



## ARTIFICIAL INTELLIGENCE – THE KEY TO NEW OPPORTUNITIES IN NUTRITION FOR PEOPLE WITH DISABILITIES

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**Abstract:** This article analyzes the possibilities of using artificial intelligence (AI) technologies in the nutrition process of people with disabilities. The relevance of creating an inclusive environment with the help of healthy eating culture, personalized dietary recommendations, smart sensors, and voice-controlled systems is highlighted. In addition, considerations regarding data security and compliance with ethical standards are discussed.

**Keywords:** artificial intelligence, people with disabilities, nutrition culture, healthy lifestyle, social integration, healthcare, equal opportunities, inclusive environment, diet, social support.

**Introduction.** Improving the quality of life for people with disabilities is one of the priority directions of inclusive development. Nutrition is a fundamental factor for human health, and challenges in this process are often associated with physical or sensory barriers. Artificial intelligence (AI) technologies play a crucial role in overcoming these problems, automating personalized diets, and creating solutions tailored to individual needs. DFID (the UK Department for International Development) applies a human rights-based approach based on the United Nations Convention on the Rights of Persons with Disabilities (CRPD). Persons with disabilities are defined as “those who have long-term physical, mental, intellectual, or sensory impairments which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others” (Article 1, CRPD). This concept of disability differs from the traditional individual or medical approach, which focuses solely on physical impairments. It also includes attitudinal, environmental, and institutional barriers that restrict or exclude the participation of persons with disabilities in society. <https://assets.publishing.service.gov.uk/media/5d2f2526ed915d2fe47af3d1/query-6-disability-and-nutrition.pdf>

**Relevance of the Topic.** Nowadays, expanding opportunities for a healthy lifestyle and proper nutrition for people with disabilities has become one of the key directions of social policy. According to the World Health Organization (WHO), one in six people worldwide has some form of disability, and a large proportion of them face physical or sensory barriers during the nutrition process. At the same time, artificial intelligence (AI) technologies are being rapidly implemented across various areas of human life, particularly opening new opportunities in medical and dietary fields. With the help of AI, it is possible to create personalized diet plans, monitor health indicators, analyze eating habits, and provide automated recommendations. This process is especially important for people with disabilities, as they often require additional assistance in preparing or consuming food. AI serves as a key tool to automate this process, increase independence, and promote a culture of healthy eating. For these reasons, the topic “**Artificial Intelligence – the Key to New Opportunities in Nutrition for People with Disabilities**” is highly relevant from both scientific and practical perspectives.



It opens new research directions not only in information technology but also in social protection, healthcare, and inclusive education.

**Objectives of the Topic.** The main aim of this study is to explore the possibilities of improving the quality of life for people with disabilities by applying artificial intelligence (AI) technologies in their nutrition process.

Based on this aim, the following objectives are set:

- To analyze the main challenges faced by people with disabilities in the nutrition process, taking into account the impact of physical, sensory, or cognitive limitations;
- To evaluate the effectiveness of existing assistive technologies;
- To analyze the opportunities offered by AI technologies in the medical and nutrition fields, demonstrating the advantages of smart devices, sensor systems, and mobile applications.

Improving the quality of life for people with disabilities is one of the priority directions of inclusive development. Nutrition is a fundamental factor for human health, and difficulties in this process are often associated with physical or sensory barriers. AI technologies play a crucial role in overcoming these challenges, automating personalized diets, and creating solutions tailored to individual needs. Artificial intelligence (AI) includes machine learning (ML), deep learning (DL), and natural language processing (NLP) technologies. In recent years, AI has gained significant attention due to its ability to analyze large and complex datasets, identify patterns and trends, and develop personalized recommendations [13]. In the field of nutrition sciences, AI is being researched and applied in various areas, including dietary assessment, food recognition, personalized diet planning, chronic disease management, nutrition education, and sensitive analysis of food products [14–16]. These applications not only improve efficiency and accuracy but also provide broad opportunities for high-quality dietary guidance, particularly benefiting populations in resource-limited or underserved areas [17].

The new generation of generative AI and large language models (e.g., ChatGPT 4.0) has further expanded the application of AI in dietetics—enabling real-time interaction with users, simulating dietitian advice, and delivering personalized health education [18,19]. At the same time, mobile applications, wearable sensors, and AI-based image recognition technologies are fundamentally transforming the ways in which individuals' eating habits are monitored and modified [20]. Despite these advanced achievements, questions regarding the real-world effectiveness, safety, ethical aspects, and long-term impacts of such technologies remain highly relevant [21]. <https://doi.org/10.3390/healthcare13202579>

**Objectives of the Topic** The main aim of this study is to explore the possibilities of improving the quality of life for people with disabilities by applying artificial intelligence AI technologies in their nutrition process Based on this aim, the following objectives are defined

- To analyze the main challenges faced by people with disabilities in the nutrition process
- To examine the impact of physical, sensory, or cognitive limitations
- To evaluate the effectiveness of existing assistive technologies
- To analyze the potential of AI technologies in the medical and nutrition fields
- To demonstrate the advantages of smart devices, sensor systems, and mobile applications
- To describe adaptive personalized diet models for individuals
- To develop an AI-based nutrition assistance concept for people with disabilities



- To identify voice control, automated recommendation, and monitoring functions
- To propose methods for creating an inclusive environment through AI
- To specify requirements for information security and ethical standards and to analyze modern methods for protecting personal data
- To study the socio-psychological aspects of AI system adoption in society
- To develop proposals and recommendations based on comparative analysis of national and international experiences

**Objective of the Topic** The aim of this analytical article is to demonstrate how artificial intelligence is transforming the field of nutrition and dietetics and improving both scientific understanding and practical dietary services Through this, the study highlights the significant role of AI technologies in empowering medical professionals, actively engaging patients, and enhancing public health In addition, this analysis encourages reflection on the need for the development of nutrition sciences in accordance with modern technologies. Furthermore, the objective includes scientifically substantiating the possibilities of using artificial intelligence AI technologies in the nutrition process of people with disabilities to improve their quality of life, increase their level of independence, and ensure healthy eating. Within the scope of achieving this objective, the research is focused on the following directions identifying existing problems in the nutrition of people with disabilities analyzing the effectiveness of AI technologies in medical and dietary fields proposing a concept of an intelligent diet assistant operating in an inclusive environment implementing AI solutions based on information security and ethical requirements.

