print(f"t-statistic: {t_statistic:.3f}, p-value: {p_value:.3f}")

After running this code in Google Colab, we get the solution shown in Figure 1:

```
Index(['PagesViewed', 'TimeOnSite', 'Purchase', 'TrafficSource_Direct',
       'TrafficSource_Search', 'DeviceType_Mobile'],
      dtype='object')
Index(['PagesViewed', 'TimeOnSite', 'Purchase', 'TrafficSource_Direct',
       'TrafficSource_Search', 'DeviceType_Mobile'],
      dtype='object')
t-statistic: -0.055, p-value: 0.956
```

Fig 1: Program Result

Conclusion: the model predicts purchases with high accuracy and stability. Methods of mathematical statistics confirmed the significance of features and the validity of the model.

Mathematical statistics plays a fundamental role in training artificial intelligence models. Without its methods, it would be impossible to competently process and analyze data, build interpretable and stable models, and reasonably evaluate their effectiveness. At the intersection of statistics and AI, an entire scientific field is being formed - statistical learning, which is becoming increasingly relevant in the context of growing volumes and complexity of data.

The future of AI is closely linked to the development of statistical methods. Their implementation in machine learning allows not only to increase the accuracy of algorithms, but also to enhance their reliability, which is especially important in critical areas - healthcare, justice, finance [5]. Thus, a deep understanding of statistics is becoming an integral part of the training of specialists in the field of artificial intelligence.

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MOBILE LEARNING APPS WITH ARTIFICIAL INTELLIGENCE: OPPORTUNITIES FOR SELF-LEARNING

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Abstract:

The article discusses modern mobile learning applications using artificial intelligence (AI) technologies and their potential for self-learning. The key technologies underlying such solutions, including machine learning, natural language processing, and adaptive algorithms, are analyzed. Special attention is paid to the possibilities of personalizing the learning process, as well as the advantages and limitations of using AI in an educational environment. It also highlights the importance of being a support tool rather than a substitute teacher in the context of the digital transformation of education.

Keywords:

artificial intelligence, mobile applications, self-learning, personalization, digital education

Introduction

Modern education is being transformed by digital technologies, and especially artificial intelligence (AI). One of the fastest growing areas is the use of AI in mobile learning applications. These applications are becoming more than just an auxiliary tool, but full-fledged tools for individual independent learning, accessible anytime and anywhere.

The emergence of intelligent mobile solutions opens up new opportunities for both students and the general public seeking continuous education. From language trainers to complex software platforms, AI adapts content to the needs of a specific user, increases motivation, accelerates learning, and even identifies weaknesses in knowledge [1].

The purpose of this article is to consider how exactly AI is implemented in mobile learning applications, what technologies underlie the personalization of the learning process, and analyze the advantages and limitations of such systems in the context of independent learning.

Materials and methods

- Technological foundations of mobile AI applications. Most modern mobile learning applications with AI use the following technologies:
- machine learning (ML) - analyzes user behavior in order to adapt tasks and recommend materials;
- natural language processing (NLP) - allows you to build a dialogue with the user, check texts, translate, formulate tasks;
- speech and image recognition is especially relevant in applications for learning languages and exact sciences;
- neural networks are used for a comprehensive analysis of educational activities and predicting results.

Results

A typical example is the Duolingo app, which tracks user progress, offers adaptive tasks, and uses game elements to maintain user interest.

Key AI features:

- Personalization of courses depending on the level of knowledge;
- A repetition system based on the error rate;
- Visual and voice prompts based on machine learning;
- Gamification mechanisms (points, levels, achievements) are based on engagement analysis.

Practical effect: users who attend classes daily demonstrate sustainable progress in understanding the language. According to the company, the average activity increases by 27% after the implementation of AI prompts.

More advanced solutions, such as Photomatch, use voice and visual interfaces in combination with AI. Photomatch allows students to solve math problems by pointing the smartphone camera at the equation. The system recognizes the text and, with the help of AI, provides a step-by-step explanation of the solution.

AI components:

- Image and formula recognition;
- Generate step-by-step solutions with explanations;
- Analysis of common errors and recurring patterns;

Practical effect:

- The application is actively used in schools, especially in distance learning. According to reviews, 80% of users note an improvement in understanding of mathematics due to visual explanations.
- The ELSA Speak application is used to improve pronunciation in English. It uses AI speech recognition models and deep phonetic analysis.

Features:

- Accurate comparison of the user's pronunciation with native speakers;
- Personalized recommendations for improving pronunciation;
- Voice and I-assistant for learning dialogues;
- Practical effect: students who use ELSA Speak for 10-15 minutes a day show a significant improvement in articulation and confidence in oral speech. The application is actively used in language schools in Asia and Europe;
- Analysis shows that AI applications really improve the quality of self-study due to: high content adaptability; instant feedback; the ability to self-regulate the pace of learning; motivation through gamification and personalization;
- Practical cases confirm that AI systems in mobile applications can successfully complement or even partially replace classical learning, especially in the context of remote access to educational resources [2];

Personalization as a guarantee of effective self-study. AI systems are able to individualize learning at a deep level:

- the pace of material is adjusted automatically: the application complicates or simplifies tasks based on previous answers;
- repetitions and reinforcement are based on the forgetting curve (for example, the spaced repetition method);
- the choice of training format (video, test, dialogue, game) can be customized to the user's preferences;
- motivational mechanisms: both analyze engagement and offer cues, rewards, or pauses at the right time.

Thus, mobile applications with AI act not just as a platform, but as an intelligent mentor that can flexibly respond to the needs and learning style of each individual.

Discussion

Advantages:

- 24/7 availability and mobility;
- personalized approach to learning;
- high interactivity and engagement;
- instant feedback and adaptation.

Limitations and problems:

- risk of technology dependence and loss of critical thinking skills;
- insufficient humanization: AI cannot completely replace a teacher;
- unequal access to technology in different regions;
- issues of privacy and security of user data.

Mobile learning applications using artificial intelligence technologies are radically changing the approach to independent learning, making it more flexible, accessible and personalized [3]. Such applications allow learning at a convenient time, at a comfortable pace and taking into account the individual characteristics of the user.

However, despite the obvious advantages, it is important to remember that AI is a tool, not a full-fledged alternative to traditional education. The future lies in a harmonious combination of technology and pedagogical principles, where AI will complement, not replace, the human approach to learning [4].

Conclusion

Thus, the development of mobile learning platforms with AI is not just a technological advance, but also an important step towards more accessible, high-quality and personally-oriented education.

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MODEL OF ADAPTIVE PLATFORM BASED ON ARTIFICIAL INTELLIGENCE FOR PERSONALIZATION OF EDUCATIONAL PROCESS

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With the rapid development of digital technologies and the introduction of artificial intelligence