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ARTIFICIAL INTELLIGENCE IN ADAPTIVE TEACHING A FOREIGN LANGUAGE

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Abstract. At first, the humanities were the basis of human education in academic disciplines. The humanities are known to be the study of modern and ancient languages, literature, philosophy, history, human geography, law, politics, religion, and art. The humanities were the methods of research and development in ancient Greece to improve human potentials and teach them and new generations to adapt to their society.

Today we are faced with a new value of this term because of the fast development of our planet. This term evolves into digital humanities, which means the same thing as traditional humanities but with new methods added. In digital humanities, we can use computing systems, so this area allows us to have an intersection between computing (digital) technologies and the discipline of the humanities.

With their development, electronic education is becoming a promising direction, meeting the needs of modern society as much as possible, the hallmarks of which are working with a large amount of information on a mobile/electronic medium, and analyzing it in a short time.

There is no doubt that thanks to a single informational, intellectual, educational environment, people interested in gaining knowledge are already virtually interacting (this is not only about teachers

sharing their pedagogical findings and research results, but also about virtual assistants - chatbots), stimulating development electronic, distance, mobile education.
The article highlights the issues of adaptive learning in digital humanities and a mixture of modern language teaching methods and AI. It proposes the classification of teaching strategies that have five categories: direct teaching, indirect teaching, interactive teaching, independent study, and experiential learning. Besides, the authors study the best AI programming languages, helping the educators implement them into the teaching process and offer the use of chatbot as a virtual assistant for students and a teacher.
The post-graduate students of the Institute of the Foreign Languages (RUDN University) learn Academic English with the help of chatbots, which help to improve grammar and skills in research paper writing, expand professional vocabulary and develop professional competences of Ph.D. students.
Keywords: Artificial Intelligence (AI), foreign language teaching (FLT), digital humanities (DH), chatbot

Introduction

Digital humanities (DH) are one of the recent studies, which gives the humanities the possibility to develop and preserve all their education in an artificial memory. This artificial memory can be used to translate words or to find synonyms thanks to the internet and discoveries. Scientists and researchers use DH to think differently and to use computing methods to understand the traditional humanities, human history, languages, and other areas of studies (That Camp Paris, 2011). Today books are talking about using digital humanities in classrooms. Roberto Casati, director of education at EHESS, director of research at CNRS and François Taddei, director of the Center for Interdisciplinary Research (CRI), mentions that pedagogical sciences are changing. If people don't follow this change, then they will be obsolete (France stratégie, 2017). We can't walk against the technologies and the development of our world, so we must change our methods to integrate this new

type of thinking. One of the challenges is the AI (Artificial Intelligence).
The birth of the AI starts from 1921 in a play called "Rossum's universal robots" written by the author Karel Capek, this play represents robots that can think. From 1950 it was the scientists' turn to imagine intelligent machines. The British mathematician Alan Turing published an article named "Computing Machinery and intelligence" to discuss how to know if an intelligent machine approaches human intelligence, today this method knows as "Turing test." In summer 1956, American scientists John McCarthy, Marvin Minsky, Nathaniel Rochester, Claude Shannon in Dartmouth college for a conference for the first time employed the term "Artificial Intelligence" to descript intelligence machines. Today all social networks are connected, and the AI helps to recognize the data of any information, for example, facial recognition system, handwriting recognition, machine learning, and auto-evaluation. Still, we can mention a new type of solution with the development of Deep Learning. A computer is not at all smart. It serves merely to transform inputs into outputs with programs' help. A definition can be in this way: an application is a complex calculation performed by a computer to stupidly solve any problem for a given subject in our case; the question is about a universal method for adaptive teaching to a foreign language.
Indeed, without intelligence, our program will not be so useful, so that why we are talking about AI. AI is the set of theories and techniques used to create machines capable of simulating human intelligence. In this case, we can talk about machine learning (Fig. 1). Machine learning is the liaison between performance, task, and experience. We can speak of learning algorithms, and there three most common methods: Supervised Learning, Unsupervised Learning, and Reinforcement Learning.

