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ИСПОЛЬЗОВАНИЕ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА ДЛЯ ПОВЫШЕНИЯ ФУНКЦИОНАЛЬНОСТИ ВЕБ-САЙТОВ
USING ARTIFICIAL INTELLIGENCE TO ENHANCE THE FUNCTIONALITY OF WEBSITES

Аннотация. *В статье рассматривается использование искусственного интеллекта с целью улучшения возможностей разрабатываемых веб-сайтов. Анализируются области применения ИИ в веб-разработке, а также инструменты и технологии реализации.*

Abstract. *The article discusses the use of artificial intelligence to improve the capabilities of websites being developed. It analyzes the areas of application of AI in web development, as well as the tools and technologies for implementation.*

Ключевые слова: *Искусственный интеллект, веб-разработка, персонализация, чат-бот, генерация контента, API.*

Keywords: *Artificial intelligence, web development, personalization, chatbot, content generation, API.*

Acceleration and simplification of the website development process using artificial intelligence (AI) technologies is a reality of the modern web industry. This approach has a large number of supporters who emphasize significant savings in time and resources for obtaining adaptive and personalized digital products. However, there are also skeptics who point to the “black box” problem: the opacity of AI code generation makes it difficult to assess its safety, reliability and compliance, which creates potential risks for projects. The solution may be to find a balance between efficiency and control in order to minimize risks.

The most promising ways to use artificial intelligence (AI) are not only the automation of website development, but also personalization, content generation, intelligent search, analytics, forecasting, marketing, etc. Each of these areas has its own implementation technologies.

One of the most interesting tools in modern web development and digital marketing is AI personalization. At the same time, with the help of machine learning and neural network algorithms, user behavior and interests are analyzed. To do this, they use data from multiple sources: purchase history, search, content views, time on page, demographic information, etc. Based on the identified patterns, they form unique user characteristics, determine their motivation and predict actions. As a result, AI creates recommendations, generates messages in order to offer relevant actions, goods, services, content. A similar approach is widely used on many trading platforms, for example, Amazon [1]. Here, personalized recommendations have been used for several decades both during purchases and for messages in letters, which significantly increases sales. On the Amazon website, personalized recommendations are presented on the Home page in the "We recommend you" section. On the product page: "People who bought this also bought..." collaborative filtering is implemented, introduced back in the early 2000s. To identify jointly purchased goods, an association rules algorithm is used, which is applied in the basket in the "Don't forget to buy with this" section.

There are various services and libraries to simplify the development of recommender system models, for example:

Amazon Personalize is an AWS service that helps create personalized recommendations [2] without deep knowledge of machine learning, based on algorithms similar to those used by Amazon itself.

TensorFlow Recommenders (TFRS) is an open source library for building recommender systems. Based on TensorFlow and Keras. Provides flexible tools for creating models in Python [3]. Opportunities for using AI using JavaScript are provided by Tensorflow.js, Brain.js [4].

Apache Mahout is a framework for distributed machine learning that runs on top of Hadoop or Spark and is suitable for large-scale recommender systems [5].

Also, AI personalization can be used to create texts, images, and interfaces based on user behavior. For example, changing banners depending on the time of day or geolocation, adapting navigation and functionality, when we see a simplified interface for new visitors and an expanded one for regular ones.

Personalization trends that respond to criticism of AI and minimize risks include:

Explainable AI, which increases the transparency of algorithms so that you can understand how and why the system makes decisions. For example, the system does not simply issue a recommendation to "buy this product", but also explains: "because you looked at similar ones" or "this is based on popularity among users with the same profile." This allows developers to audit the logic and increase user trust.

Edge AI, which increases privacy and speed by processing data on the user's device. Personal data (for example, behavior history on the site) does not leave the device, and the AI model works locally.

An example of a dynamic form of AI personalization is chatbots, where needs are clarified during the dialogue in order to offer the most suitable options. Using the user's responses, an interactive personalization scenario is formed and the number of options is reduced. Modern bots often use the RAG architecture (Retrieval-Augmented Generation) and combine several parameters to respond: order history, views, status, subscription and other data from the CRM, seasonal trends, weather, etc. The bot can offer to dress according to the user's geolocation data and weather API data. Unique responses can be created using LLM (Large Language Models), which take into account the tone and style of the dialogue, as well as implicit relevant parameters (for example, environmental friendliness for vegans). Bots can identify hidden needs through questions about negative experiences and take into account the immediate context and even analyze intonation to determine the urgency of a request, use computer vision to process photos uploaded by the user, synchronize the dialogue in the messenger with the site. For voice search, integration with Siri, Alexa, and the use of the Speechnotes API are possible.

The basis of any chatbot is NLP (Natural Language Processing), which allows you to understand the user's request and generate a response. The following tools can be used, for example: Dialogflow (Google), Rasa for developing complex bots, Microsoft Bot Framework, ChatGPT (OpenAI) [6].

To generate text content, you can use neural network models of the transformer type, such as GPT-4 and GPT-5. Shopify Magic, Hootsuite, Jasper AI, Synthesia, Descript [7] are suitable for describing products, news, SEO articles. Trends include developing descriptions for images and AI filters for checking disinformation.

Generation of video content and images is based on text queries and for practical implementation can be used, for example: Midjourney, Kandinsky, Shedevroom for creating images, Lensa AI for their processing

and personalization, Runway ML, Synthesia for creating and editing videos. Possible risks of using AI are copyright compliance, verification of created content, compliance with ethical standards and principles.

A common option for expanding the functionality of a website is to use a built-in translator. This can be implemented using ready-made automatic translation services (cloud platforms Linguise, GTranslate) or customizable solutions with the ability to configure for a subject area (API Google Cloud Translation, DeepL API, OpenNMT [8]).

AI can be used to predict user behavior, for example, their outflow, analyze trends, product popularity, as well as identify suspicious activities, fraud (Google Analytics 4, IBM Watson).

In addition to the above, AI can be used to generate designs (for example, Adobe Firefly, Figma + AI), optimize loading and auto-finish the interface.

According to the Founders Forum report for 2025, the use of AI provided a net increase of 12 million jobs worldwide, with significant differences depending on region and skill level [8]. By 2026, more than 95% of interactions with customer support will be carried out using artificial intelligence. The enormous opportunities that AI provides developers today allow them to achieve high results in a short period of time. At the same time, the use of AI does not replace creativity and increases the need for control over ethical aspects.

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