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USING AI FOR FITNESS DEVELOPMENT

Abstract. The relevance of this study stems from the rapid increase in the popularity of fitness technologies and the necessity to understand their impact on people's health and behavior. The research aim is to explore the influence of Artificial Intelligence (AI) on the development of fitness applications, analyzing major trends and innovations in this field. Research methods included the analysis of scientific literature, user surveys, and statistical data processing. The study's findings, dedicated to the use of AI in developing fitness applications, highlight the significant impact of these technologies on increasing physical activity levels and enhancing users' quality of life. An analysis of motivational factors revealed that accessibility, personalization, interactivity, and the ability to conduct in-depth analysis and track progress are key aspects that facilitate the integration of fitness apps into daily life. Among the most popular apps utilizing AI were EvolveAI, Fitbod, FitnessAI, and others, offering a wide range of features from personalized workouts to integration with wearable devices. The study also points to AI's potential in increasing user motivation and engagement, promoting the development of healthy behavioral habits, and improving emotional well-being. However, it's important to consider potential risks related to privacy and ethics in using personal data. In conclusion, AI in fitness apps plays a pivotal role in creating personalized training approaches, providing a deep understanding of user needs and physical capabilities, which in turn contributes to improved physical health and overall well-being. The practical significance lies in the potential use of the findings to optimize the functionality of fitness apps, enhancing their effectiveness and user experience.

Keywords: artificial intelligence, fitness apps, motivation, personalization, behavioral habits.
Formulation of the problem. The advent of the Industrial Revolution and the shift from manual labor to mechanization led to a decrease in physical labor as machines took over many tasks previously done by humans. This transition resulted in a reduced level of physical activity and the spread of sedentary lifestyles. Consequently, there emerged a need for physical exercise to maintain health, which became one of the factors behind the development of the first gyms in countries such as Denmark, Sweden, and Germany.

In Germany, gyms were established with specialized equipment for training specific muscle groups through repetitive movements, marking the beginning of modern gyms. In Sweden, fitness programs were adapted to individual needs and medical conditions. The United Kingdom reinforced the idea that sports help reduce stress and began to promote intensive workouts. Denmark saw the introduction of the first fitness instructor training courses.

From the 20th century onwards, the concept of "fitness" rapidly evolved with the introduction of the first exercise machines that helped people stay in shape. The fitness industry, initially accessible only to the aristocracy due to its high cost, became widely popular. During World War II, the link between fitness, muscular and cardiovascular endurance was recognized, leading to the creation of exercises aimed at improving muscle flexibility and endurance.

Today, we see gyms and running parks with equipment for various muscle groups everywhere [9]. However, a significant portion of the population prefers to exercise not in open spaces or gyms but at home using fitness apps.

In 2021, the fitness app market experienced significant revenue growth, reaching $5.35 billion, which is a 54% increase compared to the previous year. This growth was partly driven by increased interest during quarantine and new subscription models tested by some apps. MyFitnessPal topped the list of the most profitable fitness apps in 2020 and 2021, with total fitness app downloads exceeding 400 million in 2021.

Moreover, the unique number of fitness app users reached approximately 385 million in 2021, showing significant interest in this segment [2].

Considering these trends, it can be predicted that the fitness technology market will continue to evolve by 2025, taking into account the growing demand for personalized and convenient fitness and health tracking solutions. Innovations in artificial intelligence and machine learning could lead to the development of even more tailored and effective training programs, providing a personalized approach for each user. Further integration of fitness and health technologies is also expected, leading to comprehensive platforms that support the overall well-being of users.

Analysis of recent research and publication. The application of Artificial Intelligence (AI) in the development of fitness apps is well-documented in the scientific literature, considering the significant body of research focused on this topic. The study by Burbach et al. [1] illustrates how technology can bridge the gap
between intention and actual behavior regarding the use of fitness apps, offering innovative approaches to user motivation. Meanwhile, Huang, Chen, and Zhou [4] explore the impact of motivational displacement on the intention to continue using gamified fitness apps, combining quantitative and qualitative research methods to open new perspectives on user behavior. Kuru's [6] work analyzes how AI can facilitate changes in user behavior through the content of fitness apps, emphasizing the need to develop content that considers the psychological aspects of user engagement. Li et al. [7] focus on understanding user needs and the factors that motivate the use of fitness apps, which is key to developing effective and beneficial applications.