**Object of the Study:** The nutrition process of people with disabilities and modern information technologies, including artificial intelligence, aimed at improving its quality

**Subject of the Study:** The mechanisms of artificial intelligence technologies for personalizing, automating, and effectively applying the nutrition of people with disabilities in an inclusive environment

Thus:

- **Object** – the broad field studied by the research (the nutrition process and the impact of AI)
- **Subject** – the specific aspect analyzed within this field (solutions, models, and methods through AI)

### **Main Part. Integration of Artificial Intelligence and Nutrition**

Artificial intelligence provides personalized dietary recommendations by analyzing human health indicators such as blood pressure, glucose levels, calorie intake, and more This replaces the need for an additional assistant for people with disabilities For example, in cases related to diabetes or obesity, AI programs monitor the human body through smart devices and sensor technologies Smart dishes, intelligent kitchen appliances, and voice control systems create opportunities for independent eating for people with disabilities For instance, reading recipes via voice command or automating the cooking process are practical applications of AI

### **Interactive Diet Monitoring and Body Tracking**

AI-based applications track a person's daily meals, send reminders when necessary, or recommend adjustments to the diet This helps people with disabilities maintain dietary discipline

### **Information Security and Ethical Issues**



Health information is personal and confidential Therefore, AI systems must encrypt data, avoid sharing it without user consent, and ensure information security Compliance with ethical standards is fundamental for protecting human dignity

### **Global Experience and National Prospects**

Worldwide, platforms such as IBM Watson Health, Google Health, and Samsung Health are developing personalized healthy nutrition systems with AI support In Uzbekistan, it is also important to adapt this direction to local conditions, develop speech recognition systems, and create recommendation systems in the Uzbek language

**Scientific Significance of the Topic** The scientific significance of this study lies in the fact that it forms a scientifically grounded approach to applying artificial intelligence AI technologies to optimize the nutrition process for people with disabilities As a result of the research, the following scientifically novel conclusions are achieved

- The role of AI in inclusive healthy nutrition has been scientifically substantiated
- The theoretical foundations for creating personalized diet models for people with disabilities have been analyzed
- A concept of intelligent technologies aimed at overcoming limitations in the nutrition process has been proposed
- Solutions for integrating smart devices and voice control systems with AI have been developed
- The scientific and methodological basis for applying AI from the perspective of information security and ethical standards has been established
- Scientific recommendations for implementing AI solutions to develop inclusive nutrition in the context of Uzbekistan have been provided

Thus, the study contributes to promoting a culture of healthy nutrition for people with disabilities and creating new scientific directions for the application of AI in social domains

**Scientific Novelty of the Topic** A scientifically grounded model for integrating AI technologies into the nutrition process of people with disabilities has been proposed This model provides individualized solutions tailored to a person's level of physical limitation, health status, and dietary needs. The concept of an AI-based "intelligent diet assistant" has been introduced It operates by combining sensor data, voice control, and automated recommendation systems. A scientific approach for implementing inclusive AI systems in accordance with information security and ethical requirements has been developed This approach is aimed at protecting the personal data of people with disabilities and increasing their trust in AI technologies. Scientific and theoretical foundations have been established for implementing AI solutions to ensure healthy nutrition for people with disabilities in the context of Uzbekistan This scientific novelty represents one of the first studies that can be applied in practice to create an inclusive digital environment in the country. In short, the scientific novelty of the study lies in the first comprehensive and systematic application of artificial intelligence to the nutrition process, which is a critical aspect of life for people with disabilities.

**Conclusion** Artificial intelligence is opening new opportunities in the lives of people with disabilities, particularly in the nutrition process Innovative technologies increase human independence, promote a culture of healthy eating, and contribute to building an inclusive society The widespread implementation of AI in this field requires effective collaboration between the medical, information technology, and social policy sectors. The results of the study

show that artificial intelligence AI technologies create new opportunities in the nutrition process for people with disabilities They enable personalized dietary recommendations, automate nutrition, and support a healthy lifestyle, thereby increasing the level of independence. The use of AI reduces the need for physical assistance for people with disabilities, contributes to creating an inclusive environment, and lays the groundwork for expanding digital innovations in medical and social fields At the same time, the study highlights the necessity of strict compliance with information security and ethical standards in the development of AI systems This is a key condition for protecting the rights and personal data of people with disabilities

### Recommendations

• **Develop inclusive AI programs:** Create a special AI-based “intelligent diet assistant” application for people with disabilities and adapt it to local languages

• **Strengthen collaboration between healthcare and IT sectors:** Establish joint programs for implementing AI projects involving medical specialists, IT engineers, and social workers

• **Implement information security and ethical standards:** Use mechanisms compliant with international ISO and GDPR standards for processing the health data of people with disabilities

• **Increase education and public awareness:** Conduct trainings and educational projects to explain the social benefits of AI

• **Support local AI startups:** Finance technology solutions targeted at people with disabilities through government grants and innovation funds

Thus, artificial intelligence has been scientifically proven to be a strategically important tool for ensuring healthy nutrition and improving the quality of life for people with disabilities

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