the Russian language using artificial intelligence, within the framework of the dissertation work, comparative analyzes of the following machine learning algorithms are given:

Classification and regression. These algorithms allow the system to classify and predict a student's level of achievement based on available learning data. For example, classification algorithms can determine if a student belongs to a certain category (for example, beginner, intermediate, or advanced), and regression algorithms can predict their expected performance based on previous achievements.
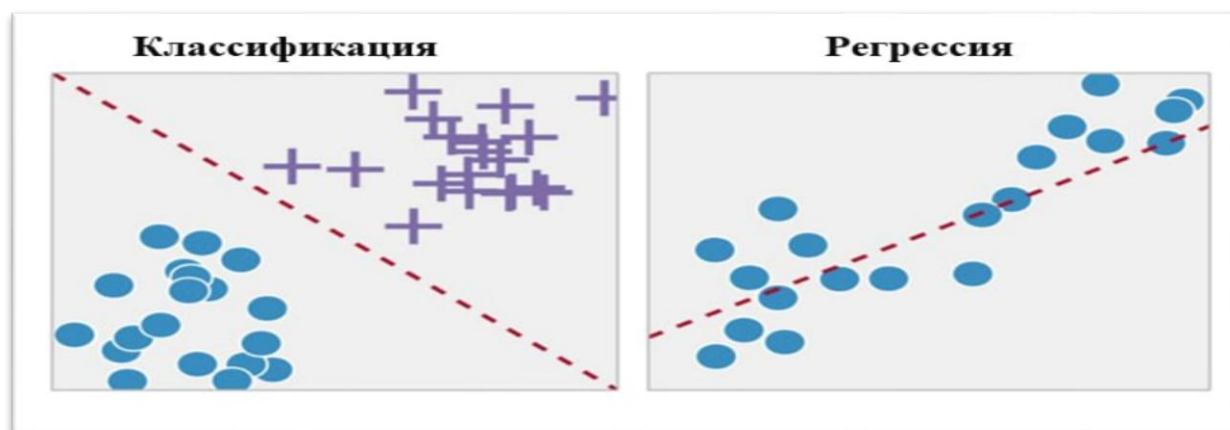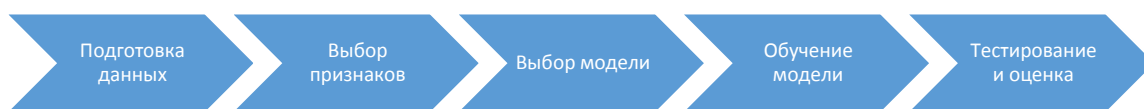

Fig.1.3. General principle of operation of classification and regression algorithms

When analyzing a student's progress in the context of learning the Russian language using artificial intelligence, classification and regression methods can be applied. They allow you to determine the level of language proficiency and predict the further progress of the student based on the available data.

The classification process separates the data into certain categories or classes in accordance with given characteristics. In the context of Russian language learning, classification can be used to

determine the level of a student's language proficiency (e.g. beginner, intermediate, advanced) or to determine the type of mistakes a student makes when learning Russian (e.g. lexical, grammatical, phonetic).

| Подготовка данных | Выбор признаков | Выбор модели | Обучение модели | Тестирование и оценка |

Rice. 1.4. Sequence of implementation of classification and regression algorithms

The classification process includes the following steps:

1. Data preparation: collection and pre-processing of student data, including test results, exercises, audio recordings, etc.

2. Feature selection: defining a set of characteristics that are used to classify vocabulary, grammar skills, articulation, etc.

3. Model selection: selection of the classification algorithm to be applied to the data, such as machine learning methods (for example, naive bayes classifier, support vector machine, etc.).

4. Model Training: Train the selected model on the training data to create a classification model.

5. Testing and evaluation: checking the accuracy and efficiency of the model on test data and evaluating its performance.

The regression process analyzes and predicts continuous values based on the available data. In the context of Russian language learning, regression can be used to assess student progress in certain language skills (e.g. vocabulary, understanding grammar) and predicting his future achievements. The regression process includes the following steps:

1) data preparation: collection and pre-processing of data about the student, including the results of tests, exercises, audio recordings, etc.;

2) feature selection: determining a set of characteristics that can be used for regression, for example, the number of words learned, the number of correctly completed tasks, etc.;

3) model selection: selection of the regression algorithm to be applied to data, such as linear regression, nearest neighbors, etc.;

4) model training: training the selected model on the training data to create a regression model;

5) testing and evaluation: testing the accuracy and performance of the model on test data and evaluating its ability to predict outcomes.

The use of classification and regression in the context of teaching the Russian language using machine learning and artificial intelligence allows you to more accurately assess the progress of students, identify their individual needs and offer a personalized approach to learning.

Clustering. Clustering algorithms allow the system to group students based on their similarities or differences in learning progress. This can help identify groups of students with similar needs and problems, and determine the best learning strategies for each group.

When analyzing the progress of a student in the context of learning the Russian language using artificial intelligence. These algorithms allow the system to group students based on their similarities or differences in learning progress. This approach helps to identify groups of students with similar needs and problems, as well as to determine the best learning strategies for each group.