In addition to scientific articles, the research utilized expert literature and publications in contemporary online outlets such as "Business of Apps," "Rare Connections," "ISSA Online," "Medium," "MakeUseOf," and "LinkedIn." These sources shed light on current aspects of AI use in fitness apps, including the latest trends, case studies, and commercial successes, making the information more relevant and practical for a broader audience.

Despite the abundance of available sources, there is a noticeable lack of a systematic analysis that would integrate various studies and perspectives into a unified, coherent picture. Therefore, an analytical effort was undertaken to group, systematize, and analyze information to present it in the context of fitness app development using AI. This allows for a better understanding of the current state of the industry, identifying key trends, and determining future research directions.

**The purpose of the research.** The research aims to investigate the impact of Artificial Intelligence (AI) on the development of fitness apps, analyze the main trends and innovations in this field, and assess the effectiveness of AI in motivating users to engage in regular physical exercises. To achieve this objective, the following tasks were undertaken during the research: analyze the factors that motivate people to use fitness apps; explore the application and impact of Artificial Intelligence in fitness apps; evaluate the transformation of fitness apps with the integration of Artificial Intelligence.

**Research results.**

**Preconditions and Reasons for Using Fitness Apps.** Users engaged in fitness and utilizing apps experience significant shifts in their approach to physical activity and overall lifestyle.

In the USA, health-conscious individuals generally have a positive attitude towards fitness apps and often incorporate them into their daily routine. A 2023 study indicates that key factors for using these apps include app cost, effectiveness, personal belief in a healthy lifestyle, self-confidence, the presence of conducive conditions, and the desire for enjoyment. These aspects collectively help understand why approximately 55% of people choose to use such apps to support their health [10].

The primary reasons for using apps, according to 2023 research [6], are increased motivation towards a healthy lifestyle and engagement in fitness activities...
as a form of physical activity. Major changes in users who actively use fitness apps include:

- Increased Motivation: Apps with adaptive workouts and personalized goals boost users' motivation for regular physical exercises.
- Enhanced Engagement: Interactive elements and feedback from apps maintain high user engagement, making workouts more captivating.
- Improved Physical Fitness: Regular workouts through apps contribute to better physical fitness, endurance, and flexibility of users.
- Improved Health: Balanced fitness programs tailored to individual needs can reduce the risk of chronic diseases, including cardiovascular issues.
- Behavioral Habit Changes: Fitness apps employing behavior change techniques help users form healthy habits, such as regular workouts and balanced nutrition.
- Emotional Well-being: Engaging in sports, reinforced by positive experiences using apps, can enhance mood and reduce stress levels.
- Community and Support: Many fitness apps offer access to communities where users can share experiences, receive support, and motivation.

The use of fitness apps, especially those based on Artificial Intelligence like Freeletics, underscores the importance of integrating advanced algorithms and psychological theories to create effective and motivating training experiences. Such apps take into account psychological aspects of motivation and behavior change, leading to significant improvements in users' physical and emotional well-being[6].

While it may seem that fitness app usage only offers benefits, in reality, drawbacks exist. These include developing an unhealthy obsession or underestimating other important health aspects, such as nutrition and sleep. Consumer intentions to use health and fitness apps are significantly influenced by technological interventions, playing a significant role in this process [10].

**AI Application in Fitness Apps.** In the rapidly evolving fitness app market, Artificial Intelligence (AI) has found its application, making fitness apps not only more personalized but also more convenient and efficient (Table 1).