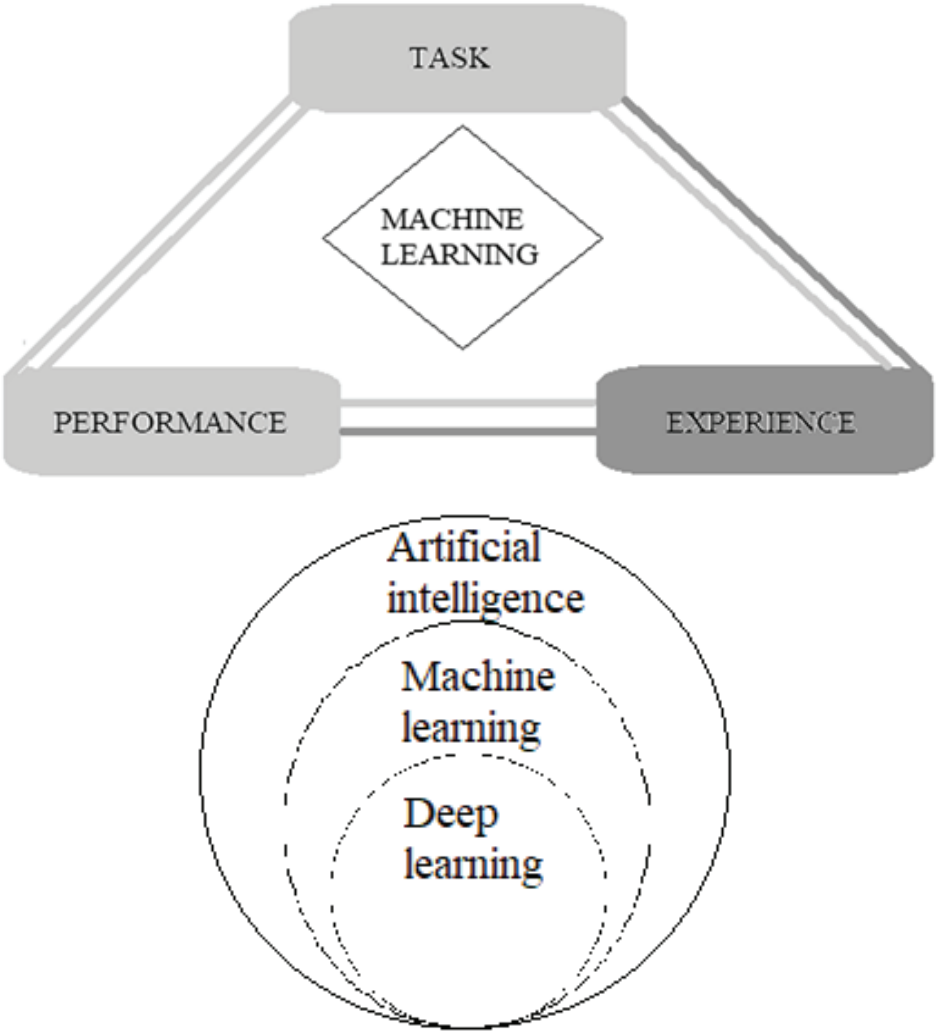


Figure 1. Machine Learning algorithm

Adaptive learning is one of the most challenging areas of AI application in education.

The level of knowledge of those who begin to study science is different. And the abilities, life experiences, and motivations are different. Therefore, the program always seems too easy for some of the students; it is unbearably difficult for others. It is convenient for someone to perceive the material in one form—someone in another. As a result, the teacher always faces an insolvable task: how to ensure acceptable performance of low-achieving students and not discourage the desire of advanced students to learn accessible material?

Adaptive technologies should solve this problem. It is assumed that artificial intelligence will track the progress of each student and either align the educational course with the student's ability or inform the teacher that the students had a poor grasp of the lesson or they have successfully internalized the curriculum.

Experiments to introduce such programs into a previously conservative learning process are conducted by many advanced technology companies. However, the Russian market is still dominated by the view of high-tech education as utterly remote, preserving the paradigm of the linear course: an online course.

One of the few platforms that allow online course creators to use the capabilities of adaptive technologies using artificial intelligence is Stepik. But there are less than ten courses on it.

Elements of adaptive technologies are also used in projects for children and adolescents, such as logic like, which offer programs for the development of logical thinking, in the project for self-training for the Unified State Exam Examiner.

Experiments on the introduction of adaptive technologies in training are carried out in commercial projects in the field of HR. Today the most noticeable are Competentum, Ispring, E-mba on the Russian market. There are attempts to implement AI when teaching languages (Skyeng, Lingualeo, Websoft), as well as programming and design (Geekbrains, Netology).

The purpose of the study is to research programming languages for AI and machine learning for selecting the FLT techniques and creating a virtual assistant based on Artificial Intelligence.