The process of applying clustering algorithms in the analysis of student progress includes the following steps:

1) data preparation: collection and pre-processing of data related to the progress of students, such as test results, exercises performed, audio recordings, etc. These data should be presented in an easy-to-analyze format;

2) feature selection: defining a set of features that will be used to cluster students. These can be such features as the speed of mastering the material, the accuracy of completing tasks, the level of grammatical and lexical competence, etc.;

3) choice of clustering algorithm: selection of an appropriate clustering algorithm to be applied to the data. Some popular algorithms include k-means, hierarchical clustering, DBSCAN algorithms, and others;

4) performing clustering: applying the selected clustering algorithm to student data. This allows the system to automatically identify groups of students with similar learning progress characteristics;

5) analysis and interpretation of the results: assessment of the obtained clusters, their similarities and differences. The interpretation of the results makes it possible to identify the main groups of students with common needs and problems in language learning.

The use of clustering algorithms in the analysis of the progress of students allows you to more effectively adapt the educational program to the individual needs and abilities of each group of students. This helps to create a differentiated approach to teaching the Russian language, improve student outcomes and satisfaction.

Recommender systems. These algorithms allow the system to offer personalized recommendations and exercises for each student based on their preferences and past progress. Recommendations may be based on similarities with other students, successful learning strategies, or similar assignments that have helped other students.
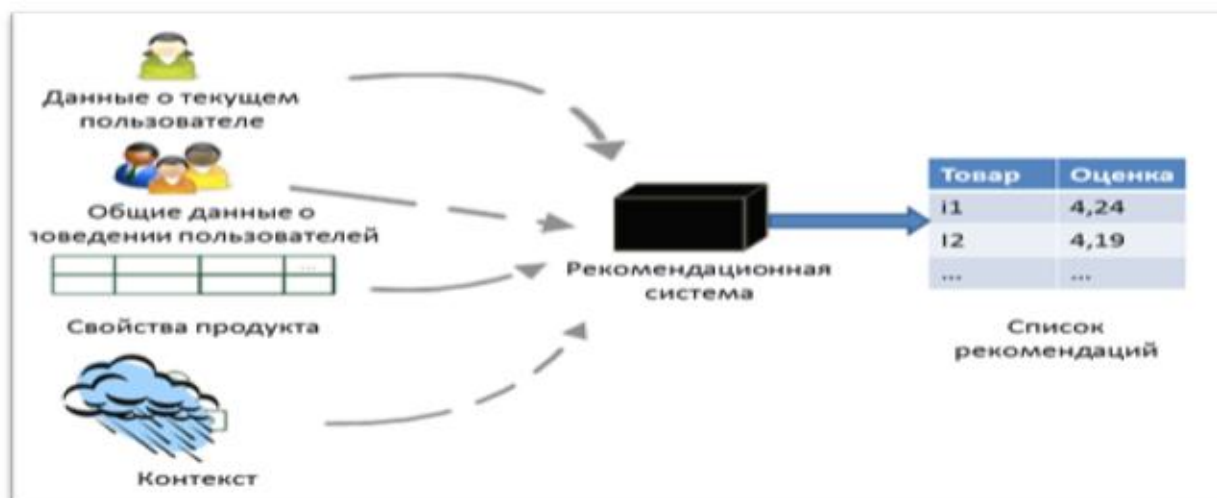

Figure 1.5. How the recommender system works

2. Data analysis. The collected data is analyzed using machine learning and artificial intelligence algorithms. Algorithms can be applied to identify similarities between learners, identify successful learning strategies, and find similar tasks or exercises.

3. Building a student profile. Based on data analysis, the system creates a profile of each student, including their preferences, strengths and weaknesses, knowledge level and needs. This profile serves as the basis for personalized recommendations.

4. Generation of recommendations. Based on the student's profile, the system generates personalized recommendations and exercises. Recommendations may include selecting specific lessons, topics, or activities that best suit the needs and interests of the student.

5. Feedback and adaptation. In the process of using recommendations, the system collects feedback from the student, analyzes his reaction and the results of completing tasks. This information helps system to improve guidance and adapt to changing student needs and progress.

The introduction of a recommender system in the process of teaching the Russian language allows creating a more personalized and effective learning, taking into account the individual needs and preferences of each student. Recommendations based on the analysis of data and the experience of other students help to increase motivation and achieve better results in learning the Russian language.

Sequence analysis. These algorithms allow the system to analyze the sequence of student actions in the learning process, such as responses to tasks, task completion time, and other parameters. By analyzing this data, the system can identify patterns (schema-image) and trends in the progress of the student and make appropriate decisions, for example, make adjustments to the educational program.

The implementation of the recommender system in the process of teaching the Russian language may also include an analysis of the student's sequences of actions. This means that the system analyzes data about the student's progress, including student responses to tasks, time to complete tasks, and other parameters.

Sequence analysis algorithms allow the system to identify patterns and trends in student behavior. For example, the system may determine that a student excels in certain types of tasks but struggles with others. Or the system may notice that the student is spending too much time on certain tasks, which may indicate a need for more intensive training in that area.

Sequence analysis allows the system to gain a deeper understanding of a student's progress and individual needs. Based on this analysis, the system can make decisions and offer appropriate recommendations. For example, if the system notices that the student often makes mistakes in a certain grammatical structure, it can offer additional exercises or explanations aimed at eliminating these mistakes.

Sequence analysis can also help the system adapt to changing student needs and progress. If a student is progressing too fast or too slow, the system can automatically adjust the difficulty level of the assignments or suggest additional materials to keep the learning pace at an optimal pace. Thus, sequence analysis is an important part of the implementation of the recommender system in the process of teaching the Russian language in military academic lyceums. It allows the system to more accurately assess a student's progress and offer personalized recommendations and corrections, facilitating more effective learning.

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