In 2024, the landscape of AI fitness apps has evolved to offer highly personalized and diverse benefits to users, enhancing the personal fitness experience significantly. These apps provide a range of features including AI-driven personalization, compatibility with wearable technology, and user-friendly interfaces. They cater to a variety of fitness needs, from daily workout personalization and nutritional advice to ensuring correct exercise techniques with advanced technologies. Additionally, the emphasis on mental health and community support in some apps highlights a holistic approach to fitness. The integration of real-time feedback, extensive workout libraries, and scientifically-backed insights into these platforms demonstrates the pivotal role of AI in making fitness more accessible, engaging, and tailored to individual goals, underscoring a shift towards a more inclusive and technologically advanced fitness culture.
## AI Fitness Apps in 2024 and Their Benefits [3, 11]

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<tr>
<th>№</th>
<th>App Name</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>1</td>
<td>EvolveAI</td>
<td>AI personalization, daily workouts and check-ins, unique user interface, nutritional recommendations</td>
</tr>
<tr>
<td>2</td>
<td>Fitbod</td>
<td>Customized workout programs, active progress tracking, compatibility with wearable devices, extensive exercise library</td>
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<tr>
<td>3</td>
<td>FitnessAI</td>
<td>Personalized workouts, user-friendly interface, 3D animations for correct exercise techniques</td>
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<tr>
<td>4</td>
<td>Freeletics</td>
<td>Personalization, AI coach, comprehensive training and nutrition plans, 350+ exercises</td>
</tr>
<tr>
<td>5</td>
<td>Aaptiv</td>
<td>Highly personalized fitness plans, extensive library with over 7000 guided workouts, community support</td>
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<tr>
<td>6</td>
<td>Hyperefficient</td>
<td>Workout time optimization, scientifically-backed training insights, personalization for individual user goals</td>
</tr>
<tr>
<td>7</td>
<td>Zing</td>
<td>Custom coaching, immediate feedback, use of computer vision to ensure proper form</td>
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<tr>
<td>8</td>
<td>Infigro</td>
<td>Personal and interactive training with real-time feedback, guided meditations, extensive library of expert-designed workouts</td>
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<tr>
<td>9</td>
<td>Cult.fit</td>
<td>Unique features for mental health improvement, targeted workouts and meditations, inclusion of group classes, home workouts, and gym sessions</td>
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The integration of Artificial Intelligence (AI) into fitness programs marks a pivotal moment in the personalization and efficiency of health and wellness strategies. Let's explore the key features that most AI-powered fitness apps possess.

- **Personalized Training Schedules**: AI algorithms excel in synthesizing vast amounts of data about physical activity, physiological indicators, and individual user preferences, enabling the creation of highly personalized training plans. This approach optimizes the load and types of exercises according to the user's body characteristics, goals, and capabilities, ensuring maximum training efficiency [13].

- **Adaptability and Flexibility**: AI can analyze user feedback in real-time, adapting training programs based on progress, fatigue, and personal responses. This adaptability ensures continuous improvement of the fitness experience, preventing declines in motivation and risks of overtraining [13].

- **Optimization of Recovery**: AI facilitates the development of effective recovery strategies, integrating rest periods and recommendations for rehabilitative exercises into training plans. This minimizes the risk of injuries and promotes rapid recovery of the muscular system [13].

- **Enhancement of Motivation**: AI can utilize gamified elements and interactive challenges to increase user motivation. Individual achievements, goals, and rewards can encourage users to maintain regular workouts and an active lifestyle [13].

- **Analytics and Feedback**: AI algorithms allow for a detailed analysis of training data, providing users with feedback on their progress, exercise effectiveness, and potential areas for improvement. This contributes to educating users about fitness and health, increasing their self-awareness and autonomy in achieving fitness goals [13].
Integration with Wearable Technologies: Smart trackers and other wearable devices collect data on activities, sleep patterns, and vital signs, allowing AI to provide deeper insights into users' overall health and well-being [12].

Nutrition and Diet Planning: AI develops personalized nutrition plans by analyzing dietary preferences, restrictions, and health goals of users, optimizing their overall well-being [12].

Virtual Coaches and AI Coaching: Virtual coaches based on AI offer users a personalized coaching experience, adapting to individual progress and adjusting workouts to match the level of physical fitness [12].