Methodology

With the development of digital technologies, the opportunities and needs of education have increased many times, as a result of which all participants in the educational process need to be able to use and apply them in practice. A change in the paradigm of the educational process has led to a rethinking of its structure and applied technologies, highlighting the informational ones (Chernyshkova N.V., 2016).

Since the distinctive features of modern higher education are flexibility, efficiency and practical orientation of learning, such a knowledge exchange marks the transition from the traditional reproductive transfer of knowledge to a creative form of learning with its innovative methods, structures, means (Martynenko E.P., 2016; Moor P.K. & Moor S.M., 2016). It became possible also thanks to the advent of Web 2.0 technologies. The latter has become a prerequisite for the emergence of smart education, flexible learning that operates in an interactive educational environment using content from around the world that is in the public domain.

The teacher's task is to intensify the use of electronic resources, to ensure their reasonable and justified use, which, in turn, requires continuous improvement of his qualifications, the development of the so-called "innovative individual trajectory of a foreign language teacher" (Kozarenko O.M., Karsenty T., 2019 : 132).

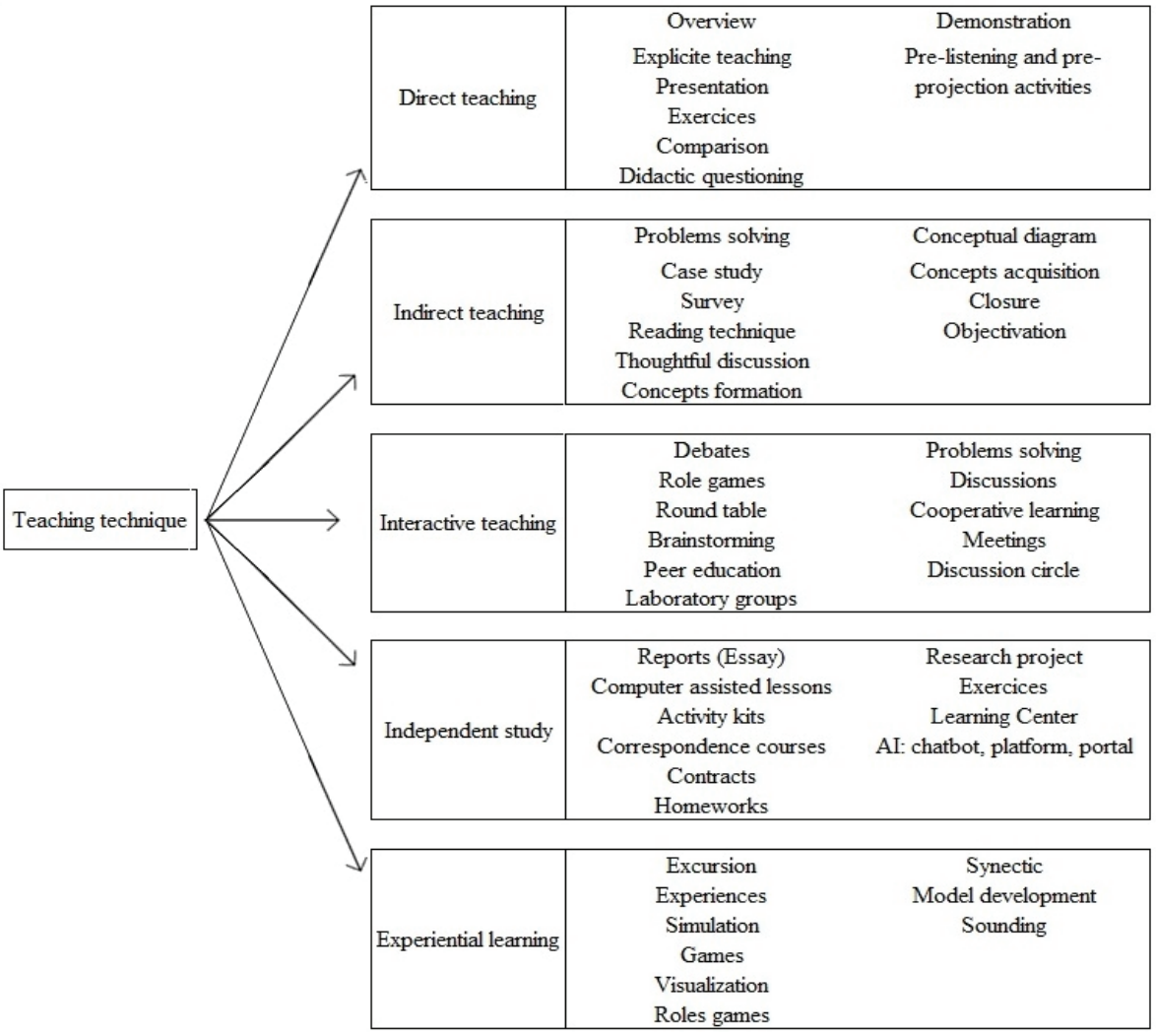
According to the figurative definition of the German philosopher and linguist Wilhelm von Humboldt (1767-1835), language is the soul of the people; it captures its entire 'national character.' Learning a language is to create in students' minds, a character of a foreign national, and to be that character (Shukin and Florova, 2015).

There is a better understanding today of what constitutes effective teaching and learning. A better understanding of teaching and learning styles provides a better appreciation of what is the most appropriate way to meet the individual needs of students. Educators also realize that learning is an interactive process and that students need to actively participate in practical, useful, relevant, and challenging tasks if they are to respond to the challenges posed by the curriculum successfully. Today if we take an example from our university RUDN University to learn a foreign language, it looks like traveling to other countries without crossing borders.

At RUDN University, there are many international students from Asia, Europe, Latin America, and Africa (for example, Arabs,

Spaniards, Turkic people, Chinese people, Persians, and other people). Every year the direction of RUDN University organizes concerts in the International culture center (Interclub). Teaching strategies determine the approach a teacher will take to achieve specific goals.

Table 1. **Teaching strategies**



The procedures are classified into five categories: direct teaching, indirect teaching, interactive teaching, independent study, and experiential learning. Teaching methods are used to create learning environments and to specify the nature of the activity in which the teacher and the learner will participate during the lesson. A given method is often associated with a given strategy, but some techniques can also be found in a variety of approaches.

Table 1 presents the most common teaching methods taken from each of the five teaching strategies.

What students learn depends not only on what they are taught but also on how an educator teach them, their level of development, interests, and experience. It means that we must, therefore, choose very carefully the methods used to present materials.

Results

Artificial intelligence is an extensive and growing technological field. It means that AI can be implemented in different programming languages in foreign languages learning, and teaching. However, it is still challenging to determine which of the languages should be used for AI development. The best AI programming languages, helping the educators implement them into the teaching process, are shown in Figure 2.

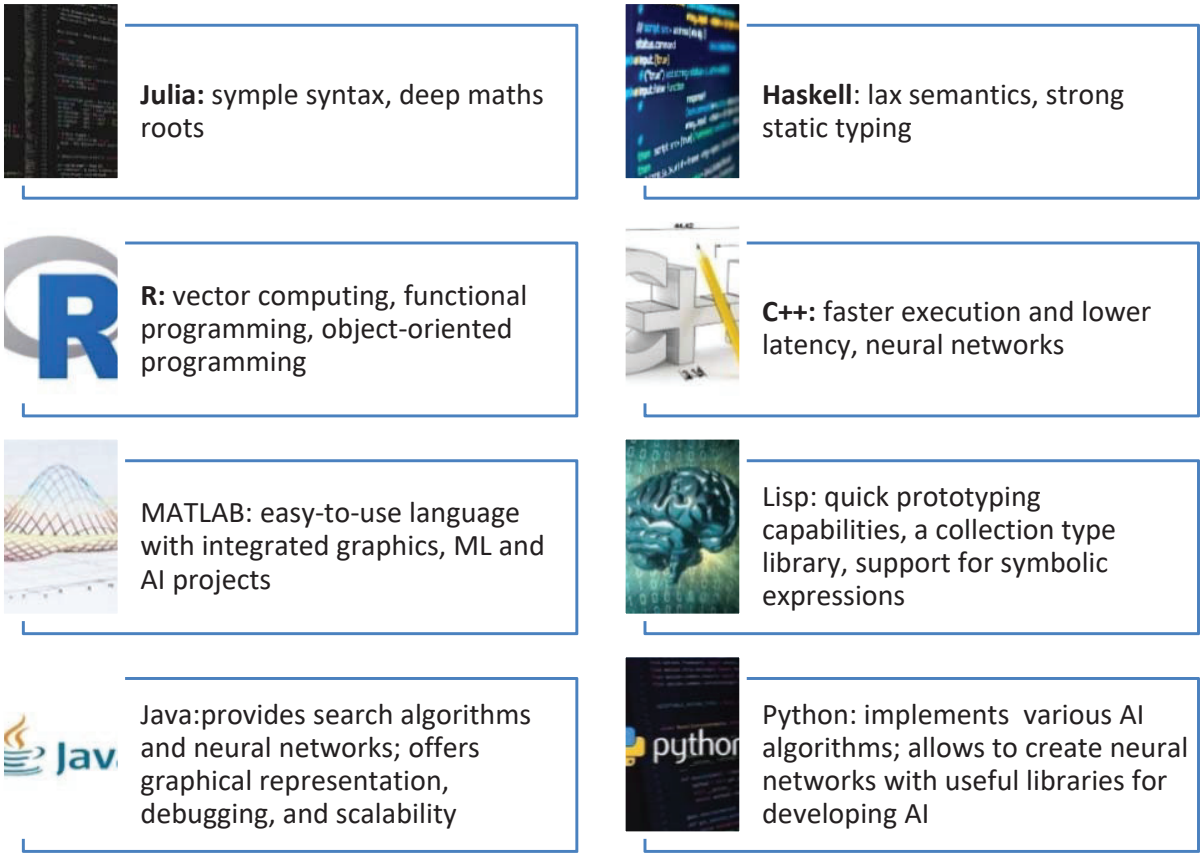


Figure 2. AI programming languages in teaching process

Julia is a high-level, general-purpose programming language developed by Jeff Besancon, Stefan Karpinsky, Viral B. Shah, and Alan Edelman in 2009. It does not include the need for a separate compilation by speed. Simple syntax and deep mathematical roots make Julia a friendly. It supports machine learning platforms (TensorFlow, MXnNet), includes the foundation for machine learning and AI (Flux), mathematical syntax, and a programming language for data analysts.

As a result, Julia offers the perfect way to express algorithms. This language will be useful for applications in bioinformatics, astronomy, physics, chemistry, engineering, data science.

Haskell is a standardized, universal programming language designed with lax semantics and strong static typing. Initially developed in 1990, Haskell is mainly used in academia, although there are some examples of its use in industry and commerce for projects in AT&T, Facebook, Google, and others. Haskell is based on the semantics of the Miranda programming language and allows efficient libraries to implement AI algorithms.

R is a unique programming language and a free, open-source software environment for statistical computing and graphics. Developed in 1993 by Ros Ithaca and Robert Gentleman, R is widely used among data analysts to develop statistical software and data analysis. It is also used in new-style artificial intelligence and general machine learning. R provides several such kinds of programming, as vector computing, functional programming, and object-oriented programming, and is considered as one of the leading standard languages for finance, biology, and medicine.

MATLAB (Matrix Laboratory) is a proprietary programming language developed by MathWorks. It is an easy-to-use language with integrated graphics that allows developers to visualize data and get meaningful information from them. MATLAB is the right choice for machine learning and AI projects for visualization and matrix execution tasks.

Lisp is one of the oldest programming languages available but remains one of the preferred AI development options because of

its unique features. It is a practical mathematical notation for computer programs. Thanks to its flexibility, Lisp offers quick prototyping capabilities, a collection type library, support for symbolic expressions, and more.

Java, a popular programming language, can also be considered the right choice for AI programming, as it provides search algorithms and neural networks. It is an easy-to-understand language that offers graphical representation, debugging, and scalability. Its portability makes it the preferred implementation for various applications based on the availability of different built-in types.

Python is a widely-used programming language and can be used to implement AI because of the seamless and straightforward structure that it offers. The Python syntax makes it easy to implement various AI algorithms, which also reduces development time compared to other available programming languages. Using Python allows users to create neural networks with a set of useful libraries that can be used to develop AI. Other features include the ability to test algorithms without the need to implement them. It also supports object-oriented, functional, and procedural-oriented programming styles.

That is why the postgraduate department of the Institute of Foreign Languages at RUDN University preferred this program in chatbots' creating for Academic English. The chatbot has subsystems: choice of journal, cover letter, glossary, assessment & testing, personal message from Ph.D. students to the teacher (Feedback). The subsystem Glossary includes professional terms in three areas of the postgraduate studies: Education and Pedagogical Sciences, Linguistics and Literary Studies, and Psychological Sciences. Three groups of Ph.D. students write glossaries and dialogues for chatbots.

Discussion

The use of AI tools in teaching a foreign language helps to increase students' interest in the subject and enhance their speech and cognitive activity, develop independent work skills and work in a team, and effectively form all types of speech activity. Systematic

work with computer tasks creates stable, independent work skills for students, which leads to a reduction in the time to complete standard tasks and allows them to increase the time to complete creative work.

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