Gamification in Fitness Apps: Gamification, combined with AI, transforms fitness into an exciting and interactive experience, allowing users to participate in challenges, earn rewards, and compete with friends, adding a fun element to their workouts [2].

Transforming fitness apps using artificial intelligence. The use of Artificial Intelligence (AI) in fitness apps can significantly transform the approach to workouts and the personalization of fitness plans. However, like any technology, it has its strengths and weaknesses. Let's consider a SWOT analysis of using AI in fitness apps.

<table>
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<tr>
<th>Strengths</th>
<th>Weaknesses</th>
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<tr>
<td>Accuracy and Personalization: AI can analyze large volumes of data about the user, including past workouts, exercise preferences, and physiological indicators, to create highly personalized training plans.</td>
<td>Limitations in Decision-Making: Despite the ability to process large amounts of information, AI cannot fully replace human experience and intuition, especially in complex or non-standard situations.</td>
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<td>Minimization of Human Errors: The use of algorithms reduces the risk of errors that can occur with human workout planning.</td>
<td>Dependence on Data Quality: The accuracy of AI recommendations heavily depends on the quality and volume of input data. False or biased data can lead to incorrect conclusions.</td>
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<td>Automation of Routine Tasks: AI can automate many aspects of workout management, such as tracking progress, workout reminders, and responding to frequent user queries.</td>
<td>Lack of Empathy: AI cannot provide emotional support or motivate users in the way a human can.</td>
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<th>Opportunities</th>
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<td>Integration with Other Technologies: Combining AI with other technologies, such as wearable devices, can improve data collection and provide a deeper analysis of users' physical activities.</td>
<td>Data Privacy Concerns: Collecting and analyzing large volumes of personal data can raise questions about data privacy and security.</td>
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<td>Enhancing Online Workouts: AI can enhance online workouts by providing personalized advice in real-time and adapting training plans based on user progress.</td>
<td>Technical and Ethical Challenges: The application of AI can pose technical challenges related to system integration, as well as ethical dilemmas, such as in the use of decision-making algorithms.</td>
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<td>Attracting New Users: Innovative AI-based fitness apps can attract new users looking for personalized and convenient solutions for maintaining their health.</td>
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Note: Compiled by the author [5,8]
The integration of Artificial Intelligence (AI) into fitness applications brings enhanced personalization and efficiency, with notable strengths such as precise, data-driven workout plans and minimized human errors through automation. However, challenges persist, including the dependency on high-quality data and the lack of emotional support AI provides compared to human coaches. The potential for growth lies in merging AI with wearable tech and improving online workout experiences, attracting a wider audience. Nonetheless, concerns over data privacy and ethical considerations of AI use remain significant hurdles. Balancing these aspects is crucial for the future development of AI-powered fitness solutions.

Conclusions. The research into the reasons and prerequisites for using fitness apps has revealed a significant positive impact on changing users' approach to physical activity and lifestyle. It was found that the main motivational factors encouraging people to integrate these apps into their daily lives include accessibility, a personal desire to lead a healthy lifestyle, confidence in their abilities, the presence of favorable conditions for training, and the desire for enjoyment from the process. In particular, the widespread application of AI-based apps significantly enhances user motivation, engagement in the training process, physical fitness, overall health, and fosters the development of healthy behavioral habits and a positive emotional state. However, potential drawbacks such as the possibility of developing an unhealthy fixation on workouts or underestimating other aspects of a healthy lifestyle should be considered.

Among fitness apps using AI, EvolveAI, Fitbod, FitnessAI, Freeletics, Aaptiv, Hyperefficient, Zing, Infigro, and Cult.fit stand out. These programs offer key features such as workout personalization, integration with wearable devices, in-depth progress analysis, and interactive exercises, providing a comprehensive approach to improving physical health.

Artificial intelligence in fitness apps opens new horizons for personalized workouts, optimizing plans, and considering the individual needs of users. However, it is crucial to balance between innovations and maintaining privacy and ethical standards in the use of personal data.

References:


